Final Report on the

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

(Amended)

Southern Research Study Number: 13026.01.01

April 1, 2011

Amended Final Report on the

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

To:

American Chemistry Council
1300 Wilson Avenue
Arlington, VA 22209

and

ToxStrategies, Inc.
23501 Cinco Ranch Blvd.
Katy, TX 77494

Southern Research Institute
2000 Ninth Avenue South • 35205
P.O. Box 55305
Birmingham, AL 35255-5305

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

(Amendment 2)

General:

- Page numbers shown below refer to the pages in the report as first amended.
- Page numbers throughout the report and in the Table of Contents have been updated to reflect the addition of the Amendment.
- A new table, Table 2, was added to the main body of the report. This caused all subsequent tables in the main body of the report to be renumbered (e.g., the former Table 2 became Table 3). All references to table numbers in the Table of Contents and throughout the report, and the headers of the tables themselves, have been amended to reflect the new table numbers.

Amendment Page: The header of the amendment page used for the first amendment of this report has been revised from "Amendment" to "Amendment 1."

Page 4 (Executive Summary): The discussion of the 8-OHdG, 8-isoprostane, and cytokine results has been amended to reflect the revised Results sections of the report and the Immunology Contributing Scientist Report.

Page 17 (Sample Collection): A sentence was added to note that the weights of the oral cavity and duodenum samples collected for biochemical analysis are presented in Table 2. All subsequent references to table numbers following the new table have been revised

Page 25 (8-Isoprostane): This paragraph has been amended to clarify that the 8-isoprostane levels measured were free 8-isoprostane rather than total 8-isoprostane, and to discuss the impact on interpretation of the 8-isoprostane data in terms of its relationship to SDD exposure.

Page 25 (8-OHdG): A sentence was added to note that the 8-OHdG data are presented in terms of ng 8-OHdG/mg DNA. This had no effect on interpretation of the data, as there were still no apparent effects of treatment on 8-OHdG levels when normalized to DNA concentration.

Page 25 (Cytokines): This paragraph has been amended to remove reference to statistical significance for the apparent change in IL-1β, and to remove reference to other inter-group differences in cytokine levels that were not considered to be related to SDD exposure.

Appendix G (Immunology Contributing Scientist Report): This report has been revised as shown in the second amendment page of that report.

Submitted by:

Charles D. Hébert 4-1-11

Charles D. Hébert, Ph.D., D.A.B.T. Date

Study Director

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

(Amendment 1)

General:

- Page numbers shown below refer to the pages in the original report
- Page numbers throughout the report and in the Table of Contents have been updated to reflect the addition of the Amendment.
- Minor typographical errors have been corrected throughout the report.
- The original report referred to “dose groups.” However, strictly speaking, the values of 0, 0.3, 4, 14, 60, 170, and 520 mg/L refer to concentrations, not doses. Therefore, except as noted, throughout the report the term “dose groups” has been revised to “exposure groups” or simply “groups.” If replacement of the term “dose groups” would have resulted in amendment of a Contributing Scientist Report that would not otherwise have to be amended, the replacement was not made.

Page 3 (Executive Summary): For clarification, the second sentence in the second paragraph of the Executive Summary has been amended to clarify that the observed effects of SDD on body weight were considered to be of no toxicological or biological significance.

Page 4 (Executive Summary): For clarification, a sentence has been added to the paragraph describing the serum iron results to note that, as stated in the Clinical Pathology Contributing Scientist report, biologically relevant effects on serum iron at higher levels of SDD cannot be excluded.

Page 4 (Executive Summary): Because no test article-related effects were seen at 14 mg/L or lower, the phrase “no observed adverse effect level (NOAEL)” has been amended to read “no observed effect level (NOEL).”

Pages 6-7 (Table of Contents): The page numbers in this section have been revised as a result of other changes noted below.

Page 9 (Study Schedule and Personnel): Brenda Yamamoto and Christy Price have been added to the Personnel list.

Page 15 (Section 2.3.7, Gene Expression Analysis): The name of the Principal Investigator has been added to the last sentence of the paragraph.

Page 23 (Section 2.3.12, Statistical Analysis): The statistical analysis of the body weight, serum iron, ferritin, transferrin, 8-isoprostane (oral and duodenum), and 8-OHdG (oral and duodenum) data was re-run using a consultant statistician. This section has been revised accordingly.

Page 26 (Section 3.5, Food and Water Consumption): The first sentence of the third paragraph in this section has been revised to indicate that the water consumption value for Group 7 was statistically significantly different from control through Day 91, rather than Day 85 as stated in the original report.

Page 37 (Table 2): The header of this table has been corrected to show that the units were "mg/L" and to remove "Avg." from the column of actual values, since those values were from single, not replicate analyses.

Page 47 (Table 6): Because of errors in the data set used for the original statistical analysis of the water consumption data, the analysis of these data was re-run for four time periods using corrected data sets. This table has been revised accordingly.

Appendix G (Immunology Contributing Scientist Report): This report has been revised as shown in the amendment page of that report.

Appendix H (Pathology Contributing Scientist Report): This report has been revised as shown in the amendment page of that report.

Appendix J (Statistics Contributing Scientist Report): This report has been revised as shown in the amendment page of that report.

Submitted by:

Charles A. Hébert 2-3-11

Charles D. Hébert, Ph.D., D.A.B.T. Date
Study Director

Executive Summary

Title: 90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

Study No.: 13026.01.01

Sponsor: American Chemistry Council (Arlington, VA)

Sponsor's Representatives: ToxStrategies, Inc. (Katy, TX)
Mark R. Harris, Ph.D.; Laurie C. Haws. Ph.D., D.A.B.T.

Contractor: Southern Research Institute (Birmingham, AL)

Study Director: Charles D. Hébert, Ph.D., D.A.B.T.

Sodium dichromate dihydrate (SDD) is a form of hexavalent chromium [CR(VI)] that is produced as a by-product of a variety of industrial processes and that is found as a contaminant in drinking water. In recent studies conducted by the National Toxicology Program (NTP)[1] exposure to SDD in drinking water for 2 years was found to be associated with an increase in tumors of the oral epithelium in rats and of the intestinal epithelium in mice. The objective of this study was to evaluate the toxicity and potential mechanisms of action of SDD administered in drinking water to mice for 90 days. Female B6C3F1 mice approximately 5-7 weeks of age on the first day of dosing received drinking water containing SDD at concentrations of 0, 0.3, 4, 14, 60, 170, or 520 mg/L (equivalent to 0, 0.1, 1.4, 4.9, 20.9, 59.3, and 181.4 mg Cr/L, respectively). Formulations were available ad libitum from Day 1 through Day 8 or Day 91/92. These concentrations were similar to those used in the NTP studies with the exception of the 0.3 and 4 mg/L dose levels. The latter two concentrations were included in the current study to evaluate the mode of action at more relevant environmental exposure levels. One cohort of 25 mice/group was removed from study after 7 days of dosing (i.e., on Day 8), and was used for collection of samples for evaluation of histopathology, gene expression, reduced-to-oxidized glutathione ratio (GSH/GSSG ratio), or DNA-Cr adducts. The remaining mice were removed on Day 91 or 92, and samples were collected for evaluation of histopathology, iron status, gene expression, gene mutation, total chromium and iron content, and a variety of biochemical markers of oxidative stress and DNA-damaging potential including GSH/GSSG ratio, DNA-Cr adducts, 8–hydroxydeoxyguanosine (8-OHdG), 8-iso-prostaglandin F2α (8-isoprostane), and a panel of 22 cytokines/chemokines. Samples for analysis of GSH/GSSG ratio, DNA-Cr adducts, gene expression, gene mutation, and total chromium and iron content were shipped to Sponsor-designated laboratories for analysis, and the results of those evaluations are not presented in this report.

Exposure to SDD had no effect on food consumption or survival of mice at any dose level, and there were no clinical signs that were considered to be related to SDD administration. Administration of SDD was associated with minimal to mild deficits in body weight gain that were considered to be of no toxicological or biological significance, and by generally lower water consumption for mice in the 170 and 520 mg/L groups.

No test article-related macroscopic lesions were observed at necropsy. Test article-related microscopic lesions were observed in the duodenum and jejunum of animals in the 170 and 520 mg/L groups on Day 8 and in the 60, 170, and 520 mg/L groups on Day 91. On Day 8, microscopic lesions included minimal cytoplasmic vacuolization of the villous epithelium (duodenum and jejunum; 170 and 520 mg/L), minimal crypt epithelial hyperplasia (duodenum; 520 mg/L), and minimal villous atrophy (duodenum; 520 mg/L). The incidence of the cytoplasmic vacuolization was greater in the duodenum than in the jejunum in both exposure groups. On Day 91, microscopic lesions included crypt epithelial hyperplasia (duodenum and jejunum; 170 and 520 mg/L), histiocytic cellular infiltration of the villous lamina propria (duodenum; 60; duodenum and jejunum; 170 and 520 mg/L), cytoplasmic vacuolization of the villous epithelium (duodenum and jejunum; 60, 170, and 520 mg/L), multinucleated syncytia of the villous lamina propria (jejunum; 520 mg/L), villous atrophy (duodenum and jejunum; 170 and 520 mg/L), and apoptosis (jejunum; 520 mg/L). In the duodenum and jejunum, the incidence and severity of villous atrophy, and the severity of crypt epithelial hyperplasia and histiocytic cellular infiltration were greater in the 520 mg/L SDD than in the 170 mg/L SDD group. Histiocytic cellular infiltration, multinucleated syncytia, and apoptosis of the villous lamina propria appeared to result from prolonged injury to the villi in the small intestine. No test article-related microscopic lesions were observed in duodenum or jejunum of mice in the 0.3, 4, 14, and 60 mg/L groups on Day 8 or in the 0.3, 4, and 14 mg/L groups on Day 91. In addition, no test article-related microscopic lesions were observed in the oral mucosa of mice in any of the exposure groups on Day 8 or Day 91.

Exposure to SDD had no discernible effect upon stored iron as assessed by examination of Prussian blue-stained bone marrow smears, and no changes were observed in circulating ferritin or transferrin levels at any of the concentrations tested. Administration of 520 mg/L SDD was associated with a slight decrease in serum iron levels, although a clear dose-related impact on serum iron was not observed. However, biologically relevant effects on serum iron at higher levels of SDD cannot be excluded.

There were no apparent differences between the vehicle control group and SDD-treated groups for 8-OHdG levels in the oral cavity or duodenum. Omission of a hydrolysis step in the sample preparation process resulted in the 8-isoprostane assay measuring free rather than total 8-isoprostane levels. Because it has been reported that less than half of the total isoprostane in plasma is present in the free (non-esterified) form, the Study Director felt that the measurement of only free 8-isoprostane may not have completely reflected the impact of Cr(VI) exposure on levels of this molecule. The data suggested that there were no apparent inter-group differences in the levels of free 8-isoprostane for the oral cavity samples tested. The data also suggested that in the duodenum the levels of free 8-isoprostane in samples from Groups 6-7 may have been higher than those in the control and lower dose groups. However, the relationship of this apparent difference to Cr(VI) administration cannot be determined. Other than an apparent significant decrease in the inflammatory cytokine IL-1β in the duodenum in all groups treated with SDD, no other remarkable changes occurred in the serum, oral cavity, or duodenum of any of the groups with respect to the 22 cytokines/chemokines analyzed.

Due to the microscopic changes observed in the three highest exposure groups, the no observed effect level (NOEL) was determined to be 14 mg/L SDD under the conditions of this study.

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90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

Charles D. Hébert | 12-29-10

Charles D. Hébert, Ph.D., D.A.B.T. — Date
Study Director

GOOD LABORATORY PRACTICES DISCLAIMER

The study described in this final report was not conducted in strict compliance with the U.S. Food and Drug Administration (FDA) Good Laboratory Practice (GLP) Regulations (21 CFR Part 58), and neither the report nor the raw data were reviewed by the Southern Research Institute Quality Assurance Unit. However, the study was conducted according to the protocol and the applicable standard operating procedures, and all study procedures, data reporting, and recording were performed in a manner consistent with the standard of GLPs. The final report accurately reflects the raw data obtained during the performance of the study.

Charles D. Hébert 12-29-10

Charles D. Hébert, Ph.D., D.A.B.T. Date
Study Director

Study Schedule and Personnel

Study Dates:

Study Initiation:	February 22, 2010
Treatment Initiation:	March 2-6, 2010; March 9, 2010; March 15-19, 2010
Study Termination:	March 22-24, 2010; May 31–June 4, 2010; June 7, 2010; June 17-18, 2010
Study Completion:	December 29, 2010

Study Personnel:

Charles D. Hébert, Ph.D., D.A.B.T.	Study Director
Kellye K. Daniels, Ph.D., D.A.B.T.	Director, Toxicology
Brian E. LaGory, B.S.	Supervisor, Toxicology Animal Laboratory
Dora Marrisette, B.S.	Team Lead, Toxicology Animal Laboratory
Christy L. Price, B.S.	Supervisor, Preclinical Research Support (September 27, 2010 – Present)
Courtney R. Goslowsky, B.S., ALAT	Preclinical Research Coordinator
Gregory S. Gorman, Ph.D.	Director, Bioanalytical Sciences (February 22, 2010 – July 30, 2010)
Lori U. Coward, B.S.	Supervisor, Bioanalytical Sciences (February 22, 2010 – July 30, 2010)
Sanford Mendonca, Ph.D.	Manager, Bioanalytical Sciences (August 2, 2010 – Present)
Russell Carter, B.S., ASPC	Supervisor, Clinical Pathology (February 22, 2010 – September 17, 2010)
Brenda Yamamoto,Ph.D., D.A.C.V.P.	Clinical Pathologist
Sheila D. Grimes, D.V.M., Ph.D., D.A.C.V.P.	Senior Research Pathologist
Richard D. May, Ph.D.	Manager, Cell Biology and Immunology
James S. Toomey, D.V.M.	Attending Veterinarian/Manager, Animal Care and Research
D. Wayne May, RLATG	Supervisor, Animal Care
Nicola Richardson-Harman, Ph.D.	Consultant Statistician

1.0 Introduction

Sodium dichromate dihydrate (SDD) is a form of hexavalent chromium [CR(VI)] that is produced as a result of various industrial processes and is found as a contaminant in drinking water. In recent studies conducted by the National Toxicology Program[(1)] exposure to SDD in drinking water for 2 years was found to be associated with an increase in tumors of the oral epithelium in rats and of the small intestinal epithelium in mice. The objective of this study was to evaluate the toxicity and potential mechanisms of action of sodium dichromate dihydrate (SDD) administered in drinking water to mice for 90 days. A copy of the operational protocol and amendments are presented in Appendix A.

2.0 Materials and Methods

The Provantis application (Version 7; Instem Life Sciences Systems, Ltd.; Staffordshire, United Kingdom) was used for the direct on-line capture of most in-life and pathology data. In addition, Provantis will interface with the Cobas c501 Clinical Chemistry Analyzer (Version 04-02; Roche Diagnostics; Indianapolis, IN) for capture of serum iron data. Environmental monitoring of animal rooms (i.e., temperature/humidity and light/dark cycles) was performed using the Edstrom Watchdog System (Version 5.13; Edstrom Industries, Inc.; Waterford, WI). The remainder of the data was collected manually.

2.1 Test System

The 560 female B6C3F1 mice designated for use in this study were selected from 600 females received in two separate shipments from Charles River (Raleigh, NC). The mice were approximately 4-5 weeks of age when they arrived at Southern Research Institute (Southern Research) on February 23, 2010 and March 9, 2010. The animal identification number for each mouse consisted of a letter designating the exposure group, a letter designating the sex, and a unique number (see Comments on Study Data). The mice were uniquely identified by tail tattoo using the numerical portion, but not the letter portion, of the identification. The B6C3F1 mice are an accepted species and strain that is commonly used in preclinical pharmacological and toxicological evaluations of drugs used or intended for use in humans. On Day 1 of the study (3/2/10-3/6/10; 3/9/10; 3/15/10-3/19/10), the mice were approximately 6-7 weeks of age and weighed between 13.3 and 22.9 grams.

Irradiated NTP-2000 Wafers (Zeigler Bros.; Gardners, PA) were provided ad libitum to the mice during the pre-study and study periods. Analysis of the feed was conducted by the manufacturer. The results of the feed analysis are located in the facility records at Southern Research. Water (Birmingham public water supply), either undosed for control animals or containing SDD for treated animals, was supplied in amber glass water bottles. Teflon®-lined lids with stainless steel, double-balled sipper tubes were used. Water bottles were changed twice weekly on a 3-day/4-day schedule, or more frequently as needed. Samples of water from the animal facility were periodically analyzed, and the analyses were reviewed by Southern Research's Attending Veterinarian. No known contaminants were present in the food or water that would have been expected to interfere with or affect the outcome of the study. Water bottles and sipper tubes were labeled with color-coded zip ties to indicate the chemical and dose concentration.

The animals were group housed (5/cage) in solid bottom, polycarbonate cages on a stainless steel rack in a room maintained at a temperature of 68.4–78.0 °F and a relative humidity of 24.7%–76.5%. Excursions outside the desired temperature (69–75 °F) and humidity (35%–65%) ranges were brief in duration and did not adversely affect the health of the animals or outcome of the study (see Comments on Study Data). Fluorescent lighting provided illumination approximately 12 hours per day. Irradiated hardwood bedding chips (Sani Chips®; P.J. Murphy Forest Products, Corp.; Montville, NJ) was used as bedding material. No known contaminants were present in the bedding that would have been expected to interfere with or affect the outcome of the study. Cage size and animal care conformed to the guidelines of the *Guide for the Care and Use of Laboratory Animals*,[2] the U.S. Department of Agriculture through the Animal Welfare Act (Public Law 99-198), and to the applicable Standard Operating Procedures (SOPs) of Southern Research.

2.2 Test Article and Vehicle

2.2.1 Test Article: Southern Research received 27 bottles (10 grams/bottle) of Sodium Dichromate Dihydrate (SDD) (Lot No.05914AS; Southern Research Institute Lot No. E36/L-4; expiration date unknown) from Sigma-Aldrich, Inc. (Milwaukee, WI) on February 19, 2010. The test article was received at room temperature, and was stored at room temperature and protected from light. The Certificate of Analysis for the test article is presented in Appendix B.

2.2.2 Vehicle: The tap water used in this study was supplied from the Birmingham Water Works. Water was not stored prior to use in preparation of dose formulations.

2.2.3 Dose Formulation Preparation: The SDD dose formulations were prepared at concentrations of 0.3, 4, 14, 60, 170, and 520 mg/L in tap water (equivalent to 0, 0.1, 1.4, 4.9, 20.9, 59.3, and 181.4 mg Cr/L, respectively). A premix was prepared for each concentration by mixing the required amount of SDD in tap water until dissolution. The premix was then transferred to a mixing container which had been filled with a portion of the required amount of tap water (about two-thirds full). After the premix container was rinsed with tap water five times, and the rinseate was transferred each time to the mixing container, the contents of the mixing container were then stirred (~2 minutes). The mixing container was then brought to final volume and the formulations stirred an additional 5 minutes.

2.2.4 Dose Formulation Concentration Analysis: Samples of each batch of SDD dose formulations from the first, third, fifth, and last mixes were collected and shipped to Brooks Rand Labs (Seattle, WA) for concentration analysis. The concentration of SDD in the 4 mg/L formulation prepared during the fifth mix was found to be out of the ±10% range, and was not used. A replacement mix was prepared and analyzed, and was found to be within the required range. This replacement mix was used on the study. The results of these analyses were provided to Southern Research by the Sponsor. Because dose formulations of SDD in tap water are solutions, it was not necessary to demonstrate homogeneity of the formulations used in this study. Information on the laboratory performing the dose formulation analyses was included in the study records.

2.2.5 Formulation Storage, Stability, and Handling: When not in use, dose formulations of SDD and vehicle formulations were stored in sealed Nalgene carboys at room temperature protected from light. SDD has been shown to be stable for 42 days in dosed water formulations at a concentration of 41.8 mg/L, when stored under these conditions.[(1)] Reserve samples of each formulation, except for the 2-22-10 formulation mix, were retained and stored at approximately -70 °C. A reserve sample of the formulations for mix on 2-22-10 were not collected; however, samples for analysis were collected on 2-22-10 and shipped to a Sponsor designated lab, where the formulations were analyzed and found to be within acceptable specifications.

SDD formulations in tap water have been shown to be stable under simulated animal room conditions (i.e., ambient temperature in glass bottles) for at least 7 days.[2]

Disposition: Residual formulations remaining after dose administration was complete were disposed of as hazardous waste.

2.3 Experimental Design

2.3.1 Randomization and Group Assignment: Animals were assigned to their respective exposure groups using a computerized randomization procedure designed to yield comparable group mean body weights. The body weights required for randomization were determined during Week -1. After randomization, animals were assigned to treatment groups as indicated below. The correlation between animal identification numbers, cage numbers, dose levels, and analysis groups is shown in Table 1.

Treatment Groups

Group	Treatment	Conc. (mg/L)	Number of Animals							
			Toxicology and Histopathology		Biochemical Evaluations		Gene Expression Analysis		Mutation Analysis	Total Chromium and Iron Analyses
			Day 8	Day 91	Day 8	Day 91	Day 8	Day 91	Day 91/92	Day 92
1	Water	0	5 F	10 F	10 F	20 F	10 F	10 F	10 F	5 F
2	SDD	0.3	5 F	10 F	10 F	20 F	10 F	10 F	10 F	5 F
3	SDD	4	5 F	10 F	10 F	20 F	10 F	10 F	10 F	5 F
4	SDD	14	5 F	10 F	10 F	20 F	10 F	10 F	10 F	5 F
5	SDD	60	5 F	10 F	10 F	20 F	10 F	10 F	10 F	5 F
6	SDD	170	5 F	10 F	10 F	20 F	10 F	10 F	10 F	5 F
7	SDD	520	5 F	10 F	10 F	20 F	10 F	10 F	10 F	5 F

Color codes and letter designations were assigned to the exposure groups as follows:

Group	Treatment	Conc. (mg/L)	Letter Code	Color Code
1	Water	0	U	Black
2	SDD	0.3	L	Grey
3	SDD	4	I	Yellow
4	SDD	14	J	Orange
5	SDD	60	M	Purple
6	SDD	170	N	Blue
7	SDD	520	H	Red

2.3.2 Dose Procedure: In order to accommodate necropsy and sample collections on large numbers of mice the study was stagger-started, with Days 1 distributed as shown below.

Event	Sequence	Dates
Day 1 of Dosing	Toxicology/Histology Groups (Day 8 Necropsy, 5/group)	3/15/10
	Toxicology/Histology Groups (Day 91 Necropsy, 5/group)	3/2/10
	Toxicology/Histology Groups (Day 91 Necropsy, 5/group)	3/3/10
	Biochemical Evaluation Groups (Day 8, 10/group)	3/16/10
	Biochemical Evaluation Groups (Day 91, 10/group)	3/4/10
	Biochemical Evaluation Groups (Day 91, 10/group)	3/5/10
	Gene Expression Groups (Day 8, 10/group)	3/17/10
	Gene Expression Groups (Day 91, 10/group)	3/6/10
	Mutation Analysis Groups (Day 91, 5/group)	3/9/10
	Mutation Analysis Groups (Day 91, 5/group)	3/18/10
	Possible Future Analyses (Day 91, 5/group)	3/19/10

Mice in this study received the test article in their drinking water. The test article was available ad libitum to study animals 7 days per week (including holidays) for 7, 90, or 91 days (5/10 samples collected for mutation analysis from each group; samples collected for evaluation of total chromium and iron), as shown in the table above.

2.3.3 Clinical Observations: All animals were observed at least twice daily during the pre-study and study periods for signs of mortality and moribundity. Each animal was removed from its cage and examined for clinical signs of toxicity on Day 1 and weekly thereafter.

2.3.4 Body Weights: Each animal was weighed during Week -1 for randomization, on Day 1, weekly thereafter, and prior to scheduled euthanasia.

2.3.5 Food and Water Consumption: Quantitative food and water consumption were measured by cage weekly for each cage of animals throughout the study. Values were reported as an average consumption [(grams/animal/day) or (mL/animal/day), respectively] on a weekly basis. For comparison with values from NTP studies, water consumption values in the current study were also calculated as an average over the entire 13 weeks of dosing, corrected for the actual number of values at each time point. This transformation is documented in the study files and the transformed water consumption values are shown only in the Discussion of this report for comparison with values from NTP studies.

2.3.6 Mutation Analysis: Samples for mutation analysis were collected on Day 91 (5 animals/group) or Day 92 (5 animals/group). On each day, 5 mice/group were euthanized using CO_2, and samples of oral epithelium and duodenal epithelium were collected and snap frozen. These samples were stored frozen at approximately -80 °C or lower until they were shipped for analysis to a Sponsor-designated laboratory at the following address:

Dr. Travis O'Brien
Department of Pharmacology and Physiology
George Washington Cancer Institute
Washington, DC 20037

2.3.7 Gene Expression Analysis: Samples for gene expression analysis were collected on Days 8 and 91. On each of these days, 10 mice/group were euthanized using CO_2, and samples of oral epithelium, duodenal epithelium, and jejunal epithelium were collected. These samples were stored frozen at approximately -80 °C or lower until they were shipped for analysis to a Sponsor-designated laboratory (the laboratory of Dr. Timothy Zacharewski) at the following address:

Anna K. Kopec
Michigan State University
East Lansing, MI 48824

2.3.8 Biochemical Analyses:

Sample Collection: Samples for biochemical analyses were collected from 5 mice/group on Day 8 and from 10 mice/group on Day 91. On Days 8 and 91, 5 mice/group were designated as Subgroup A; on Day 91, the remaining 5 mice/group were designated as Subgroup B.

On Day 8 and on Day 91, 5 mice/group in Subgroup A were used for collection of samples for GSH/GSSG analysis and 5 mice/group in Subgroup A were used for collection of samples for DNA-Cr adduct analysis.

For collection of blood samples for GSH/GSSG analysis, each mouse was anesthetized with ketamine/xylazine (87 mg ketamine/kg; 13.4 mg xylazine/kg) injected intraperitoneally or with CO_2/O_2 by inhalation, and blood samples were collected from the retro-orbital sinus into tubes containing heparin as anticoagulant (Subgroup A). Samples were gently mixed by inversion and placed on ice. Within 15 minutes of collection, samples were centrifuged (approximately 5 minutes) for separation of plasma using a refrigerated centrifuge. Plasma was collected, and mixed in a 1:1 ratio with 2X Redox Quenching Buffer (RQB), to yield final concentrations of 20 mM HCl, 5 mM diethylenetriamine pentaacetic acid, and 1 mM 1,10-phenanthroline. The 2X RQB also contained 5% ultrapure grade trichloroacetic acid. Samples were snap frozen until they were shipped for analysis.

For collection of blood samples for cytokine analysis, each mouse was anesthetized with CO_2/O_2, and blood samples were collected from the retro-orbital sinus into serum separator tubes containing no anticoagulant (Subgroup B). The contents of the Subgroup B tubes were centrifuged to separate serum.

Immediately following blood collection, each mouse was euthanized using CO_2. Samples of oral epithelium, duodenal epithelium, ileal epithelium, and jejunal epithelium were collected from animals in Subgroup A. Tissues for GSH/GSSG analysis were immediately placed into tubes containing 0.5 mL 2X RQB on ice. The tissues were allowed to sit in RQB on ice for approximately 10-15 minutes to allow penetration of the buffer into the tissues, then the tubes were snap frozen in liquid nitrogen. Tissues for DNA-Cr adduct analysis were placed into tubes and snap frozen without buffer. A sample of oral mucosa and underlying muscle and an intact segment from the cranial end of the duodenum was collected from each animal in Subgroup B.

Plasma and tissue samples from animals in Subgroup A were stored frozen (at or below -70 ºC) until they were shipped to Sponsor-designated laboratories for analysis. Serum samples from animals in Subgroup B were divided into two aliquots, and the oral cavity and duodenum samples were weighed and split into two pieces longitudinally (if possible). Weights of the tissue pieces are shown in Table 2. Serum and tissue samples were snap-frozen upon collection, and were stored frozen (at or below -80 ºC) until they were used for analysis.

Biochemical Analysis, GSH/GSSG Ratio: One plasma sample, one sample of oral epithelium, one sample of duodenal epithelium, one sample of ileal epithelium (Day 91 only), and one sample of jejunal epithelium from each of 5 animals/group (Day 8 and Day 91 collections) in Subgroup A were shipped to a Sponsor-designated laboratory at the address shown below for analysis of GSH and GSSG, and subsequent calculation of GSH/GSSG ratios.

Dr. Howard G. Shertzer
Division of Environmental Genetics & Molecular Toxicology
University of Cincinnati Medical Center
Cincinnati, OH 45267-0056

Biochemical Analysis, DNA-Cr Adducts: One sample of oral epithelium, one sample of duodenal epithelium, one sample of ileal epithelium (Day 91 only), and one sample of jejunal epithelium from each of 5 animals/group (Day 8 and Day 91 collections) in Subgroup A was shipped for analysis to a Sponsor-designated laboratory at the following address:

Dr. Travis O'Brien
Department of Pharmacology and Physiology
George Washington Cancer Institute
Washington, DC 20037

Biochemical Analysis, 8-OHdG: One sample of oral cavity and one sample of duodenum from each animal in Subgroup B was analyzed for 8-OHdG as described in Appendix G.

Biochemical Analysis, Cytokines: One serum sample, one sample of oral cavity, and one sample of duodenum from each animal in Subgroup B was analyzed for IL-1α, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-7, IL-9, IL-10, IL-12p70, IL-13, IL-15, IL-17, TNF-α, KC/GRO, MCP-1, G-CSF, GM-CSF, IP-10, MIP-1α, RANTES, and IFN-γ as described in Appendix G.

Biochemical Analysis, 8-Isoprostane: One sample of oral cavity and one sample of duodenum from each animal in Subgroup B was analyzed for 8-isoprostane as described in Appendix G.

2.3.9 Total Chromium and Iron Analysis: Samples for evaluation of total chromium and iron content were collected on Day 92. Five mice/group were anesthetized using CO_2, and blood was collected from the retro-orbital sinus into tubes containing lithium heparin as anticoagulant. Plasma was prepared, and plasma and red blood cells were separated, snap frozen, and stored at approximately -80 °C.

Following blood collection, the tissues in the list below were collected from each animal, weighed, and snap frozen. Prior to freezing, the length of the intestinal segments (duodenum, jejunum, and ileum) were recorded.

Bone
Glandular stomach (flushed of contents)
Kidney
Liver
Oral mucosa (intact)
Small intestine, Duodenum (flushed of contents)
Small intestine, Jejunum (flushed of contents)
Small intestine, Ileum (flushed of contents)
Spleen

Plasma, red blood cells, and tissue samples were stored frozen at approximately -80 °C or lower until they were shipped to a Sponsor-designated laboratory at the address shown below. Bone, kidney, and spleen samples were retained at Southern Research pending instructions on disposition from the Sponsor (see Comments on Study Data).

Andrea Pratt
Brooks Rand Labs
Seattle, WA 98107

2.3.10 Macroscopic and Microscopic Pathology: Prior to euthanasia, half of the mice designated for macroscopic and microscopic pathology evaluation (i.e., those in the Toxicology and Histopathology groups) were used for collection of samples for evaluation of iron status.

Macroscopic Pathology: Mice designated for macroscopic and microscopic pathology evaluation (i.e., those in the Toxicology and Histopathology groups) were euthanized by CO_2 asphyxiation on Day 8 (5 mice/group) and Day 91 (10 mice/group).

Mice in the groups designated for pathologic examination that were euthanized at scheduled necropsy were subjected to a complete gross necropsy examination. The postmortem examination of each mouse included, but was not limited to, examination of the external surfaces of the body, all orifices of the body, and the cranial, thoracic, abdominal, and pelvic cavities and their contents.

The oral cavity, duodenum, jejunum, and any gross lesions were collected from each mouse and saved in 10% neutral buffered formalin for histopathologic evaluation. The animal identification was collected, fixed in 10% neutral buffered formalin, and retained with its tissues collected during necropsy.

In addition, for animals in histopathology groups 1, 2, 4, and 7 on Days 8 and 91, the esophagus, stomach (forestomach and glandular), liver, and mesenteric lymph nodes were collected. Each tissue was divided into two samples (tissues split longitudinally where possible) and saved for possible future evaluation. One piece of each tissue from each animal was fixed in 10% neutral buffered formalin, and the other was snap frozen and stored at -80 °C or lower.

Histology: The oral cavity, duodenum, jejunum, and any gross lesions from each mouse in the Toxicology and Histopathology groups were processed to slides. The fixed tissues were trimmed, processed, and microtomed (approximately 5-µm sections), and the tissue sections were mounted on glass slides; ten slides of each tissue were prepared. One of the ten slides from each tissue of each animal was stained with hematoxylin and eosin, and coverslipped. The remaining nine samples were shipped to the following Sponsor-designated laboratory.

Dr. Travis O'Brien
Department of Pharmacology and Physiology
Washington, DC 20037

Microscopic Observations: All slides were submitted to a veterinary pathologist for evaluation and diagnosis. For tissues from animals in the Toxicology and Histopathology groups, findings were diagnosed and categorized using standardized nomenclature with lesions ranked for severity for comparison among groups.

2.3.11 Iron Status: Half of the mice designated for macroscopic and microscopic pathology evaluation (i.e., those in the Toxicology and Histopathology groups) were also used for collection of samples for evaluation of iron status.

Sample Collection: On Day 91, five mice per group were anesthetized using CO_2/O_2, and blood samples (~0.4 mL) were collected from the retro-orbital sinus into tubes containing no anticoagulant. The contents of the tubes were centrifuged to separate serum. One aliquot of serum was used for measurement of serum iron on the day of collection. The remaining serum was snap frozen and stored at approximately -80 °C for use in enzyme-linked immunosorbent assays (ELISA) as described below.

After collection of serum samples, mice were euthanized for gross and microscopic pathology. One bone marrow smear was prepared from each mouse.

Measurement of Serum Iron: One serum aliquot was used for measurement of serum iron levels using the Cobas c501 Clinical Chemistry Analyzer (Version 04-02; Roche Diagnostics; Indianapolis, IN).

Evaluation of Bone Marrow Smears: Bone marrow smears were stained using a Prussian Blue stain that allows visualization of iron, and were evaluated by a board-certified clinical pathologist to estimate iron content.

ELISA Analysis of Serum Samples: The serum samples collected for ELISA analysis were not analyzed. Instead, plasma samples collected for total chromium and iron analysis were analyzed for serum ferritin and serum transferrin using commercial ELISA kits (see Comments on Study Data), as described in Appendix G. Serum originally intended for use in these ELISA assays was retained for possible later analysis.

2.3.12 Statistical Analysis: Group means and standard deviations were calculated when appropriate for body weights, food and water consumption data, 8-isoprostane and 8-OHdG data, serum iron data, plasma ferritin and transferrin data, and cytokine/chemokine data. Evaluation of data for the differences between groups was performed for data sets in which there were at least three values in the control and at least one exposure group.

The Kolmogorov-Smirnov test (alpha = 0.001) was used to test whether the body weight, food and water consumption, serum iron, ferritin, transferrin, 8-isoprostane, and 8-OHdG data were normally distributed. The Kolmogorov-Smirnov test was run for data pooled across time points/groups and per each time point and group. The body weight, water consumption, serum iron, ferritin, transferrin, 8-isoprostane, and 8-OHdG data met criteria for normality, and for these data a one-way Analysis of Variance (alpha = 0.05) was performed at each time point followed by a post-hoc Dunnett test (alpha = 0.05) to compare Groups 2-7 to Group 1. The food intake data were positively skewed and did not meet criteria for normality. Therefore, for these data a Kruskall Wallis test (alpha = 0.05) was performed at each time point followed by a Wilcoxon (i.e., Wilcoxon-Mann-Whitney) test using a Bonferroni adjusted alpha, to compare Groups 2-7 to Group 1.

Statistical analysis for cytokine/chemokine data was performed using the Provantis automated data collection system (Instem; Staffordshire, UK) at Southern Research. Statistical analysis for body weight, food and water consumption, serum iron, transferrin, ferritin, 8-isoprostane, and 8-

OHdG data was performed by a consultant statistician as shown below, and the Statistics Contributing Scientist Report containing the results of these analyses in presented in Appendix J.

Dr. Nicola Richardson-Harman
Alpha StatConsult LLC
9820 Warthen Drive
Damascus, MD 20872

Except as noted above, the lower limit for statistical significance was defined as $p \leq 0.05$. The following inter-group comparisons were made:

- Group 1 to Groups 2, 3, 4, 5, 6, and 7

Calculation of summary food and water consumption values (i.e., means and standard deviations) followed the guidelines below:

1. For any cage that had a comment in the data indicating that the feeder or the water bottle had been spilled, the calculated food or water consumption value for that cage for that week was not included in the calculation of means and standard deviations or in statistical analysis. There were two exception to this rule for food consumption, and those exceptions are documented in the study files.
2. Any calculated food or water consumption value >10 g (or mL)/animal/day was not used in calculation of means and standard deviations, or in statistical analysis, whether or not there was a comment in the study data indicating a spilled feeder or water bottle. Values >10 g (or mL)/animal/day were considered to be biologically impossible for mice over a 7-day period. There was one exception to this rule for water consumption, and that exception is documented in the study files.
3. For any group that had fewer than three food or water consumption values at any given time point, a mean but not a standard deviation was calculated.
4. As noted above, if there were fewer than three food or water consumption values for any exposure group at any time point, the mean value was not included in inter-group comparisons.

3.0 Results

3.1 Dose Formulation Concentration Analysis

Dose formulation concentration data are included in Table 3. The concentrations of SDD in all dose formulations used in this study were within ± 10% of the target concentrations.

3.2 Mortality

Summary and individual mortality data are included in Table 4 and Appendix C, respectively. Administration of SDD had no effect on survival of mice.

3.3 Clinical Observations

Summary and individual clinical observations data are presented in Table 4 and Appendix C, respectively. There were no clinical signs of toxicity in this study that were considered to be related to administration of SDD.

Clinical signs that were observed included alopecia, scab, and convulsions. These signs occurred in a sporadic and non-dose-related manner, and were considered to be incidental.

3.4 Body Weights

Summary and individual body weight data are presented in Table 5 and Appendix D, respectively. Administration of SDD was associated with minimal to mild deficits in body weight gain for mice in the 170 and 520 mg/L groups.

Mice in the 170 and 520 mg/L groups showed a trend toward lower mean body weights that was first evident on Day 15, and this trend continued to the end of the study. While these deficits in body weight gain were considered to be potentially related to SDD administration, the maximum differences between mean body weights of mice in the 170 and 520 mg/L groups and those in the vehicle control group were <5% and <10%, respectively. Therefore, the observed deficits in body weight gain were deemed to be minimal (170 mg/L) or mild (520 mg/L) and were considered to be of no toxicological or biological significance.

3.5 Food and Water Consumption

Summary and individual food consumption data are presented in Table 6 and Appendix E, respectively. Summary and individual water consumption data are presented in Table 7 and Appendix F, respectively. Administration of SDD had no effect on food consumption of mice at any dose level. At most time points during the study, water consumption of mice in the 170 and 520 mg/L groups showed a dose related decrease compared to mice in the vehicle control group.

Throughout the study, there were no statistically or biologically significant differences between mean food consumption values for mice treated with SDD and control mice.

Water consumption was statistically reduced for mice in the 60 mg/L group for Days 43-50; for mice in the 170 mg/L group for Days 29-36, 43-57, and 64-78; and for mice in the 520 mg/L group for Days 1-8, 15-22, 29-50 and 57-91, when compared to the control group. In addition, although mean values for water consumption were not statistically reduced for mice in the 170 and 520 mg/L groups at all time points, the calculated values were lower at every time point than the mean water consumption values for mice in the vehicle control group. Overall water consumption for the entire study for these two exposure groups was approximately 80% and 70%, respectively, of that for mice in the control group. Mean water consumption values for mice in the 170 and 520 mg/L exposure groups were on occasion as much as 26% and 39% lower, respectively, than that of mice in the vehicle control group. The reductions in water consumption for mice in the 170 and 520 mg/L groups were considered to be related to SDD administration. A single statistically significant difference in mean water consumption for mice in the 60 mg/L group for Days 43-50 may have been related to SDD administration, but overall the water consumption for mice in this exposure group was not reduced relative to mice in the control group.

3.6 Biochemical Analysis

Data from the evaluation of serum, oral cavity, and duodenum for selected biochemical parameters are presented in the Immunology Contributing Scientist Report in Appendix G.

8-isoprostane, 8-OHdG, and cytokine levels were measured in oral cavity and duodenum; in addition, cytokine levels were measured in serum samples collected at necropsy.

8-Isoprostane: Individual results of 8-isoprostane assays conducted on oral cavity and duodenum samples are presented in Table G3, and summary results are presented in Table G4. As noted in Appendix G, a hydrolysis step was inadvertently omitted from the preparation of the homogenates used in the 8-isoprostane ELISA. Therefore, the assay measured only free, rather than total 8-isoprostane. It has been reported that less than half of the total isoprostane in plasma is present in the free (non-esterified) form. Thus, the measurement of only free 8-isoprostane may not completely reflect the impact of Cr(VI) exposure on levels of this molecule. The data suggest that in the oral cavity there were no apparent inter-group differences in the levels of free 8-isoprostane for the samples tested. Similarly, the data suggest that in the duodenum there were no apparent differences among groups dosed with 0 to 60 mg/L of SDD. However, the levels of free 8-isoprostane in samples from Groups 6-7 appeared to be higher than those in the control and lower dose groups. The relationship of this apparent difference to Cr(VI) administration cannot be determined.

8-OHdG: Individual results of 8-OHdG assays conducted on oral cavity and duodenum samples are presented in Table G3, and summary results are presented in Table G4. Data are presented in terms of ng 8-OHdG/mg DNA in the homogenates. There were no statistically or biologically significant differences in 8-OHdG levels in the oral cavity or the duodenum between treated and control groups.

Cytokines: The results of assays for 22 cytokines that were conducted on serum, oral cavity, and duodenum samples are presented in Table G5 and Table G6 (individual and summary serum data, respectively), Table G7 and Table G8 (individual and summary oral cavity data, respectively), and Table G9 and Table G10 (individual and summary duodenum data, respectively). Levels of many of the cytokines/chemokines were at low or background levels in all three sample types tested. Significant levels of only G-CSF, GM-CSF, IL-1α, IL-13, IL-15, IP-10, KC (the murine equivalent of human IL-8), MIP-1α, and RANTES were detected in serum. Significant levels of only G-CSF, IL-1α, IL-6, IL-15, IP-10, and KC were detected in oral cavity homogenates and significant levels of only GM-CSF, IL-1α, IL-1β, IL-9, IL-15, IP-10, KC, MIP-1α, MCP-1, and RANTES were detected in duodenum homogenates. The levels of IL-1β in duodenum for all exposure groups appeared to be lower than control values, and this decrease was considered to be potentially related to SDD administration.

GSH/GSSG Ratio and DNA-Cr Adducts: The results of assays for GSH/GSSG ratio and for DNA-Cr adducts will be reported to the Sponsor directly by the laboratories performing those assays, and will not be included in this study report.

3.7 Macroscopic Pathology

The Contributing Scientist Report for pathology is presented in Appendix H with individual and summary macroscopic pathology data provided in Table H1 and Table H2, respectively. No macroscopic lesions associated with the oral administration of SDD were observed on Day 8 or on Day 91.

3.8 Microscopic Pathology

The Contributing Scientist Report for pathology is presented in Appendix H with individual and summary microscopic pathology data provided in Table H3 and Table H4, respectively. Test article-related microscopic lesions were crypt epithelial hyperplasia, histiocytic cellular infiltration of the villous lamina propria, cytoplasmic vacuolization of the villous epithelium, multinucleated syncytia of the villous lamina propria, villous atrophy, and apoptosis.

On Day 8, cytoplasmic vacuolization of the villous epithelium was observed in the jejunum and duodenum of mice in the 170 and 520 mg/L SDD groups, and crypt epithelia hyperplasia and villous atrophy were observed in the duodenum of mice in the 520 mg/L SDD group. On Day 91, crypt epithelial hyperplasia, histiocytic cellular infiltration of the villous lamina propria, cytoplasmic vacuolization of the villous epithelium, multinucleated syncytia of the villous lamina propria, villous atrophy, and apoptosis were test article-related microscopic lesions in the small intestine. On Day 91, test article-related microscopic lesions were observed in the duodenum and jejunum of mice in the 60, 170, and 520 mg/L SDD groups. In general, the incidence and/or severity of lesions, particularly crypt epithelial hyperplasia and villous atrophy, were greater in the duodenum than the jejunum on Days 8 and 91. No test article-related microscopic lesions were observed in the oral mucosa of any of the exposure groups on Days 8 and 91. The no observable adverse effect level was determined to be 14 mg/L SDD. The incidence and/or severity of lesions were greatest in the 520 mg/L group on Days 8 and 91.

3.9 Iron Status

Measurement of Serum Iron: Data on serum iron levels are presented in the Clinical Pathology Contributing Scientist Report in Appendix I. Administration of 520 mg/L SDD was associated with a slight decrease in serum iron levels that was not statistically significant. Although a clear dose-related impact on serum iron was not observed, biologically relevant effects on serum iron at higher levels of SDD cannot be excluded.

Evaluation of Bone Marrow Smears: Data from the evaluation of bone marrow smears for iron are presented in the Clinical Pathology Contributing Scientist Report in Appendix I. SDD administration had no discernible impact upon stored iron as assessed by examination of Prussian blue-stained bone marrow smears.

ELISA Analysis of Serum Samples: Data on serum ferritin and transferrin levels are presented in the Immunology Contributing Scientist Report in Appendix G. Individual results are presented in Table G1 and summary results are presented in Table G2. These results and the statistical analyses indicated that there were no differences between the groups in terms of circulating ferritin or transferrin levels.

3.10 Gene Expression Analysis

The results of assays for gene expression will be reported to the Sponsor directly by the laboratory performing those assays, and will not be included in this study report.

3.11 Total Chromium and Iron Analysis

The results of assays for total chromium and iron content in RBC, plasma, and tissues will be reported to the Sponsor directly by the laboratory performing those assays, and will not be included in this study report. Individual and summary values for organ weights and lengths of intestinal segments collected for total chromium and iron analysis are presented in Table 8.

3.12 Mutation Analysis

The results of assays for DNA mutations will be reported to the Sponsor directly by the laboratory performing those assays, and will not be included in this study report.

4.0 Discussion and Conclusions

The results of this study demonstrated that SDD administered to mice in drinking water for 90 days was well tolerated. No mortality and no clinical signs of toxicity were observed during the study. Deficits in water consumption observed for mice in the two highest exposure groups were considered to be likely due to palatability problems rather than SDD toxicity. These deficits were consistent with and were likely at least partly responsible for the lower body weights observed for animals in the two highest exposure groups. Similar deficits in water consumption and body weight gain were reported by the NTP for female B6C3F1 mice administered SDD in drinking water at concentrations of 172 and 516 mg/L for 2 years.[(1.3)] This is illustrated in the two tables below. For female mice in the 500-520 mg/L dose range, mean body weights at the 13-week time point in the current study, the NTP 90-day study, and the NTP 2-year were 10, 10, and 16% lower, respectively, than controls. For female mice in the 500-520 mg/L dose range, mean water consumption values at the 13-week time point in the current study, the NTP 90-day study, and the NTP 2-year were 36, 39, and 39% lower, respectively, than controls.

Body Weight Comparisons Between Current Study and NTP Studies

Current Study 13-Week Time Point		NTP 90-Day Study 13-Week Time Point		NTP 2-Year Study 13-Week Time Point	
Concentration (mg/L)	% Difference from Control	Concentration (mg/L)	% Difference from Control	Concentration (mg/L)	% Difference from Control
14	+2	62.5	+1	14.3	-1
60	-2	125	-8	57.3	-5
170	-4	250	-8	172	-12
520	-10	500	-10	516	-16

Water Consumption Comparisons Between Current Study and NTP Studies

Current Study 13-Week Time Point		NTP 90-Day Study 13-Week Time Point		NTP 2-Year Study 13-Week Time Point	
Concentration (mg/L)	% Difference from Control	Concentration (mg/L)	% Difference from Control	Concentration (mg/L)	% Difference from Control
14	0	62.5	-12	14.3	+3
60	+8	125	-21	57.3	-3
170	-18	250	-27	172	-19
520	-36	500	-39	516	-39

In the current study, microscopic lesions were observed in the small intestine of animals in the 170 and 520 mg/L groups on Day 8 and in the 60, 170, and 520 mg/L groups on Day 91. These lesions included cytoplasmic vacuolization of the villous epithelium (Days 8 and 91), crypt epithelia hyperplasia (Days 8 and 91), villous atrophy (Days 8 and 91), histiocytic cellular infiltration of the villous lamina propria (Day 91), multinucleated syncytia of the villous lamina propria (Dsay 91), and apoptosis (Day 91). Given that these lesions occurred only in the groups receiving higher concentrations of SDD, and that the incidence and/or severity of villous atrophy, crypt epithelial hyperplasia, and histiocytic cellular infiltration were dose-related in the two highest exposure groups, the microscopic lesions observed in the small intestine in the current study were considered to be a result of SDD administration.

Increased incidences of epithelial hyperplasia and histiocytic cellular infiltration have also been reported by the NTP for male and female mice exposed to SDD in drinking water for either 90 days or 2 years.[(1,3)] Epithelial hyperplasia is sometimes considered to be a preneoplastic lesion, and in the 2-year NTP studies, an increased incidence of adenoma and carcinoma of the small intestine observed for female mice in the 170 and 516 mg/L groups was considered to be clear evidence of carcinogenic activity of hexavalent chromium in mice.[(1)]

An increase in intracellular free radicals leading to oxidative stress and DNA damage is one of the known mechanisms by which compounds can exert carcinogenic activity. It has been suggested that the DNA-damaging effects of hexavalent chromium may be primarily related to reduction of Cr(VI) to Cr(III), Cr(V), and Cr(IV). One proposed mechanism involves formation of DNA-Cr adducts via binding of reduced chromium directly to DNA. Another involves formation of highly reactive free radicals as by-products of the reduction of Cr(VI) to Cr(III).[(4)]

The production of lung tumors by hexavalent chromium after inhalation exposure is believed to occur at least in part due to such free radical production.[(5)]

Changes in levels of various markers of oxidative stress, including tissue levels of 8-OHdG and 8-isoprostane; plasma and tissue levels of a panel of cytokines; tissue levels of DNA-Cr adducts; and plasma and tissue levels of reduced and oxidized glutathione were evaluated in this study. The data for adduct formation and changes in GSH/GSSG ratio will be reported to the Sponsor by the laboratories performing those analyses, separately from this report. Although no changes in 8-OHdG or pro-inflammatory cytokine/chemokine levels were observed in any of the exposure groups in this study, increased levels of 8-isoprostane were measured in the duodenum of mice in the 170 and 516 mg/L groups. Isoprostanes are compounds that are formed via free radical-induced lipid peroxidation, and are considered to be reliable markers of increased oxidative stress in both humans and animals. The increases in 8-isoprostane observed in the duodenum of mice in the current study suggest that oxidative stress may have played a role in the microscopic changes observed in that tissue. The only significant change in cytokine level that was considered to be potentiatlly related to SDD administration in this study was a reduction of the pro-inflammatory cytokine IL-1β in the duodenum of all mice treated with SDD. However, the biological significance of this change, in the absence of alterations in concentrations of other cytokines, is not known.

In summary, results observed in this study were consistent with those observed in other studies where mice have been exposed to hexavalent chromium in drinking water. The data suggest that hyperplasia observed in the duodenal epithelium of mice in the two highest exposure groups may have been related to increases in lipid peroxidation and attendant oxidative stress.

5.0 Record Archives

All raw data pertaining to the conduct of this study, and all samples/specimens generated in this study, will be stored at Southern Research for up to 1 year after the issuance of the draft report. After 1 year, or at any time prior to the completion of that year if the Sponsor's Monitor so directs, the data and any samples/specimens will be shipped to the Sponsor or to the Sponsor’s designated archival facility. The Sponsor must approve the final disposition of all raw data and samples/specimens generated in this study. The original final report will be retained in the central Archives at Southern Research. All unused [test article] will be returned to the Sponsor or to the Sponsor-designated repository, after the study completion date.

6.0 References

1. National Toxicology Program (NTP) (2008). NTP Technical Report on the Toxicology and Carcinogenesis Studies of Sodium Dichromate Dihydrate (CAS No. 7789-12-0) in F344/N Rats and B6C3F1 Mice (Drinking Water Studies). NTP TR 546. NIH Publication No. 08-5887. National Institutes of Health.

2. *Guide for the Care and Use of Laboratory Animals* (1996). Institute of Laboratory Animal Resources, Commission on Life Sciences, National Research Council; National Academy Press; Washington, DC.

3. National Toxicology Program (NTP) (2007). NTP Report on Sodium Dichromate Dihydrate (CAS No. 7789-12-0) Administered in Drinking Water to Male and Female F344/N Rats and $B6C3F_1$ Mice and Male BALB/c and *am3*-C57BL/6 Mice. NTP TOX 72. NIH Publication No. 07-5964. National Institutes of Health.

4. Cohen, M.D., Kargacin, B., Klein, C.B., and Costa, M. (1993). Mechanisms of chromium carcinogenicity and toxicity. *Crit. Rev. Toxicol.* **23(3),** 255-281.

5. Dayan, A.D. and Paine, A.J. (2001). Mechanisms of chromium toxicity, carcinogenicity and allergenicity: Review of the literature from 1985 to 2000. *Human Exp. Toxicol.* **20(9),** 439–451.

7.0 Comments on Study Data

The following is a list of protocol and/or SOP deviations occurring during this study that have not been mentioned elsewhere in this report. Unless otherwise noted, the Study Director determined that no deviation had an adverse impact on the outcome of the study. The following may also list incidents in recording data and general comments on the study data.

Protocol Section 7.3 required that a reserve sample of each formulation be retained. Reserve samples of the formulations prepared on 2/22/10 were not collected. These formulations underwent dose analysis and were found to be within acceptable limits for SDD concentration.

Protocol Section 8.2 required that the environmental conditions in the animal room be maintained at 69-75 °C and 35-65% relative humidity. Minor excursions beyond these limits occurred on several occasions. These excursions were determined to have had no effect on animal health.

Protocol Section 8.6 (Animal Identification) stated that the animal identification number for each mouse would consist of a letter designating the exposure group, a letter designating the sex, and a unique number. For the majority of data recording, the animals were identified using group numbers instead of letter codes for the exposure groups. For example, animal UF1 was identified in the data as animal 1F1. These IDs are equivalent. A table showing the correlation between group numbers (1, 2, 3, 4, 5, 6, and 7) and group letter codes (U, L, I, J, M, N, and H) is included in the protocol.

Protocol Sections, 9.7, 9.8, 9.9, and 9.10 required that after sample collection carcasses and remaining tissues be discarded without further evaluation. This process was not documented at the time of occurrence.

Protocol Section 9.9 required that tissues collected for GSH/GSSG analysis be allowed to sit on ice for approximately 10-15 minutes before being snap frozen. Four tissue samples were frozen outside the required 10-15 minute time frame. They were 1F51 jejunal epithelium, 1F51 oral epithelium, and 5F374 jejunal epithelium (all frozen at 9 minutes), and 6F455 duodenal epithelium (frozen at 16 minutes).

Protocol Section 9.10 (Total Chromium and Iron Analysis; as per Amendment 5) required that plasma samples for analysis of total chromium and iron be collected from five mice/group on 6/18/10. Protocol Section 9.13 (Iron Status, as per Amendment 4) required that serum samples for analysis of ferritin and transferrin by ELISA be collected from five mice/group on 6/1/10. Both sets of samples were collected as required. However, the plasma samples collected on 6/18/10 were inadvertently used for analysis of ferritin and transferrin. Samples collected on 6/1/10 were not used for any analysis.

Protocol Amendment A4 required that serum samples for analysis of iron status be collected and aliquoted into four aliquots. After the serum samples had been collected, it became apparent that the volume of the samples was low enough that dividing the samples into aliquots would have risked having each aliquot be too small to run the needed analyses. The Study Director instructed that instead of aliquoting the serum the staff were to run each entire serum sample on the clinical chemistry analyzer to perform the serum iron analysis, then freeze the remainder of each sample as one aliquot for later ELISA analysis. Because of the need to implement changes quickly, the Study Director elected to allow a planned protocol deviation, with no protocol amendment issued.

Table 1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Correlation of Animal Number, Cage Number, SDD Concentration, and Analysis Group

Animal Numbers	Cage Number	SDD (mg/L)	Analysis Group
1 – 5	1	0	Toxicology/Histology Day 91, Cohort 1
6 – 10	2	0	Toxicology/Histology Day 91, Cohort 2
11 – 15	3	0	Biochemical Evaluations, Day 91, Cohort 1
16 – 20	4	0	Biochemical Evaluations, Day 91, Cohort 1
21 – 25	5	0	Biochemical Evaluations, Day 91, Cohort 2
26 – 30	6	0	Biochemical Evaluations, Day 91, Cohort 2
31 – 35	7	0	Gene Expression Analysis, Day 91
36 – 40	8	0	Gene Expression Analysis, Day 91
41 – 45	9	0	Mutation Analysis, Day 91, Cohort 1
46 – 50	10	0	Toxicology/Histology Day 8
51 – 55	11	0	Biochemical Evaluations, Day 8
56 – 60	12	0	Biochemical Evaluations, Day 8
61 – 65	13	0	Gene Expression Analysis, Day 8
66 – 70	14	0	Gene Expression Analysis, Day 8
71 – 75	15	0	Mutation Analysis, Day 91, Cohort 2
76 – 80	16	0	Possible Future Analysis, Day 91
81 – 85	17	0.3	Toxicology/Histology Day 91, Cohort 1
86 – 90	18	0.3	Toxicology/Histology Day 91, Cohort 2
91 – 95	19	0.3	Biochemical Evaluations, Day 91, Cohort 1
96 – 100	20	0.3	Biochemical Evaluations, Day 91, Cohort 1
101 – 105	21	0.3	Biochemical Evaluations, Day 91, Cohort 2
106 – 110	22	0.3	Biochemical Evaluations, Day 91, Cohort 2
111 – 115	23	0.3	Gene Expression Analysis, Day 91
116 – 120	24	0.3	Gene Expression Analysis, Day 91
121 – 125	25	0.3	Mutation Analysis, Day 91, Cohort 1
126 – 130	26	0.3	Toxicology/Histology Day 8
131 – 135	27	0.3	Biochemical Evaluations, Day 8
136 – 140	28	0.3	Biochemical Evaluations, Day 8
141 – 145	29	0.3	Gene Expression Analysis, Day 8
146 – 150	30	0.3	Gene Expression Analysis, Day 8
151 – 155	31	0.3	Mutation Analysis, Day 91, Cohort 2
156 – 160	32	0.3	Possible Future Analysis, Day 91
161 – 165	33	4	Toxicology/Histology Day 91, Cohort 1
166 – 170	34	4	Toxicology/Histology Day 91, Cohort 2
171 – 175	35	4	Biochemical Evaluations, Day 91, Cohort 1
176 – 180	36	4	Biochemical Evaluations, Day 91, Cohort 1
181 – 185	37	4	Biochemical Evaluations, Day 91, Cohort 2
186 – 190	38	4	Biochemical Evaluations, Day 91, Cohort 2

Table 1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Correlation of Animal Number, Cage Number, SDD Concentration, and Analysis Group

Animal Numbers	**Cage Number**	**SDD (mg/L)**	**Analysis Group**
191 – 195	39	4	Gene Expression Analysis, Day 91
196 – 200	40	4	Gene Expression Analysis, Day 91
201 – 205	41	4	Mutation Analysis, Day 91, Cohort 1
206 – 210	42	4	Toxicology/Histology Day 8
211 – 215	43	4	Biochemical Evaluations, Day 8
216 – 220	44	4	Biochemical Evaluations, Day 8
221 – 225	45	4	Gene Expression Analysis, Day 8
226 – 230	46	4	Gene Expression Analysis, Day 8
231 – 235	47	4	Mutation Analysis, Day 91, Cohort 2
236 – 240	48	4	Possible Future Analysis, Day 91
241 – 245	49	14	Toxicology/Histology Day 91, Cohort 1
246 – 250	50	14	Toxicology/Histology Day 91, Cohort 2
251 – 255	51	14	Biochemical Evaluations, Day 91, Cohort 1
256 – 260	52	14	Biochemical Evaluations, Day 91, Cohort 1
261 – 265	53	14	Biochemical Evaluations, Day 91, Cohort 2
266 – 270	54	14	Biochemical Evaluations, Day 91, Cohort 2
271 – 275	55	14	Gene Expression Analysis, Day 91
276 – 280	56	14	Gene Expression Analysis, Day 91
281 – 285	57	14	Mutation Analysis, Day 91, Cohort 1
286 – 290	58	14	Toxicology/Histology Day 8
291 – 295	59	14	Biochemical Evaluations, Day 8
296 – 300	60	14	Biochemical Evaluations, Day 8
301 – 305	61	14	Gene Expression Analysis, Day 8
306 – 310	62	14	Gene Expression Analysis, Day 8
311 – 315	63	14	Mutation Analysis, Day 91, Cohort 2
316 – 320	64	14	Possible Future Analysis, Day 91
321 – 325	65	60	Toxicology/Histology Day 91, Cohort 1
326 – 330	66	60	Toxicology/Histology Day 91, Cohort 2
331 – 335	67	60	Biochemical Evaluations, Day 91, Cohort 1
336 – 340	68	60	Biochemical Evaluations, Day 91, Cohort 1
341 – 345	69	60	Biochemical Evaluations, Day 91, Cohort 2
346 – 350	70	60	Biochemical Evaluations, Day 91, Cohort 2
351 – 355	71	60	Gene Expression Analysis, Day 91
356 – 360	72	60	Gene Expression Analysis, Day 91
361 – 365	73	60	Mutation Analysis, Day 91, Cohort 1
366 – 370	74	60	Toxicology/Histology Day 8
371 – 375	75	60	Biochemical Evaluations, Day 8
376 – 380	76	60	Biochemical Evaluations, Day 8

Table 1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Correlation of Animal Number, Cage Number, SDD Concentration, and Analysis Group

Animal Numbers	**Cage Number**	**SDD (mg/L)**	**Analysis Group**
381 – 385	77	60	Gene Expression Analysis, Day 8
386 – 390	78	60	Gene Expression Analysis, Day 8
391 – 395	79	60	Mutation Analysis, Day 91, Cohort 2
396 – 400	80	60	Possible Future Analysis, Day 91
401 – 405	81	170	Toxicology/Histology Day 91, Cohort 1
406 – 410	82	170	Toxicology/Histology Day 91, Cohort 2
411 – 415	83	170	Biochemical Evaluations, Day 91, Cohort 1
416 – 420	84	170	Biochemical Evaluations, Day 91, Cohort 1
421 – 425	85	170	Biochemical Evaluations, Day 91, Cohort 2
426 – 430	86	170	Biochemical Evaluations, Day 91, Cohort 2
431 – 435	87	170	Gene Expression Analysis, Day 91
436 – 440	88	170	Gene Expression Analysis, Day 91
441 – 445	89	170	Mutation Analysis, Day 91, Cohort 1
446 – 450	90	170	Toxicology/Histology Day 8
451 – 455	91	170	Biochemical Evaluations, Day 8
456 – 460	92	170	Biochemical Evaluations, Day 8
461 – 465	93	170	Gene Expression Analysis, Day 8
466 – 470	94	170	Gene Expression Analysis, Day 8
471 – 475	95	170	Mutation Analysis, Day 91, Cohort 2
476 – 480	96	170	Possible Future Analysis, Day 91
481 – 485	97	520	Toxicology/Histology Day 91, Cohort 1
486 – 490	98	520	Toxicology/Histology Day 91, Cohort 2
491 – 495	99	520	Biochemical Evaluations, Day 91, Cohort 1
496 – 500	100	520	Biochemical Evaluations, Day 91, Cohort 1
501 – 505	101	520	Biochemical Evaluations, Day 91, Cohort 2
506 – 510	102	520	Biochemical Evaluations, Day 91, Cohort 2
511 – 515	103	520	Gene Expression Analysis, Day 91
516 – 520	104	520	Gene Expression Analysis, Day 91
521 – 525	105	520	Mutation Analysis, Day 91, Cohort 1
526 – 530	106	520	Toxicology/Histology Day 8
531 – 535	107	520	Biochemical Evaluations, Day 8
536 – 540	108	520	Biochemical Evaluations, Day 8
541 – 545	109	520	Gene Expression Analysis, Day 8
546 – 550	110	520	Gene Expression Analysis, Day 8
551 – 555	111	520	Mutation Analysis, Day 91, Cohort 2
556 – 560	112	520	Possible Future Analysis, Day 91

Table 2

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Weights of Tissues Collected for Assay of 8-OHdG, 8-Isoprostane, and Cytokine Levels:

Tissue Weight (g)

Animal ID	Duodenum	Oral Cavity
1F16	0.1049	0.0117
1F17	0.1239	0.0126
1F18	0.1033	0.0078
1F19	0.0710	0.0112
1F20	0.1243	0.0214
1F26	0.0895	0.0177
1F27	0.1064	0.0160
1F28	0.1420	0.0215
1F29	0.1413	0.0171
1F30	0.1434	0.0185
Mean	**0.1150**	**0.0156**
S.D.	**0.0242**	**0.0046**

Animal ID	Duodenum	Oral Cavity
2F96	0.1124	0.0172
2F97	0.1255	0.0200
2F98	0.0899	0.0168
2F99	0.0934	0.0145
2F100	0.0976	0.0150
2F106	0.0864	0.0163
2F107	0.1103	0.0149
2F108	0.1239	0.0151
2F109	0.1234	0.0204
2F110	0.1070	0.0146
Mean	**0.1070**	**0.0165**
S.D.	**0.0146**	**0.0022**

Animal ID	Duodenum	Oral Cavity
3F176	0.1192	0.0170
3F177	0.1258	0.0153
3F178	0.1262	0.0285
3F179	0.1084	0.0280
3F180	0.1365	0.0173
3F186	0.1441	0.0119
3F187	0.1206	0.0178
3F188	0.1532	0.0158
3F189	0.1059	0.0161
3F190	0.1025	0.0142
Mean	**0.1242**	**0.0182**
S.D.	**0.0166**	**0.0056**

Animal ID	Duodenum	Oral Cavity
4F256	0.0741	0.0143
4F257	0.0974	0.0243
4F258	0.1203	0.0170
4F259	0.0787	0.0163
4F260	0.1095	0.0110
4F266	0.1123	0.0177
4F267	0.1534	0.0141
4F268	0.1044	0.0221
4F269	0.1591	0.0155
4F270	0.0950	0.0170
Mean	**0.1104**	**0.0169**
S.D.	**0.0281**	**0.0039**

Table 2

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Weights of Tissues Collected for Assay of 8-OHdG, 8-Isoprostane, and Cytokine Levels:

Tissue Weight (g)

Animal ID	Duodenum	Oral Cavity
5F336	0.1561	0.0093
5F337	0.1379	0.0185
5F338	0.1191	0.0191
5F339	0.0901	0.0159
5F340	0.1182	0.0151
5F346	0.1375	0.0222
5F347	0.1929	0.0103
5F348	0.1306	0.0183
5F349	0.1391	0.0210
5F350	0.1748	0.0109
Mean	**0.1396**	**0.0161**
S.D.	**0.0294**	**0.0046**

Animal ID	Duodenum	Oral Cavity
6F416	0.1623	0.0206
6F417	0.1211	0.0167
6F418	0.1919	0.0109
6F419	0.2073	0.0189
6F420	0.1327	0.0170
6F426	0.2063	0.0307
6F427	0.2000	0.0143
6F428	0.1713	0.0136
6F429	0.1410	0.0159
6F430	0.1548	0.0171
Mean	**0.1689**	**0.0176**
S.D.	**0.0316**	**0.0054**

Animal ID	Duodenum	Oral Cavity
7F496	0.1449	0.0290
7F497	0.1991	0.0230
7F498	0.0913	0.0191
7F499	0.1403	0.0183
7F500	0.1239	0.0173
7F506	0.1269	0.0179
7F507	0.1638	0.0142
7F508	0.1892	0.0077
7F509	0.1800	0.0072
7F510	0.1543	0.0167
Mean	**0.1514**	**0.0170**
S.D.	**0.0330**	**0.0065**

Table 3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Sodium Dichromate Dihydrate Dose Concentration Analysis

Date Mixed	Date Analyzed	Concentration (mg/L)		% High/Low of Theoretical
		Theoretical	Actual	
2/22/10	2/24/10	0	0.02	NA
2/22/10	2/24/10	0.3	0.31	103.14
2/22/10	2/24/10	4	4.21	105.29
2/22/10	2/24/10	14	13.69	97.82
2/22/10	2/24/10	60	56.15	93.59
2/22/10	2/24/10	170	168.46	99.10
2/22/10	2/24/10	520	492.78	94.77
3/16/10	3/17/10	0	0.01	NA
3/16/10	3/17/10	0.3	0.33	108.87
3/16/10	3/17/10	4	1.04	100.99
3/16/10	3/17/10	14	14.24	101.71
3/16/10	3/17/10	60	60.74	101.23
3/16/10	3/17/10	170	170.18	100.11
3/16/10	3/17/10	520	501.38	96.42
4/13/10	4/14/10	0	0.01	NA
4/13/10	4/14/10	0.3	0.30	98.37
4/13/10[a]	4/14/10[a]	4[a]	4.53[a]	113.17[a]
4/13/10	4/14/10	14	13.75	98.23
4/13/10	4/14/10	60	58.45	97.41
4/13/10	4/14/10	170	165.02	97.07
4/13/10	4/14/10	520	495.65	95.32
4/15/10[b]	4/16/10[b]	4[b]	3.72[b]	93.11[b]
5/25/10	5/26/10	0	0.01	NA
5/25/10	5/26/10	0.3	0.30	101.23
5/25/10	5/26/10	4	4.13	103.14
5/25/10	5/26/10	14	13.78	98.43
5/25/10	5/26/10	60	60.17	100.28
5/25/10	5/26/10	170	175.62	103.31
5/25/10	5/26/10	520	524.30	100.83

[a]Concentration was out of acceptable range. Not used for dosing.
[b]Replacement mix for 4/13/10 formulation that was out of range.
NA = Not applicable
Note: Values reported were calculated based on nontruncated raw data; therefore, some values may not be reproducible when calculated from rounded values presented in this table.

Table 4

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary of Clinical Observations

Day numbers relative to Start Date

Group	Sex	Clinical Sign	1	8	15	22	29	36	43	50	57	64	71
1	f	ANIMALS ALIVE	80	80	55	55	55	55	55	55	55	55	55
		ANIMALS NORMAL	80	80	55	55	55	55	55	55	55	55	55
		Convulsions	.	.	.	.	.	.	.	.	.	.	.
		Scheduled euthanasia	.	25	.	.	.	.	.	.	.	.	.
2	f	ANIMALS ALIVE	80	80	55	55	55	55	55	55	55	55	55
		ANIMALS NORMAL	80	80	55	55	55	55	55	55	54	54	54
		Alopecia	.	.	.	.	.	.	.	.	1	1	1
		Convulsions	.	.	.	.	.	.	.	.	.	.	.
		Scheduled euthanasia	.	25	.	.	.	.	.	.	.	.	.
3	f	ANIMALS ALIVE	80	80	55	55	55	55	55	55	55	55	55
		ANIMALS NORMAL	80	80	55	55	55	55	55	55	55	55	55
		Scheduled euthanasia	.	25	.	.	.	.	.	.	.	.	.
4	f	ANIMALS ALIVE	80	80	55	55	55	55	55	55	55	55	55
		ANIMALS NORMAL	80	80	55	55	55	55	55	55	55	55	55
		Scheduled euthanasia	.	25	.	.	.	.	.	.	.	.	.
5	f	ANIMALS ALIVE	80	80	55	55	55	55	55	55	55	55	55
		ANIMALS NORMAL	80	80	55	55	55	55	55	55	55	55	53
		Alopecia	.	.	.	.	.	.	.	.	.	.	2
		Scheduled euthanasia	.	25	.	.	.	.	.	.	.	.	.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table 4

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary of Clinical Observations

Day numbers relative to Start Date

Group	Sex	Clinical Sign	78	85	91	92
1	f	ANIMALS ALIVE	55	55	55	10
		ANIMALS NORMAL	54	55	45	10
		Convulsions	1	.	.	.
		Scheduled euthanasia	.	.	45	10
2	f	ANIMALS ALIVE	55	55	55	10
		ANIMALS NORMAL	54	53	45	9
		Alopecia	1	1	.	1
		Convulsions	.	1	.	.
		Scheduled euthanasia	.	.	45	10
3	f	ANIMALS ALIVE	55	55	55	10
		ANIMALS NORMAL	55	55	45	10
		Scheduled euthanasia	.	.	45	10
4	f	ANIMALS ALIVE	55	55	55	10
		ANIMALS NORMAL	55	55	45	10
		Scheduled euthanasia	.	.	45	10
5	f	ANIMALS ALIVE	55	55	55	10
		ANIMALS NORMAL	53	53	42	10
		Alopecia	2	2	3	.
		Scheduled euthanasia	.	.	45	10

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table 4

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary of Clinical Observations

Day numbers relative to Start Date

Group	Sex	Clinical Sign	1	8	15	22	29	36	43	50	57	64	71
6	f	ANIMALS ALIVE	80	80	55	55	55	55	55	55	55	55	55
		ANIMALS NORMAL	80	80	55	55	55	55	55	55	55	55	55
		Convulsions	.	.	.	.	.	.	.	.	.	.	.
		Scheduled euthanasia	.	25	.	.	.	.	.	.	.	.	.
7	f	ANIMALS ALIVE	80	80	55	55	55	55	55	55	55	55	55
		ANIMALS NORMAL	80	80	55	55	55	54	54	54	55	55	55
		Scab	.	.	.	.	.	1	1	1	.	.	.
		Alopecia	.	.	.	.	.	.	.	.	.	.	.
		Scheduled euthanasia	.	25	.	.	.	.	.	.	.	.	.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table 4

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary of Clinical Observations

Day numbers relative to Start Date

Group	Sex	Clinical Sign	78	85	91	92
6	f	ANIMALS ALIVE	55	55	55	10
		ANIMALS NORMAL	55	54	44	10
		Convulsions	.	1	1	.
		Scheduled euthanasia	.	.	44	10
7	f	ANIMALS ALIVE	55	55	55	10
		ANIMALS NORMAL	55	55	44	10
		Scab	.	.	.	.
		Alopecia	.	.	1	.
		Scheduled euthanasia	.	.	45	10

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table 5

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary of Body Weights (g)

Day numbers relative to Start Date

Group	Sex		Week -1	1	8	15	22	29	36	43
1	f	Mean	16.96	17.80	18.51	20.25	19.98	21.49	22.20	22.54
		S.D.	1.44	1.60	1.85	1.16	2.56	1.14	1.24	1.27
		N	80	80	80	55	55	55	55	55
2	f	Mean	16.92	18.10	18.70	20.46	20.15	21.60	22.17	23.16
		S.D.	1.45	1.25	1.76	0.97	2.45	1.14	1.25	1.22
		N	80	80	80	55	55	55	55	55
3	f	Mean	16.97	18.20	19.10	20.50	20.87*	21.71	22.39	22.86
		S.D.	1.43	1.36	1.53	1.29	1.52	1.55	1.44	1.73
		N	80	80	80	55	55	55	55	55
4	f	Mean	16.99	17.90	18.73	20.36	21.05*	21.51	22.17	22.80
		S.D.	1.43	1.42	1.93	1.15	1.07	1.04	1.08	1.17
		N	80	80	80	55	55	55	55	55
5	f	Mean	16.97	17.98	18.80	20.20	20.87*	21.47	22.05	22.46
		S.D.	1.44	1.49	1.67	1.01	1.02	1.22	1.18	1.73
		N	80	80	80	55	55	55	55	55
6	f	Mean	16.98	18.07	18.62	19.95	20.04	21.12	21.54*	22.01
		S.D.	1.44	1.40	1.61	1.07	1.48	1.07	1.32	1.11
		N	80	80	80	55	55	55	55	55
7	f	Mean	17.00	17.91	18.58	19.53*	20.08	20.67*	21.21*	21.47*
		S.D.	1.44	1.43	1.44	1.35	1.28	1.30	1.33	1.29
		N	80	80	80	55	55	55	55	55

Statistics Test: Dunnett Test: * - 5% significance level (Group 1 to Groups 2-7)

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table 5

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary of Body Weights (g)

Day numbers relative to Start Date

Group	Sex		50	57	64	71	78	85	91	92
1	f	Mean	23.13	23.95	23.98	24.37	25.01	24.86	25.83	24.94
		S.D.	1.55	1.63	1.45	2.09	1.80	2.01	2.57	1.89
		N	55	55	55	55	55	55	44	10
2	f	Mean	23.50	24.14	24.60	25.05	25.38	25.55	26.37	26.03
		S.D.	1.23	1.37	1.60	1.80	1.77	1.98	2.08	1.90
		N	55	55	55	55	55	55	44	10
3	f	Mean	23.63	24.14	24.41	25.16	25.61	25.63	25.85	26.68
		S.D.	1.82	1.91	1.94	2.29	2.50	2.64	2.43	4.37
		N	55	55	55	55	55	55	45	10
4	f	Mean	23.22	23.84	24.34	24.71	24.71	25.62	26.31	25.03
		S.D.	1.32	1.35	1.55	2.03	1.79	1.86	2.07	1.81
		N	55	55	55	55	55	55	45	10
5	f	Mean	22.79	23.55	23.86	24.17	24.73	24.70	25.30	25.51
		S.D.	1.37	1.27	1.50	1.50	1.71	2.15	2.02	1.68
		N	55	55	55	55	55	55	45	10
6	f	Mean	22.58	23.07*	23.27	23.50	23.93*	24.01	24.85	24.70
		S.D.	1.27	1.34	1.44	1.60	1.69	1.74	1.41	2.31
		N	55	55	55	55	55	55	45	10
7	f	Mean	21.61*	22.66*	22.33*	22.97*	22.97*	23.15*	23.34*	23.96
		S.D.	1.57	1.69	1.53	1.51	1.57	1.57	1.74	1.60
		N	55	55	55	55	55	55	45	10

Statistics Test: Dunnett Test: * - 5% significance level (Group 1 to Groups 2-7)

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table 6

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary of Food Consumption (g/animal/day)

Day numbers relative to Start Date

Group	Sex	From: / To:	1 / 8	8 / 15	15 / 22	22 / 29	29 / 36	36 / 43	43 / 50	50 / 57	57 / 64	64 / 71	71 / 78	78 / 85	85 / 91	85 / 92
1	f	Mean	3.5	3.7	3.4	3.8	3.6	3.8	4.2	4.1	3.9	4.1	4.6	3.9	4.4	3.8
		S.D.	0.4	0.6	0.5	0.3	0.3	0.6	0.7	1.0	0.5	0.7	1.2	1.0	0.7	.
		N	16	10	11	11	11	11	11	8	10	10	10	9	8	2
2	f	Mean	3.6	3.5	3.4	4.0	3.4	3.9	4.5	3.9	4.1	4.4	4.6	3.9	4.1	4.2
		S.D.	0.6	0.2	0.4	0.6	0.7	0.3	0.9	0.3	0.7	0.8	0.9	0.3	0.7	.
		N	16	10	11	11	11	11	11	9	9	8	10	9	7	1
3	f	Mean	3.6	3.7	3.6	3.8	3.8	3.8	4.1	4.1	3.8	4.6	4.1	4.1	5.2	3.6
		S.D.	0.5	0.8	0.4	0.5	1.1	1.1	1.0	0.7	0.2	1.3	0.7	0.8	1.3	.
		N	15	10	11	11	10	10	10	9	8	7	6	8	7	2
4	f	Mean	3.6	3.7	3.8	3.8	4.0	3.8	3.9	4.0	3.9	5.3	4.7	5.1	4.9	5.2
		S.D.	0.6	0.4	0.6	0.7	0.9	0.8	0.6	0.7	0.6	1.4	1.2	2.0	1.3	.
		N	12	10	10	11	10	10	9	8	4	8	7	7	6	1
5	f	Mean	3.8	3.9	3.6	3.7	3.7	3.7	4.0	4.3	4.2	4.2	4.1	4.5	4.3	3.7
		S.D.	0.7	0.7	0.3	0.4	0.7	0.4	0.6	1.4	0.7	0.7	0.7	0.7	1.3	.
		N	12	11	10	11	11	11	9	10	9	9	9	9	6	2
6	f	Mean	3.7	4.1	4.3	4.7	4.7	4.3	3.9	4.5	5.3	5.1	5.7	4.9	5.1	3.7
		S.D.	0.5	0.7	0.9	1.2	1.2	1.0	0.5	0.9	0.8	1.2	2.4	0.8	1.0	.
		N	13	7	9	10	8	10	8	4	3	8	5	10	5	1
7	f	Mean	3.6	3.9	3.6	3.9	3.3	3.7	3.8	3.6	4.5	4.2	4.9	4.4	4.2	3.3
		S.D.	0.7	0.8	0.6	0.9	0.3	0.5	1.0	0.4	1.3	0.9	1.1	1.1	1.4	.
		N	12	10	10	10	10	10	10	8	5	9	5	10	7	1

Statistics Test: Kruskall Wallis test (α= 0.05) was performed at each time point followed by Wilcoxon test using a Bonferroni adjusted α. (Group 1 to Groups 2-7)

. – Standard deviation not calculated because there were fewer than three values available.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table 7

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary of Water Consumption (mL/animal/day)

Day numbers relative to Start Date

		From:	1	8	15	22	29	36	43	50	57	64	71	78	85	85
Group	Sex	To:	8	15	22	29	36	43	50	57	64	71	78	85	91	92
1	f	Mean	4.9	5.1	4.3	5.5	5.1	5.6	5.5	5.3	5.4	5.2	5.4	5.3	5.0	6.8
		S.D.	1.1	0.5	1.1	0.4	0.2	1.6	0.4	0.6	0.6	0.6	0.5	0.9	1.2	.
		N	12	9	7	8	8	7	9	8	8	9	10	7	6	2
2	f	Mean	4.7	5.4	4.6	6.1	4.7	5.4	5.4	5.5	5.7	5.4	5.4	5.1	6.1	5.1
		S.D.	1.1	0.7	1.3	1.8	1.2	0.3	0.8	0.3	0.8	0.7	0.7	0.5	2.5	.
		N	13	8	10	5	8	7	9	10	10	10	9	9	8	2
3	f	Mean	5.1	4.7	5.2	5.7	5.1	5.8	5.4	5.2	5.4	5.5	5.6	5.0	5.1	5.5
		S.D.	0.9	1.0	0.9	1.1	0.3	1.1	0.4	0.3	0.4	0.3	0.6	0.7	0.6	.
		N	11	7	8	8	8	6	8	7	8	9	9	10	9	2
4	f	Mean	4.4	5.0	5.0	5.0	5.2	5.3	5.2	5.4	5.4	5.2	4.8	5.2	5.0	8.7
		S.D.	1.0	0.6	0.6	0.5	0.3	0.8	0.3	0.5	0.7	0.4	0.6	0.6	0.6	.
		N	11	8	10	9	7	6	7	9	6	9	7	8	6	1
5	f	Mean	4.4	4.8	4.8	5.0	4.9	4.7	4.8*	5.1	5.3	5.0	5.2	5.5	5.4	5.7
		S.D.	1.0	0.4	0.4	0.8	0.4	0.6	0.4	0.4	1.0	0.4	0.6	0.8	1.7	.
		N	10	8	5	8	9	9	9	8	4	9	10	8	7	2
6	f	Mean	4.1	4.3	4.0	4.6	4.1*	4.5	4.4*	4.1*	4.7	4.4*	4.0*	4.4	4.1	4.2
		S.D.	1.2	0.3	0.6	0.8	0.4	0.9	0.4	0.8	0.8	1.2	0.3	0.8	0.5	.
		N	10	8	5	7	10	11	9	8	7	11	9	7	9	1
7	f	Mean	3.1*	4.2	3.0*	4.5	3.6*	3.4*	3.7*	4.4	3.4*	3.4*	3.9*	3.9*	3.2*	5.9
		S.D.	0.2	1.9	0.6	1.9	0.1	0.4	0.4	1.9	0.5	0.2	1.9	1.5	0.3	.
		N	8	8	9	8	10	7	8	8	6	10	11	8	7	2

Statistics Test: Dunnett Test: * - 5% significance level (Group 1 to Groups 2-7)

. – Standard deviation not calculated because there were fewer than three values available.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table 8

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Organ Weights (g) and Intestinal Segment Lengths (cm):
Samples Collected for Total Cr and Fe Analysis

Animal ID	Oral Mucosa (g)	Bone (g)	Spleen (g)	Kidney (g)	Liver (g)	Glandular Stomach (g)	Duodenum (g)	Jejunum (g)	Ileum (g)	Duodenum (cm)	Jejunum (cm)	Ileum (cm)
1F76	0.0150	0.0784	0.0743	0.3129	1.0284	0.1108	0.2275	0.4130	0.1194	8.5	17.5	8.5
1F77	0.0197	0.0976	0.0888	0.3671	1.2368	0.1290	0.2639	0.6696	0.2637	7.5	18.7	9.7
1F78	0.0202	0.0596	0.0747	0.3327	1.0839	0.1296	0.2206	0.3659	0.1198	8.5	18.0	8.5
1F79	0.0246	0.0707	0.0753	0.2912	0.9740	0.1270	0.2346	0.4869	0.1658	8.0	18.3	10.0
1F80	0.0202	0.0745	0.0848	0.2954	1.0122	0.1144	0.2442	0.4541	0.1808	9.5	17.5	8.5
Group Mean	**0.0199**	**0.0762**	**0.0796**	**0.3199**	**1.0671**	**0.1222**	**0.2382**	**0.4779**	**0.1699**	**8.4**	**18.0**	**9.0**
SD	**0.0034**	**0.0139**	**0.0068**	**0.0311**	**0.1028**	**0.0089**	**0.0168**	**0.1164**	**0.0591**	**0.7**	**0.5**	**0.7**
2F156	0.0227	0.0836	0.0864	0.3302	1.1553	0.1605	0.2906	0.4677	0.1516	9.0	19.5	8.5
2F157	0.0179	0.0788	0.0702	0.3154	1.1051	0.1420	0.3927	0.5742	0.1496	9.5	19.0	8.8
2F158	0.0204	0.0758	0.0848	0.2949	1.0679	0.1330	0.3705	0.4585	0.1931	9.5	18.0	8.5
2F159	0.0300	0.0711	0.0805	0.3282	1.1037	0.1246	0.4020	0.5316	0.2786	9.5	18.5	10.3
2F160	0.0247	0.0854	0.0850	0.3187	1.1899	0.1470	0.2928	0.4590	0.1264	9.0	19.0	8.5
Group Mean	**0.0231**	**0.0789**	**0.0814**	**0.3175**	**1.1244**	**0.1414**	**0.3497**	**0.4982**	**0.1799**	**9.3**	**18.8**	**8.9**
SD	**0.0046**	**0.0058**	**0.0066**	**0.0141**	**0.0481**	**0.0137**	**0.0542**	**0.0523**	**0.0602**	**0.3**	**0.6**	**0.8**

Nominal Dose: Group 1 - 0 mg/L Water; Group 2 - 0.3 mg/L SDD; Group 3 - 4 mg/L SDD; Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD; Group 6 - 170 mg/L SDD; Group 7 - 520 mg/L SDD

Table 8

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Organ Weights (g) and Intestinal Segment Lengths (cm)
Samples Collected for Total Cr and Fe Analysis

Animal ID	Oral Mucosa (g)	Bone (g)	Spleen (g)	Kidney (g)	Liver (g)	Glandular Stomach (g)	Duodenum (g)	Jejunum (g)	Ileum (g)	Duodenum (cm)	Jejunum (cm)	Ileum (cm)
3F236	0.0164	0.0890	0.0851	0.3606	1.2890	0.1549	0.3579	0.5660	0.2308	9.0	16.7	9.5
3F237	0.0149	0.0651	0.0813	0.2685	0.9349	0.1175	0.2087	0.3586	0.0912	8.5	17.0	8.2
3F238	0.0195	0.0711	0.0730	0.2750	0.9088	0.1242	0.2609	0.4355	0.1673	8.5	17.7	8.5
3F239	0.0188	0.0692	0.0697	0.3045	1.0711	0.1351	0.2471	0.3630	0.1389	9.5	18.2	8.5
3F240	0.0178	0.0912	0.0897	0.3599	1.3291	0.1306	0.3480	0.6568	0.2141	9.6	19.9	9.9
Group Mean	**0.0175**	**0.0771**	**0.0798**	**0.3137**	**1.1066**	**0.1325**	**0.2845**	**0.4760**	**0.1685**	**9.0**	**17.9**	**8.9**
SD	**0.0019**	**0.0121**	**0.0083**	**0.0446**	**0.1953**	**0.0142**	**0.0654**	**0.1313**	**0.0566**	**0.5**	**1.3**	**0.7**
4F316	0.0188	0.0792	0.1064	0.3539	1.2014	0.1414	0.2869	0.5011	0.1681	9.3	19.5	9.0
4F317	0.0176	0.0846	0.0789	0.2976	0.9648	0.1624	0.2248	0.5404	0.1874	9.5	20.4	9.0
4F318	0.0169	0.0785	0.0765	0.3075	1.0545	0.1332	0.2661	0.4798	0.1364	9.3	19.0	8.5
4F319	0.0201	0.0924	0.0597	0.2932	0.8740	0.1425	0.2179	0.4683	0.1125	8.7	17.7	8.7
4F320	0.0174	0.0715	0.0689	0.2845	0.9038	0.1307	0.2400	0.3665	0.0996	9.0	17.0	8.0
Group Mean	**0.0182**	**0.0812**	**0.0781**	**0.3073**	**0.9997**	**0.1420**	**0.2471**	**0.4712**	**0.1408**	**9.2**	**18.7**	**8.6**
SD	**0.0013**	**0.0078**	**0.0175**	**0.0273**	**0.1322**	**0.0125**	**0.0289**	**0.0647**	**0.0369**	**0.3**	**1.4**	**0.4**

Nominal Dose: Group 1 - 0 mg/L Water; Group 2 - 0.3 mg/L SDD; Group 3 - 4 mg/L SDD; Group 4 - 14 mg/L SDD; Group 5 - 60 mg/L SDD; Group 6 - 170 mg/L SDD; Group 7 - 520 mg/L SDD

Table 8

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Organ Weights (g) and Intestinal Segment Lengths (cm)
Samples Collected for Total Cr and Fe Analysis

Animal ID	Oral Mucosa (g)	Bone (g)	Spleen (g)	Kidney (g)	Liver (g)	Glandular Stomach (g)	Duodenum (g)	Jejunum (g)	Ileum (g)	Duodenum (cm)	Jejunum (cm)	Ileum (cm)
5F396	0.0182	0.0933	0.0817	0.2873	0.9403	0.1277	0.3325	0.6255	0.2129	9.7	19.9	9.8
5F397	0.0163	0.0691	0.0659	0.2862	0.9464	0.1639	0.2810	0.4638	0.1186	9.0	18.3	8.0
5F398	0.0273	0.0809	0.0901	0.3038	1.1361	0.1369	0.3810	0.5203	0.1707	9.7	19.2	9.0
5F399	0.0173	0.0717	0.0820	0.2753	1.0468	0.1472	0.2773	0.4320	0.1317	9.4	18.0	8.3
5F400	0.0305	0.0991	0.0818	0.2887	0.9854	0.1417	0.3360	0.6010	0.1602	9.2	19.1	8.5
Group Mean	**0.0219**	**0.0828**	**0.0803**	**0.2883**	**1.0110**	**0.1435**	**0.3216**	**0.5285**	**0.1588**	**9.4**	**18.9**	**8.7**
SD	**0.0065**	**0.0131**	**0.0088**	**0.0102**	**0.0818**	**0.0135**	**0.0432**	**0.0840**	**0.0368**	**0.3**	**0.8**	**0.7**
6F476	0.0165	0.0562	0.0728	0.2529	0.8789	0.1236	0.3698	0.4824	0.1462	9.6	18.6	8.8
6F477	0.0215	0.0862	0.0703	0.2682	0.8824	0.1227	0.3172	0.6000	0.1911	10.0	19.7	9.5
6F478	0.0200	0.0734	0.0702	0.3006	1.0135	0.1201	0.3728	0.6301	0.1303	9.0	19.0	8.0
6F479	0.0211	0.0959	0.0544	0.2677	0.8913	0.1304	0.3855	0.5656	0.1345	9.2	20.7	10.0
6F480	0.0123	0.0780	0.0657	0.2809	1.0019	0.1324	0.3586	0.5392	0.1152	9.2	18.6	9.0
Group Mean	**0.0183**	**0.0779**	**0.0667**	**0.2741**	**0.9336**	**0.1258**	**0.3608**	**0.5635**	**0.1435**	**9.4**	**19.3**	**9.1**
SD	**0.0039**	**0.0149**	**0.0073**	**0.0178**	**0.0679**	**0.0053**	**0.0262**	**0.0569**	**0.0288**	**0.4**	**0.9**	**0.8**

Nominal Dose: Group 1 - 0 mg/L Water; Group 2 - 0.3 mg/L SDD; Group 3 - 4 mg/L SDD; Group 4 - 14 mg/L SDD; Group 5 - 60 mg/L SDD; Group 6 - 170 mg/L SDD; Group 7 - 520 mg/L SDD

Table 8

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Organ Weights (g) and Intestinal Segment Lengths (cm)
Samples Collected for Total Cr and Fe Analysis

Animal ID	Oral Mucosa (g)	Bone (g)	Spleen (g)	Kidney (g)	Liver (g)	Glandular Stomach (g)	Duodenum (g)	Jejunum (g)	Ileum (g)	Duodenum (cm)	Jejunum (cm)	Ileum (cm)
7F556	0.0189	0.0699	0.0643	0.2711	0.8057	0.1265	0.3985	0.6140	0.1469	9.5	20.5	9.7
7F557	0.0159	0.0712	0.0627	0.2904	0.8638	0.1284	0.3438	0.6128	0.1247	9.2	22.0	9.0
7F558	0.0141	0.0916	0.0612	0.2572	0.8771	0.1515	0.3621	0.6788	0.1663	9.7	19.7	10.3
7F559	0.0191	0.0746	0.0602	0.2758	0.8349	0.1286	0.3619	0.5635	0.1505	10.0	20.0	8.6
7F560	0.0165	0.0684	0.0707	0.3030	1.0017	0.1328	0.4664	0.6606	0.1930	9.9	21.6	9.9
Group Mean	**0.0169**	**0.0751**	**0.0638**	**0.2795**	**0.8766**	**0.1336**	**0.3865**	**0.6259**	**0.1563**	**9.7**	**20.8**	**9.5**
SD	**0.0021**	**0.0095**	**0.0041**	**0.0177**	**0.0751**	**0.0103**	**0.0489**	**0.0453**	**0.0253**	**0.3**	**1.0**	**0.7**

Nominal Dose: Group 1 - 0 mg/L Water; Group 2 - 0.3 mg/L SDD; Group 3 - 4 mg/L SDD; Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD; Group 6 - 170 mg/L SDD; Group 7 - 520 mg/L SDD

Appendix A

Operational Protocol and Amendments

Study Protocol:

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

Southern Research Institute Study No: 13026.01.01

February 22, 2010

IACUC No.: 10-01-003B

Approval Date: 1/13/10

SOUTHERN RESEARCH

Legendary Discoveries. Leading Innovation.

1.0 SPONSOR REPRESENTATIVE AND CONTACTS:

Sponsor:	American Chemistry Council 1300 Wilson Avenue Arlington, VA 22209
Sponsor's Representative:	Mark A. Harris, Ph.D. ToxStrategies, Inc. 23501 Cinco Ranch Blvd. Suite G265 Katy, TX 77494 E-mail: mharris@toxstrategies.com Tel: 281-712-2062 Ext 2001
Test Article:	Sodium dichromate dihydrate (SDD)

2.0 TITLE:

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

3.0 OBJECTIVE:

The objective of this study is to evaluate the toxicity and potential mechanisms of action of sodium dichromate dihydrate (SDD) administered in drinking water to mice for 90 days.

4.0 TESTING LABORATORY:

Drug Development Division
Southern Research Institute (Southern Research)
2000 Ninth Avenue South 35205
P.O. Box 55305
Birmingham, AL 35255-5305

5.0 KEY STUDY DATES:

Event	Sequence	Dates
Day 1 of Dosing	Toxicology/Histology Groups (Day 8 Necropsy, 5/group) Toxicology/Histology Groups (Day 91 Necropsy, 5/group) Toxicology/Histology Groups (Day 91 Necropsy, 5/group) Biochemical Evaluation Groups (Day 8, 10/group) Biochemical Evaluation Groups (Day 91, 10/group) Biochemical Evaluation Groups (Day 91, 10/group) Gene Expression Groups (Day 8, 10/group) Gene Expression Groups (Day 91, 10/group) Mutation Analysis Groups (Day 91, 5/group) Mutation Analysis Groups (Day 91, 5/group) Possible Future Analyses (Day 91, 5/group)	3/15/10 3/2/10 3/3/10 3/16/10 3/4/10 3/5/10 3/17/10 3/6/10 3/9/10 3/18/10 3/19/10
Collection of Samples for Biochemical Analysis	Day 8 Day 91	3/23/10 6/2-3/10
Collection of Samples for Gene Expression Analysis	Day 8 Day 91	3/24/10 6/4/10
Collection of Samples for Mutation Analysis	Day 91	6/7/10 6/17/10
Collection of Samples for Possible Future Analyses	Day 91	6/18/10
Necropsy for Toxicology and Histology	Day 8 Day 91	3/22/10 5/31/10-6/1/10

Event	Sequence	Dates
Draft Report Due	One draft report will be issued. The data of submission of the draft report will be determined at a later date, and will be added to this protocol by amendment.	TBD
Final Report Due	15 working days after receipt of Sponsor comments on the draft report	---

6.0 STUDY PERSONNEL:

Study Director: Charles D. Hébert, Ph.D., D.A.B.T.
Phone: (205) 581-2285
E-Mail: hebert@southernresearch.org

7.0 TEST ARTICLE & VEHICLE:

7.1 TEST ARTICLE:

Name: **Sodium dichromate dihydrate (SDD)**
Supplier: Sponsor
Lot Number(s): 05914AS
Special Handling: Handle bulk as hazardous material

Color Assignment: The color "green" has been designated to identify this test article.

Characterization: The bulk test article will be provided by the Sponsor. Test article identity, strength, quality, stability, composition, and purity, as well as methods of synthesis, fabrication, or derivation, are the responsibilities of the Sponsor. A copy of the Certificate(s) of Analysis will be included in the study file.

Stability & Storage: The test article will be supplied as bulk test article and will be stored at room temperature in glass containers and protected from light.

Disposition: Unused test article will be maintained at Southern Research until instructions on disposition are received from the Sponsor's Representative. The residual bulk test article (with the exception of the reserve sample) will be disposed of as directed by the Sponsor's Representative.

Reserve Samples: Reserve samples from each lot of test article used on the study will be retained and stored frozen at approximately -20 °C or lower.

7.2 VEHICLE

Name:	**Tap Water**
Supplier:	Birmingham Water Works
Lot Number(s):	Not applicable
Special Handling:	None
Characterization:	Not applicable
Stability & Storage:	Not applicable. Tap water will be used directly from the source, and will not be stored.
Disposition:	Not applicable.
Reserve Samples:	Reserve samples of vehicle will be retained and stored frozen at approximately -20 °C or lower.

7.3 FORMULATIONS:

Preparation: Dose formulations of SDD will be prepared and vehicle control formulations (tap water) will be collected once during Week -1 and at 2-week (i.e., 10- to 17-day) intervals thereafter throughout the study.

Dose Formulation Analyses: Samples of each batch of SDD dose formulations from the first, third, fifth, and last mixes will be collected and shipped to a Sponsor-designated laboratory for concentration analysis. The results of these analyses will be provided to Southern Research by the Sponsor and will be included in the study records and the report. Because dose formulations of SDD in tap water are solutions, it will not be necessary to demonstrate homogeneity of the formulations used in this study. Information on the designated laboratory will be included in the study records.

Formulation Storage, Stability, and Handling: When not in use, dose formulations of SDD and vehicle formulations will be stored in sealed Nalgene (or equivalent) containers at room temperature protected from light. SDD has been shown to be stable for 42 days in dosed water formulations at a concentration of 41.8 mg/L when stored under these conditions (NTP Technical Report on the Toxicology and Carcinogenesis Studies of Sodium Dichromate Dihydrate (CAS No. 7789-12-0) in F344/N Rats and B6C3F1 Mice (Drinking Water Studies). 2008. NTP TR 546). Reserve samples of each formulation will be retained and stored at approximately -70 °C.

SDD formulations in tap water have been shown to be stable under simulated animal room conditions (i.e., ambient temperature in glass bottles) for at least 7 days (NTP Technical Report on the Toxicology and Carcinogenesis Studies of

Sodium Dichromate Dihydrate (CAS No. 7789-12-0) in F344/N Rats and B6C3F1 Mice (Drinking Water Studies). 2008. NTP TR 546).

Disposition: Residual formulations remaining after dose administration is complete will be disposed of as hazardous waste.

8.0 TEST SYSTEM:

Species & Strain:	B6C3F1 mice
Supplier:	Charles River Laboratories International, Inc.
Age on Day 1:	5-7 Weeks
Weight on Day 1:	16-24 g
Number & Sex on Study:	Females – 560

8.1 JUSTIFICATION:

Justification for Test System: The B6C3F1 mouse model was selected for this study because it is the species/strain that was used in previous studies conducted by the National Toxicology Program (NTP). The data from the current study are intended to provide information on mechanisms of action of the test article.

Justification for Number on Study: The number of animals proposed for use on this study was selected to be the minimum number needed to obtain reliable statistical results in light of limitations on the amount of blood and tissue that can be collected from a mouse. Because of the small size of the target tissues, it is not feasible to collect samples of those tissues for all the necessary evaluations from the same mice. Therefore, it will be necessary to use separate cohorts of mice for collection of samples for histopathologic, biochemical, gene expression, and mutation analyses. The number of dose groups is the fewest possible consistent with the objective of the study, the scientific needs of the Sponsor, contemporary scientific standards, and applicable regulatory requirements.

Rationale for the Use of Animals for this Study: The current state of scientific knowledge does not provide acceptable alternatives, in vitro or otherwise, to the use of live animals to accomplish the purpose of this study.

Justification for Dose Levels and Route: The oral route of administration was selected for this study because this is one of the likely routes of exposure in humans. The dose levels were chosen to bracket those used in the previous NTP studies, and to provide an environmentally relevant concentration on the low end of the dose curve.

8.2 HOUSING:

Animals will be group housed (5/cage) in solid bottom cages on stainless steel racks. Irradiated hardwood bedding chips (Sani Chips®; P.J. Murphy Forest Products Corp.; Montville, NJ) will be used. Analytical reports for the bedding will be reviewed by Southern Research's veterinarian to assure that no known contaminants are present that could interfere with or affect the results of the study.

Animals will be housed in an environmentally monitored, well-ventilated room maintained at a temperature of 69–75 °F and a relative humidity of 35%-65%. Fluorescent lighting will provide illumination approximately 12 hours per day.

8.3 DIET:

Mice will be fed irradiated NTP-2000 Wafers (Zeigler Bros.; Gardners, PA) during the pre-study and study periods. Feed will be provided ad libitum. Analyses of the feed, provided by the manufacturer, will be reviewed by Southern Research's Veterinarian, or designee, to assure that no known contaminants are present that would interfere with or affect the outcome of studies.

8.4 WATER:

The water source will be the Birmingham municipal water supply. Water (either undosed for control animals or containing SDD for treated animals) will be supplied in amber glass water bottles. Teflon®-lined lids with stainless steel, double-balled sipper tubes will be used. Water bottles will be changed twice weekly on a 3-day/4-day schedule, or more frequently as needed. Samples of water from the animal facility will be periodically analyzed, and the analyses will be reviewed by Southern Research's Veterinarian, or designee, to assure that no known contaminants are present that could interfere with or affect the outcome of studies. Water bottles and sipper tubes will be labeled with color-coded zip ties to indicate the chemical and dose concentration.

8.5 ACCLIMATION:

Mice will be acclimated for a minimum of 7 days. Prior to study start, the animals will be observed for general health and acceptability for use in this study. Only animals deemed healthy will be included in this study.

8.6 ANIMAL IDENTIFICATION:

The animal identification number for each mouse will consist of a letter designating the dose group, a letter designating the sex, and a unique number (e.g., UM12). The mice will be uniquely identified by tail tattoo using the numerical portion, but not the letter portion, of the identification.

9.0 EXPERIMENTAL DESIGN:

The Provantis application (Version 7; Instem Life Sciences Systems, Ltd.; Staffordshire, United Kingdom) will be used for the direct on-line capture of most in-life and pathology data. Environmental monitoring of animal rooms (i.e., temperature/humidity and light/dark cycles) will be performed using the Edstrom Watchdog (Version 5.11; Edstrom Industries, Inc.; Waterford, WI). The remainder of the data will be collected manually or by the appropriate automated system.

9.1 RANDOMIZATION & GROUP ASSIGNMENT:

In order to obtain groups that are comparable by body weight, all mice will be assigned to their respective treatment groups using a computer-generated randomization procedure. Because of the number of mice in the study, the animals will be received in two separate shipments (cohorts), and the mice in the different cohorts will be randomized separately. The body weights required for randomization will be determined during the week prior to randomization. After randomization, mice will be assigned to one vehicle control group or to one of six treated groups as indicated below.

Group	Treatment	Conc. (mg/L)	Number of Animals							
			Toxicology and Histopathology		Biochemical Evaluations		Gene Expression Analysis		Mutation Analysis	Future Analyses
			Day 8	Day 91	Day 8	Day 91	Day 8	Day 91	Day 91	Day 91
1	Water	0	5 F	10 F	10 F	20 F	10 F	10 F	10 F	5 F
2	SDD	0.3	5 F	10 F	10 F	20 F	10 F	10 F	10 F	5 F
3	SDD	4	5 F	10 F	10 F	20 F	10 F	10 F	10 F	5 F
4	SDD	14	5 F	10 F	10 F	20 F	10 F	10 F	10 F	5 F
5	SDD	60	5 F	10 F	10 F	20 F	10 F	10 F	10 F	5 F
6	SDD	170	5 F	10 F	10 F	20 F	10 F	10 F	10 F	5 F
7	SDD	520	5 F	10 F	10 F	20 F	10 F	10 F	10 F	5 F

Color codes and letter designations will be assigned to the dose groups as follows:

Group	Treatment	Conc. (mg/L)	Letter Code	Color Code
1	Water	0	U	Black
2	SDD	0.3	L	Grey
3	SDD	4	I	Yellow
4	SDD	14	J	Orange
5	SDD	60	M	Purple
6	SDD	170	N	Blue
7	SDD	520	H	Red

9.2 DOSE PROCEDURE:

In order to accommodate necropsy and sample collections on large numbers of mice the study will be stagger-started, with Days 1 distributed as shown in Section 5.0 (Key Study Dates) of this protocol.

Mice in this study will receive the test article in their drinking water. The test article will be available ad libitum to study animals 7 days per week (including holidays) for 7 or 90 days, as shown in the table above.

In the event unanticipated, severe toxicity should be encountered in any dose group, dose groups or dosing schedules may be adjusted. The decision to exercise the option of dose reduction or schedule adjustment will be made by the Study Director or designee, in conjunction with the Sponsor's Representative if possible, based upon the nature of clinical signs that are present and severity of the condition of the animals.

9.3 FASTING REQUIREMENTS:

Fasting is not required during the course of this study.

9.4 CLINICAL OBSERVATIONS:

Daily Observations: All animals will be observed at least twice daily during the pre-study and study periods for signs of mortality and moribundity.

Detailed Observations: Each animal will be removed from its cage and examined for clinical signs of toxicity on Day 1 and weekly thereafter. Detailed clinical observations may be assessed more frequently as clinical signs warrant.

9.5 BODY WEIGHTS:

Each animal will be weighed during Week -1 for randomization, on Day 1, weekly thereafter, and prior to scheduled euthanasia. In addition, a body weight will be collected on any animal that is euthanized in extremis; body weights will not be collected for animals found dead. Body weights may be collected more frequently if deemed necessary by the Study Director.

9.6 FOOD AND WATER CONSUMPTION:

Quantitative food and water consumption will be measured by cage weekly for each cage of animals throughout the study. Values will be reported as an average consumption (grams/animal/day).

9.7 MUTATION ANALYSIS:

Samples for mutation analysis will be collected on Day 91. Ten mice/group will be euthanized using CO_2, and samples of oral epithelium and duodenal epithelium will be collected and snap frozen. Samples for mutation analysis will also be collected prior to the necropsy of any mouse designated for mutation analysis that is euthanized in a moribund condition. These samples will be stored frozen at approximately -20 °C or lower until they are shipped to a Sponsor-designated laboratory for analysis. Following collection of these tissues, mice designated for mutation analysis will be discarded without further evaluation.

9.8 GENE EXPRESSION ANALYSIS:

Samples for gene expression analysis will be collected on Days 8 and 91. On each of these days, 10 mice/group will be euthanized using CO_2, and samples of oral epithelium, duodenal epithelium, and jejunal epithelium will be collected. Details on handling and storage of samples after collection will be documented in the study record. Samples for gene expression analysis will also be collected prior to the necropsy of any mouse designated for gene expression analysis that is euthanized in a moribund condition. These samples will be stored at Southern Research until they are shipped to a Sponsor-designated laboratory for analysis.

Following collection of these samples, carcasses and remaining tissues from mice designated for gene expression analysis will be discarded without further evaluation.

9.9 BIOCHEMICAL ANALYSES:

Sample Collection: Samples for biochemical analyses will be collected from 10 mice/group on Day 8 and from 20 mice/group on Day 91. On Days 8 and 91, 10 mice/group will be designated as Subgroup A; on Day 91, the remaining 10 mice/group will be designated as Subgroup B.

For blood collection, each mouse will be anesthetized with CO_2/O_2 and blood samples will be collected from the retro-orbital sinus into tubes containing EDTA as anticoagulant (Subgroup A) in serum separator tubes containing no anticoagulant (Subgroup B). The contents of the Subgroup B tubes will be centrifuged to separate serum. Prior to euthanasia, the orbital route may be supplemented by puncture of the vena cava if necessary. Blood samples for biochemical analysis will also be collected prior to the necropsy of any mouse designated for biochemical analysis that is euthanized in a moribund condition.

Immediately following blood collection, each mouse will be euthanized using CO_2. Samples of oral epithelium, duodenal epithelium, and jejunal epithelium will be collected from animals in Subgroup A. A sample of oral mucosa and underlying muscle and an intact segment from the cranial end of the duodenum will be collected from each animal in Subgroup B. Following collection of these tissues, mice designated for biochemical analysis will be discarded without further evaluation.

Whole blood samples and tissue samples from animals in Subgroup A will not be stored, but will be provided to representatives of a Sponsor-designated laboratory for analysis. Serum samples from animals in Subgroup B will be divided into two aliquots, and the oral cavity and duodenum samples will be weighed and split into two pieces longitudinally (if possible). Serum and tissue samples will be snap-frozen upon collection, and will be stored frozen (at or below -70 °C) until they are used for analysis.

Biochemical Analysis, GSH/GSSG Ratio: One blood sample, one sample of oral epithelium, and one sample of duodenal epithelium, and one sample of jejunal epithelium from each animal in Subgroup A will be provided to a Sponsor-designated laboratory for analysis of GSH and GSSG, and subsequent calculation of GSH/GSSG ratios.

Biochemical Analysis, DNA-Cr Adducts: One sample of oral epithelium, one sample of duodenal epithelium, and one sample of jejunal epithelium from each animal in Subgroup A will be shipped to a Sponsor-designated laboratory for analysis.

Biochemical Analysis, 8-OHdG: One sample of oral cavity and one sample of duodenum from each animal in Subgroup B will be analyzed for 8-OHdG.

Biochemical Analysis, Cytokines: One serum sample, one sample of oral cavity, and one sample of duodenum from each animal in Subgroup B will be analyzed for IL-1α, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-7, IL-9, IL-10, IL-12p70, IL-13, IL-15, IL-17, TNF-α, KC/GRO, MCP-1, G-CSF, GM-CSF, IP-10, MIP-1α, RANTES, and IFN-γ.

Biochemical Analysis, 8-Isoprostane: One sample of oral cavity and one sample of duodenum from each animal in Subgroup B will be analyzed for 8-isoprostane.

9.10 FUTURE SAMPLE ANALYSIS:

Samples for possible future analyses will be collected on Day 91. Five mice/group will be euthanized using CO_2, and samples of intact oral mucosa, a segment of intact duodenum from the cranial end approximately 1 cm from stomach, and a segment from the middle of the intact jejunum will be collected and snap frozen. Samples for possible future analysis will also be collected prior to the necropsy of any mouse designated for these groups that is euthanized in a moribund condition. Samples will be stored frozen at approximately -20 °C or lower until Southern Research receives instructions on their disposition from the Sponsor's Representative. Following collection of these tissues, mice designated for these groups will be discarded without further evaluation.

9.11 MACROSCOPIC AND MICROSCOPIC PATHOLOGY:

Macroscopic Pathology: Mice designated for macroscopic and microscopic pathology evaluation (i.e., those in the Toxicology and Histopathology groups) will be euthanized by CO_2 asphyxiation on Day 8 (5 mice/group) and Day 91 (10 mice/group). In the event that some mice die on study, the distribution of animals necropsied on the two necropsy days will be determined by the Study Director with concurrence from the Sponsor.

Mice in the groups designated for pathologic examination that are euthanized at scheduled necropsy, and any that are found dead or euthanized in extremis will be subjected to a complete gross necropsy examination. The postmortem examination of each mouse will include, but not be limited to, examination of the external surfaces of the body, all orifices of the body, and the cranial, thoracic, abdominal, and pelvic cavities and their contents.

The oral cavity, duodenum, jejunum, and any gross lesions will be collected from each mouse and saved in 10% neutral buffered formalin for histopathologic evaluation. The animal identification will be collected, fixed in 10% neutral buffered formalin, and retained with its tissues collected during necropsy.

In addition, for animals in histopathology groups 1, 2, 4, and 7 on Days 8 and 91, the esophagus, stomach (forestomach and glandular), liver, and mesenteric lymph nodes will be collected. Each tissue will be divided into two samples (tissues split longitudinally where possible) and saved for possible future evaluation. One piece of each tissue from each animal will be fixed in 10% neutral buffered formalin, and the other will be snap frozen and stored at -20 °C or lower.

Organ Weights: Organ weights will not be required.

Histology: The oral cavity, duodenum, jejunum, and any gross lesions from each mouse in the Toxicology and Histopathology groups will be processed to slides. The fixed tissues will be trimmed, processed, and microtomed (approximately 5-μm sections), and the tissue sections will be mounted on glass slides; ten slides of each tissue will be prepared. One of the ten slides from each tissue of each animal will be stained with hematoxylin and eosin, and coverslipped. The remaining nine samples will be retained for possible future use. Special stains may be applied at the discretion of the pathologist when necessary to establish a diagnosis.

Microscopic Observations: All slides will be submitted to a veterinary pathologist for evaluation and diagnosis. For tissues from animals in the Toxicology and Histopathology groups, findings will be diagnosed and categorized using standardized nomenclature with lesions ranked for severity for comparison among groups.

9.12 EARLY TERMINATION:

In the event unanticipated, severe toxicity should be encountered in any dose group, animals or entire dose groups may be terminated early. The decision to exercise the option of early termination will be made by the Study Director or designee, in conjunction with the Sponsor's Representative if possible, based upon the nature of clinical signs that are present and severity of the condition of the animals.

10.0 STATISTICAL ANALYSIS:

Group means and standard deviations will be calculated when appropriate for body weights, food and water consumption data, biochemical assay data, and any other data deemed appropriate by the Study Director. Evaluation of data for the differences between groups (body weight data, food and water consumption data, and any other data deemed appropriate by the Study Director) will utilize ANOVA and Dunnett's Test for multiple comparisons. Additional statistical tests may be applied if deemed necessary.

Statistical analysis will be performed using the Provantis automated data collection system (Instem; Staffordshire, UK) at Southern Research, unless otherwise deemed necessary by the Study Director. If a consultant statistician is used for selected analyses, the name, credentials, contact information, and specific data evaluated will be documented in the study record. In all cases, the lower limit for statistical significance will be defined as $p \leq 0.05$. The following inter-group comparisons will be made:

- Group 1 to Groups 2, 3, 4, 5, 6, and 7

11.0 RECORDS:

All raw data pertaining to the conduct of this study, and all samples/specimens generated in this study and either analyzed at Southern Research or retained for storage, will be stored at Southern Research for up to 1 year after the issuance of the draft report. After 1 year, or at any time prior to the completion of that year if the Sponsor's Monitor so directs, the data and any samples/specimens will be shipped to the Sponsor or to the Sponsor's designated archival facility. The Sponsor must approve the final disposition of all raw data and samples/specimens generated in this study. The original final report will be retained in the central Archives at Southern Research.

12.0 REPORT:

A single draft report will be prepared and issued to the Sponsor; the date of submission of this report will be determined at a later time, and will be added to this protocol by amendment. The final report will be issued within 15 working days after receipt of the Sponsor's review comments on the draft report. If Sponsor comments on the draft report are not received at Southern Research within 60 working days after submission of the report, the draft report will be issued as final.

13.0 REGULATORY REFERENCES:

This study will be conducted in accordance with the protocol, the Standard Operating Procedures (SOPs) of Southern Research, and the applicable regulatory requirements, as addressed below.

13.1 PROTOCOL AMENDMENTS AND DEVIATIONS:

Amendments: All changes in or revisions of the approved protocol and the reasons for these changes will be documented in amendments, which will be signed and dated by the Study Director and the Sponsor's Representative. Amendments will be maintained with the protocol. Written approval (a fax signature or electronic communication, such as email) for changes in the protocol may be granted by the Sponsor's Representative, but a written amendment will follow.

Deviations: All operations pertaining to this study, unless specifically defined in this protocol, will be performed according to the SOPs of Southern Research and/or the protocol, and any deviations from protocol or SOPs will be documented.

13.2 REGULATORY COMPLIANCE:

Good Laboratory Practices: This nonclinical laboratory study will not be conducted in compliance with the Good Laboratory Practice (GLP) Regulations of the U.S. Food and Drug Administration (FDA) (21 CFR Part 58) or the U.S. Environmental Protection Agency (40 CFR Part 792).

Quality Assurance Review: The study described in this protocol will not be subjected to Quality Assurance evaluations of the laboratory processes at Southern Research, data, and the final report.

13.3 FACILITIES MANAGEMENT AND ANIMAL HUSBANDRY:

General procedures for animal care and housing will be in compliance with the SOPs of Southern Research, the *Guide for the Care and Use of Laboratory*

Animals, (Institute of Laboratory Animal Resources, Commission on Life Sciences, National Research Council; National Academy Press; Washington, DC; 1996), and the U.S. Department of Agriculture through the Animal Welfare Act (Public Law 99-198). Southern Research is fully accredited by the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC).

13.4 ANIMAL WELFARE ACT COMPLIANCE:

By signing this protocol, the Sponsor signifies that there are no generally accepted alternatives to the use of animals, and that the study described by this protocol does not unnecessarily duplicate previously conducted or reported experiments.

Procedures used in this protocol are designed to conform to accepted practices and to minimize or avoid causing pain, distress, or discomfort in the animals. In those circumstances in which required study procedures are likely to cause more than momentary or slight pain or distress, the animals will receive appropriate analgesics or anesthetics unless the withholding of these agents has been justified in writing by the Study Director and/or the Sponsor and approved by the Institutional Animal Care and Use Committee at Southern Research.

14.0 PROTOCOL APPROVALS:

This protocol has been reviewed and approved.

Study Director: Charles D. Hébert 2-22-10
Charles D. Hébert, Ph.D., D.A.B.T. — Date

Sponsor's Representative: ______________________
Mark A. Harris, Ph.D. — Date

14.0 PROTOCOL APPROVALS:

This protocol has been reviewed and approved.

Study Director:

Charles D. Hébert, Ph.D., D.A.B.T. Date

Sponsor's Representative: 2/22/10

Mark A. Harris, Ph.D. Date

PROTOCOL AMENDMENT: 13026.01.01A$_1$

March 16, 2010
Page 1 of 3

Protocol 13026.01.01 is amended as follows:

1. Page 10 Section 9.9 (Biochemical Analysis): After finalization of the original protocol, discussions with the Sponsor revealed that the tissue collection method described in the protocol was likely to yield insufficient amounts of some samples for the GSH/GSSG assays. Therefore, the decision was made, in conjunction with the Sponsor, to amend the protocol so that on Day 8, the animals designated for biochemical analysis sample collection will be used differently than originally described. Five animals/group from Subgroup A will be used for collection of samples for the DNA-Cr adduct analysis, and the remaining 5 animals/group will be used for collection of samples for GSH/GSSG analysis.

In addition, the Sponsor has provided further details about the collection procedure for the GSH/GSSG samples, including the blood samples. The sample collection procedure for blood and tissue samples is described below.

The revised Section 9.9 is presented below in its entirety. Changes are indicated in **bold underlined** font.

9.9 BIOCHEMICAL ANALYSES:

Sample Collection: Samples for biochemical analyses will be collected from 10 mice/group on Day 8 and from 20 mice/group on Day 91. On Days 8 and 91, 10 mice/group will be designated as Subgroup A; on Day 91, the remaining 10 mice/group will be designated as Subgroup B.

On Day 8, 5 mice/group in Subgroup A will be used for collection of samples for GSH/GSSG analysis and 5 mice/group in Subgroup A will be used for collection of samples for DNA-Cr adduct analysis.

For collection **of blood samples for GSH/GSSG analysis**, each mouse will be anesthetized with **ketamine/xylazine (87 mg ketamine/kg; 13.4 mg xylazine/kg) injected intreperitoneally or with** CO_2/O_2 **by inhalation,** and blood samples will be collected from the retro-orbital sinus into tubes containing **heparin** as anticoagulant (Subgroup A). **Samples will be gently mixed by inversion and placed on ice. Within 10 minutes of collection, samples will be centrifuged for separation of plasma using a refrigerated centrifuge. Plasma will be collected, and mixed in a 1:1 ratio with 2X Redox Quenching Buffer (RQB), to yield final concentrations of 20 mM HCl, 5 mM diethylenetriamine pentaacetic acid, and 1 mM 1,10-phenanthroline. The 2X RQB will also contain 5% ultrapure grade trichloroacetic acid. Samples will then be mixed by gentle inversion and snap frozen until they are shipped to a Sponsor-designated laboratory for analysis.**

For collection of blood samples for cytokine analysis, each mouse will be anesthetized with CO_2/O_2, and blood samples will be collected from the retro-orbital sinus into serum separator tubes containing no anticoagulant (Subgroup B). The contents of the Subgroup B tubes will be centrifuged to separate serum. Prior to euthanasia, the orbital route may be supplemented by puncture of the vena cava if necessary. Blood samples for biochemical analysis will also be collected prior to the necropsy of any mouse designated for biochemical analysis that is euthanized in a moribund condition.

Immediately following blood collection, each mouse will be euthanized using CO_2. Samples of oral epithelium, duodenal epithelium, and jejunal epithelium will be collected from animals in Subgroup A **and immediately placed into tubes containing 0.5 mL 2X RQB on ice. The tissues will be allowed to sit in RQB on ice for approximately 10-15 minutes to allow penetration of the buffer into the tissues, then the tubes will be snap frozen in liquid nitrogen**. A sample of oral mucosa and underlying muscle and an intact segment from the cranial end of the duodenum will be collected from each animal in Subgroup B. Following collection of these tissues, mice designated for biochemical analysis will be discarded without further evaluation.

Plasma and tissue samples from animals in Subgroup A will be **stored frozen (at or below -70 °C) until they are shipped to** Sponsor-designated laborator**ies** for analysis. Serum samples from animals in Subgroup B will be divided into two aliquots, and the oral cavity and duodenum samples will be weighed and split into two pieces longitudinally (if possible). Serum and tissue samples will be snap-frozen upon collection, and will be stored frozen (at or below -70 °C) until they are used for analysis.

Biochemical Analysis, GSH/GSSG Ratio: One plasma sample, one sample of oral epithelium, one sample of duodenal epithelium, and one sample of jejunal epithelium from **each of 5 animals/group (Day 8 collection) or from** each animal **(Day 91 collection)** in Subgroup A will be **shipped** to a Sponsor-designated laboratory for analysis of GSH and GSSG, and subsequent calculation of GSH/GSSG ratios. **The recipient laboratory will be documented in the study records.**

Biochemical Analysis, DNA-Cr Adducts: One sample of oral epithelium, one sample of duodenal epithelium, and one sample of jejunal epithelium from **each of 5 animals/group (Day 8 collection) or from** each animal **(Day 91 collection)** in Subgroup A will be shipped to a Sponsor-designated laboratory for analysis. **The recipient laboratory will be documented in the study records.**

Biochemical Analysis, 8-OHdG: One sample of oral cavity and one sample of duodenum from each animal in Subgroup B will be analyzed for 8-OHdG.

Biochemical Analysis, Cytokines: One serum sample, one sample of oral cavity, and one sample of duodenum from each animal in Subgroup B will be analyzed for IL-1α, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-7, IL-9, IL-10, IL-12p70, IL-13, IL-15, IL-17, TNF-α, KC/GRO, MCP-1, G-CSF, GM-CSF, IP-10, MIP-1α, RANTES, and IFN-γ.

Biochemical Analysis, 8-Isoprostane: One sample of oral cavity and one sample of duodenum from each animal in Subgroup B will be analyzed for 8-isoprostane.

Effective date of these items: March 16, 2010

Approval Signatures:

Study Director: Charles D. Hébert 3-16-10
Charles D. Hébert, Ph.D., D.A.B.T. Date

Sponsor's Representative: Deborah Plante for 3/17/10
Mark A. Harris, Ph.D. Date

PROTOCOL AMENDMENT: 13026.01.01A$_2$

March 17, 2010
Page 1 of 1

Protocol 13026.01.01 is amended as follows:

1. Page 10 and Amendment A1

Section 9.9 (Biochemical Analysis): Amendment A1 to this protocol provided changes to and clarification of the method for collection of samples for GSH/GSSG analysis. However, for logistical reasons some of the procedures included in Amendment A1 cannot feasibly be performed as described. Therefore, the protocol is amended to make the following further changes/clarifications:

- Centrifugation of blood samples for GSH/GSSG analysis will be initiated within 15 minutes of sample collection, rather than within 10 minutes as described in Amendment A1.

- Blood samples for GSH/GSSG analysis will be centrifuged for approximately 5 minutes under refrigerated conditions. This duration of centrifugation is sufficient to separate plasma from the formed elements of the blood, and can help to avoid hemolysis in the samples.

- For collection of blood samples for GSH/GSSG analysis, mice will be anesthetized with ketamine/xylazine as described in Amendment A1. However, should the initial dose of anesthetic fail to produce the required level of anesthesia to allow blood collection, animals may, if necessary, be administered another half dose of ketamine (approximately 43-44 mg/kg). Should this additional dose fail to produce the required level of anesthesia, the mice will be anesthetized with CO_2/O_2.

- The word "intraperitoneally" was misspelled in the third paragraph of Section 9.9 of Amendment A1.

Effective date of these items: March 17, 2010

Approval Signatures:

Study Director: Charles D. Hébert 3-17-10
Charles D. Hébert, Ph.D., D.A.B.T. Date

Sponsor's Representative: Deborah Rowe for 3/18/10
Mark A. Harris, Ph.D. Date

PROTOCOL AMENDMENT: 13026.01.01A$_3$

March 23, 2010
Page 1 of 3

Protocol 13026.01.01 is amended as follows:

1. Page 10 Section 9.9 (Biochemical Analysis): Due to an error at the time of preparation of protocol amendment A1, the amendment failed to distinguish between the post-collection handling of samples for GSH/GSSG analysis and those for DNA-Cr adduct analysis. The protocol is hereby amended to clarify the instructions for handling of these two sample types. The revised fourth paragraph of Section 9.9 is presented below in its entirety. Changes are indicated in **<u>bold underlined</u>** font.

9.9 BIOCHEMICAL ANALYSES:

Immediately following blood collection, each mouse will be euthanized using CO_2. Samples of oral epithelium, duodenal epithelium, and jejunal epithelium will be collected from animals in Subgroup A. **<u>Tissues for GSH/GSSG analysis will</u>** be immediately placed into tubes containing 0.5 mL 2X RQB on ice. The tissues will be allowed to sit in RQB on ice for approximately 10-15 minutes to allow penetration of the buffer into the tissues, then the tubes will be snap frozen in liquid nitrogen. **<u>Tissues for DNA-Cr adduct analysis will be placed into tubes and snap frozen without buffer.</u>** A sample of oral mucosa and underlying muscle and an intact segment from the cranial end of the duodenum will be collected from each animal in Subgroup B. Following collection of these tissues, mice designated for biochemical analysis will be discarded without further evaluation.

Effective date of these items: March 23, 2010

Approval Signatures:

Study Director: Charles D. Hébert 3-23-10

Charles D. Hébert, Ph.D., D.A.B.T. Date

Sponsor's Representative: 3/23/10

Mark A. Harris, Ph.D. Date

PROTOCOL AMENDMENT: 13026.01.01A_4

Protocol 13026.01.01 is amended as follows:

1. Page 3 Section 5.0 (Key Study Dates): The Sponsor has requested that additional blood samples be collected for evaluation of iron status of the mice. The key study dates table is amended by adding the following line:

Event	Sequence	Dates
Collection of Samples for Evaluation of Iron Status	Day 91	6/1/10

2. Page 8 Section 9.0 (Experimental Design): Evaluation of blood samples for iron status will include measurement of serum iron. This section is amended as shown below to add a description of the instrument used for the iron measurement. Changes are indicated in **bold underlined** font.

The Provantis application (Version 7; Instem Life Sciences Systems, Ltd.; Staffordshire, United Kingdom) will be used for the direct on-line capture of most in-life and pathology data. **In addition, Provantis will interface with the Cobas c501 Clinical Chemistry Analyzer (Version 04-02; Roche Diagnostics; Indianapolis, IN) for capture of serum iron data.**

3. Section 9.9 (Biochemical Analysis): After finalization of the original protocol, discussions with the Sponsor revealed that the tissue collection method described in the protocol was likely to yield insufficient amounts of some samples for the GSH/GSSG assays. Therefore, the decision was made, in conjunction with the Sponsor, to amend the protocol so that on Day 91, the animals designated for biochemical analysis sample collection will be used differently than originally described. Five animals/group from Subgroup A will be used for collection of samples for the DNA-Cr adduct analysis, and the remaining 5 animals/group will be used for collection of samples for GSH/GSSG analysis.

The revised Section 9.9 (also incorporating changes that were made in previous amendments) is presented below in its entirety. Changes effective with this amendment are indicated in **bold underlined** font.

9.9 BIOCHEMICAL ANALYSES:

Sample Collection: Samples for biochemical analyses will be collected from 10 mice/group on Day 8 and from 20 mice/group on Day 91. On Days 8 and 91, 10 mice/group will be designated as Subgroup A; on Day 91, the remaining 10 mice/group will be designated as Subgroup B.

On Day 8 **and on Day 91**, 5 mice/group in Subgroup A will be used for collection of samples for GSH/GSSG analysis and 5 mice/group in Subgroup A will be used for collection of samples for DNA-Cr adduct analysis.

For collection of blood samples for GSH/GSSG analysis, each mouse will be anesthetized with ketamine/xylazine (87 mg ketamine/kg; 13.4 mg xylazine/kg) injected intraperitoneally. Should the initial dose of anesthetic fail to produce the required level of anesthesia to allow blood collection, animals may, if necessary, be administered another half dose of ketamine (approximately 43-44 mg/kg). Should this additional dose fail to produce the required level of anesthesia, the mice will be anesthetized with CO_2/O_2 administered by inhalation. Blood samples will be collected from the retro-orbital sinus into tubes containing heparin as anticoagulant (Subgroup A). Samples will be gently mixed by inversion and placed on ice. Within 15 minutes of collection, samples will be centrifuged for approximately 5 minutes under refrigerated conditions for separation of plasma. Plasma will be collected, and mixed in a 1:1 ratio with 2X Redox Quenching Buffer (RQB), to yield final concentrations of 20 mM HCl, 5 mM diethylenetriamine pentaacetic acid, and 1 mM 1,10-phenanthroline. The 2X RQB will also contain 5% ultrapure grade trichloroacetic acid. Samples will then be mixed by gentle inversion and snap frozen until they are shipped to a Sponsor-designated laboratory for analysis.

For collection of blood samples for cytokine analysis, each mouse will be anesthetized with CO_2/O_2, and blood samples will be collected from the retro-orbital sinus into serum separator tubes containing no anticoagulant (Subgroup B). The contents of the Subgroup B tubes will be centrifuged to separate serum. Prior to euthanasia, the orbital route may be supplemented by puncture of the vena cava if necessary. Blood samples for biochemical analysis will also be collected prior to the necropsy of any mouse designated for biochemical analysis that is euthanized in a moribund condition.

Immediately following blood collection, each mouse will be euthanized using CO_2. Samples of oral epithelium, duodenal epithelium, **ileal epithelium,** and jejunal epithelium will be collected from animals in Subgroup A. Tissues for GSH/GSSG analysis will be immediately placed into tubes containing 0.5 mL 2X RQB on ice. The tissues will be allowed to sit in RQB on ice for approximately 10-15 minutes to allow penetration of the buffer into the tissues, then the tubes will be snap frozen in liquid nitrogen. Tissues for DNA-Cr adduct analysis will be placed into tubes and snap frozen without buffer. A sample of oral mucosa and underlying muscle and an intact segment from the cranial end of the duodenum will be collected from each animal in Subgroup B. Following collection of these tissues, mice designated for biochemical analysis will be discarded without further evaluation.

Plasma and tissue samples from animals in Subgroup A will be stored frozen (at or below -70 °C) until they are shipped to Sponsor-designated laboratories for analysis. Serum samples from animals in Subgroup B will be divided into two aliquots, and the oral cavity and duodenum samples will be weighed and split into two pieces longitudinally (if possible). Serum and tissue samples will be snap-frozen upon collection, and will be stored frozen (at or below -70 ºC) until they are used for analysis.

Biochemical Analysis, GSH/GSSG Ratio: One plasma sample, one sample of oral epithelium, one sample of duodenal epithelium, **<u>one sample of ileal epithelium,</u>** and one sample of jejunal epithelium from each of 5 animals/group (Day 8 **<u>and Day 91 collections</u>**) in Subgroup A will be shipped to a Sponsor-designated laboratory for analysis of GSH and GSSG, and subsequent calculation of GSH/GSSG ratios. The recipient laboratory will be documented in the study records.

Biochemical Analysis, DNA-Cr Adducts: One sample of oral epithelium, one sample of duodenal epithelium, **<u>one sample of ileal epithelium,</u>** and one sample of jejunal epithelium from each of 5 animals/group (Day 8 **<u>and Day 91 collections</u>**) in Subgroup A will be shipped to a Sponsor-designated laboratory for analysis. The recipient laboratory will be documented in the study records.

Biochemical Analysis, 8-OHdG: One sample of oral cavity and one sample of duodenum from each animal in Subgroup B will be analyzed for 8-OHdG.

Biochemical Analysis, Cytokines: One serum sample, one sample of oral cavity, and one sample of duodenum from each animal in Subgroup B will be analyzed for IL-1α, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-7, IL-9, IL-10, IL-12p70, IL-13, IL-15, IL-17, TNF-α, KC/GRO, MCP-1, G-CSF, GM-CSF, IP-10, MIP-1α, RANTES, and IFN-γ.

Biochemical Analysis, 8-Isoprostane: One sample of oral cavity and one sample of duodenum from each animal in Subgroup B will be analyzed for 8-isoprostane.

4. Page 12 Section 9.11 (Macroscopic and Microscopic Pathology): Evaluation of blood samples for iron status will include measurement of serum iron. This section is amended as shown below to specify that blood samples will be collected prior to necropsy. Changes are indicated in **<u>bold underlined</u>** font.

9.11 MACROSCOPIC AND MICROSCOPIC PATHOLOGY:

<u>Prior to euthanasia, half of the mice designated for macroscopic and microscopic pathology evaluation (i.e., those in the Toxicology and Histopathology groups) will be used for collection of samples for evaluation of iron status. Sample collection and evaluation are described in Section 9.13.</u>

5. Page 13 Section 9.13 (Iron Status): The Sponsor has requested that additional blood samples be collected for evaluation of iron status of the mice. A new section is added to the protocol to describe this evaluation:

9.13 IRON STATUS:

Half of the mice designated for macroscopic and microscopic pathology evaluation (i.e., those in the Toxicology and Histopathology groups) will also be used for collection of samples for evaluation of iron status.

Sample Collection: On Day 91, five mice per group will be anesthetized using CO_2/O_2, and blood samples (~0.4 mL) will be collected from the retro-orbital sinus into tubes containing no anticoagulant. The contents of the tubes will be centrifuged to separate serum. Serum samples will be aliquotted into four aliquots, one of which will be used for measurement of serum iron on the day of collection. The remaining three aliquots will be snap frozen and stored at approximately -20 °C until used for ELISA analysis.

After collection of serum samples, mice will be euthanized for gross and microscopic pathology. One bone marrow smear will be prepared from each mouse.

Measurement of Serum Iron: One serum aliquot will be used for measurement of serum iron levels using the Cobas c501 Clinical Chemistry Analyzer (Version 04-02; Roche Diagnostics; Indianapolis, IN).

Evaluation of Bone Marrow Smears: Bone marrow smears will be stained using a stain that will allow visualization of iron (specific stain to be documented in the study records), and will be evaluated by a board-certified clinical pathologist to estimate iron content.

ELISA Analysis of Serum Samples: Two frozen serum samples will be analyzed for serum ferritin and serum transferrin using commercial ELISA kits. The third will be retained for possible late analysis of serum hepcidin. If required, analysis of serum hepcidin will incur additional cost.

Effective date of these items: May 28, 2010

PROTOCOL AMENDMENT: 13026.01.01A$_4$

Approval Signatures:

Study Director: Charles D. Hébert 5-28-10

Charles D. Hébert, Ph.D., D.A.B.T. — Date

Sponsor's Representative: Approved via e-mail on 5-27-10. Original

Mark A. Harris, Ph.D. — Date

signature of sponsor on 5-28-10 to be

mailed to Southern. CDH 5-28-10

Approval Signatures:

Study Director: ____

Charles D. Hébert, Ph.D., D.A.B.T. — Date

Sponsor's Representative: ____________________ 5/28/10

Mark A. Harris, Ph.D. — Date

PROTOCOL AMENDMENT: 13026.01.01A$_5$

Protocol 13026.01.01 is amended as follows:

1. Page 3 Section 5.0 (Key Study Dates): The Sponsor has requested that additional blood and tissue samples be collected for evaluation of total chromium and iron. The Key Study Dates table is amended by changing the line for collection of samples for "possible future analysis" to the following:

Event	Sequence	Dates
Collection of Samples for Evaluation of Total Chromium and Iron	Day 91	6/18/10

2. Page 11 Section 9.10 (Future Sample Analysis): The original protocol included collection of samples of oral mucosa, duodenum, and jejunum from 5 mice/group for possible future analysis. The Sponsor has requested that the number of samples to be collected from each mouse in this category be increased so that evaluation of total chromium and iron can be performed.

The revised Section 9.10 is presented below in its entirety. Changes effective with this amendment are indicated in **bold underlined** font.

9.10 TOTAL CHROMIUM AND IRON ANALYSIS:

Samples for **evaluation of total chromium and iron content** will be collected on Day 91. Five mice/group will be euthanized using CO_2, and **blood will be collected from the orbital sinus into tubes containing lithium heparin as anticoagulant. Plasma will be prepared, and plasma and red blood cells will be separated, snap frozen, and stored at approximately -20 °C.**

Following blood collection, the tissues in the list below will be collected from each animal, weighed, and snap frozen. Prior to freezing, the length of the intestinal segments (duodenum, jejunum, and ileum) will be recorded.

Bone
Glandular stomach (flushed of contents)
Kidney
Liver
Oral mucosa (intact)
Small intestine, Duodenum (flushed of contents)
Small intestine, Jejunum (flushed of contents)
Small intestine, Ileum (flushed of contents)
Spleen

Plasma, red blood cells, and tissue samples will be stored frozen at approximately -20 °C until they are shipped to a Sponsor-designated laboratory for analysis.

Samples for **total chromium and iron** analysis will also be collected prior to the necropsy of any mouse designated for these groups that is euthanized in a moribund condition. Following collection of these tissues, mice designated for these groups will be discarded without further evaluation.

3. Page 14 — Section 12.0 (Report): The Sponsor has indicated that data from analyses conducted at sites other than Southern Research may or may not be included in the final study report. Therefore, this section is amended to state that the decision as to whether or not the data from the following analyses will be included in the Southern Research final study report will be made by the Sponsor at a future date and documented in the study records:

Mutation analysis
Gene expression analysis
GSH/GSSG ratio analysis
DNA-Cr adduct analysis
Total chromium and iron analysis

Effective date of these items: June 16, 2010

Approval Signatures:

Study Director: Charles D. Hébert — 6-16-10
Charles D. Hébert, Ph.D., D.A.B.T. — Date

Sponsor's Representative: Deborah Proctor for — 6/16/10
Mark A. Harris, ~~Ph.D.~~ — Date

PROTOCOL AMENDMENT: 13026.01.01A$_6$

July 23, 2010
Page 1 of 2

Protocol 13026.01.01 is amended as follows:

Changes effective with this amendment are indicated in **bold underlined** font.

1. Page 4 — Section 5.0 (Key Study Dates): The original protocol stated that the submission date of the draft study report would be added to the protocol by amendment. In addition, due to miscalculation of dates at the time of protocol development, the dates selected for necropsy of animals first dosed on 3/18/10 (Mutation Analysis) and 3/19/10 (Total Chromium and Iron Analysis) were actually on Day 92 instead of Day 91. The relevant lines of the Key Study Dates table are amended as shown below. Changes are shown in bold font.

Event	Sequence	Dates
Collection of Samples for Mutation Analysis	Day 91 **Day 92**	6/7/10 6/17/10
Collection of Samples for Evaluation of Total Chromium and Iron	**Day 92**	6/18/10
Draft Report Due	**One draft report will be issued approximately 11 weeks after removal of the final animal in the study.**	**8/31/10**

2. Page 8 — Section 9.1 (Randomization and Group Assignment): The original protocol stated that sample collection for mutation analysis and collection of samples for possible future analysis (later amended to be collection of samples for total chromium and iron analysis) would be performed on Day 91. As noted above, the collection of the second set of samples for mutation analysis and the collection of the samples for total chromium and iron analysis were actually performed on Day 92. The relevant sections of the dose group table are amended as shown below. Changes are shown in bold font.

Group	Treatment	Conc. (mg/L)	Number of Animals	
			Mutation Analysis	**Total Chromium and Iron Analyses**
			Day 91 **/ 92**	**Day 92**
1	Water	0	10 F	5 F
2	SDD	0.3	10 F	5 F
3	SDD	4	10 F	5 F
4	SDD	14	10 F	5 F
5	SDD	60	10 F	5 F
6	SDD	170	10 F	5 F
7	SDD	520	10 F	5 F

3.	Page 9	Section 9.2 (Dose Procedure): The original protocol stated that animals would be dosed for 7 or 90 days. The last sentence of the second paragraph of this section is amended to read. "The test article will be available ad libitum to study animals 7 days per week (including holidays) for 7, 90, **or 91** days, as shown in the table above."
4.	Page 10	Section 9.7 (Mutation Analysis): The original protocol stated that samples for mutation analysis would be collected on Day 91. The first sentence of this section is amended to read. "Samples for mutation analysis will be collected on Day 91 **(5 animals/group) or Day 92 (5 animals/group)**."
5.	Page 11	Section 9.10 (Total Chromium and Iron Analysis): The protocol as amended by Amendment 5 stated that samples for evaluation of total chromium and iron content would be collected on Day 91. The first sentence of this section is amended to read. "Samples for evaluation of total chromium and iron content will be collected on Day **92**."
6.	Page 14	Section 12.0 (Report): The original protocol stated that the date of submission of the draft report would be determined at a later time, and would be added to the protocol by amendment. The first sentence of this section is amended to read. "A single draft report will be prepared and issued to the Sponsor approximately **11 weeks after removal of the final animal in the study**."

Effective date of these items: July 23, 2010

Approval Signatures:

Study Director: ____________________ 7-23-10
Charles D. Hébert, Ph.D., D.A.B.T. — Date

Sponsor's Representative: ____________________ 8/5/10
Mark A. Harris, Ph.D. — Date

Appendix B

Sodium Dichromate Dihydrate Certificate of Analysis

Certificate of Analysis

SIGMA-ALDRICH

Product Name	Sodium dichromate dihydrate, 99.995% trace metals basis
Product Number	483060
Product Brand	ALDRICH
CAS Number	7789-12-0
Molecular Formula	$Na_2Cr_2O_7 \cdot 2H_2O$
Molecular Weight	298.00

TEST	**LOT 05914AS RESULTS**
APPEARANCE	ORANGE CRYSTALS
INFRARED SPECTRUM	CONFORMS TO STRUCTURE.
TITRATION	34.8% CR (WITH SODIUM THIOSULFATE)
ATOMIC ABSORPTION	K 50 PPM
TRACE ANALYSIS, ICP	AG 1 PPM
	CA 1 PPM
	FE 0.8 PPM
ICP ASSAY	CONFIRM SODIUM AND CHROMIUM COMPONENTS.
QUALITY CONTROL ACCEPTANCE DATE	FEBRUARY 1998

Barbara Rajzer

Barbara Rajzer, Supervisor
Quality Control
Milwaukee, Wisconsin USA

Appendix C

Individual Clinical Observations

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
1	f	1	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		2	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		3	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		4	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		5	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		6	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		7	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		8	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		9	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		10	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		11	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		12	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		13	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		14	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
1	f	15	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	.	X	X	.
			Convulsions		.	.	.	.	.	.	.	.	.	.	.	C	.	.	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		16	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		17	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		18	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		19	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		20	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		21	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		22	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		23	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		24	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		25	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		26	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		27	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
1	f	28	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		29	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		30	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		31	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		32	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		33	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		34	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		35	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		36	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		37	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		38	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		39	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		40	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		41	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
1	f	42	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		43	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		44	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		45	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		46	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		47	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		48	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		49	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		50	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		51	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		52	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		53	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		54	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		55	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
1	f	56	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		57	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		58	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		59	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		60	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		61	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		62	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		63	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		64	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		65	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		66	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		67	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		68	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		69	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
1	f	70	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		71	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		72	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		73	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		74	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		75	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		76	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		77	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		78	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		79	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		80	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
2	f	81	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		82	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		83	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		84	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		85	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	.	X	.
			Convulsions		.	.	.	.	.	.	.	.	.	.	.	.	C	.	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		86	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		87	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		88	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		89	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		90	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		91	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		92	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		93	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
2	f	94	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		95	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		96	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		97	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		98	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		99	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		100	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		101	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		102	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		103	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		104	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		105	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		106	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		107	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
2	f	108	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		109	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		110	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		111	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		112	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		113	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		114	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		115	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		116	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		117	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		118	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		119	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		120	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		121	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
2	f	122	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		123	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		124	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		125	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		126	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		127	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		128	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		129	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		130	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		131	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		132	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		133	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		134	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		135	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
2	f	136	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		137	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		138	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		139	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		140	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		141	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		142	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		143	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		144	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		145	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		146	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		147	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		148	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		149	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
2	f	150	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		151	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		152	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		153	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		154	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		155	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		156	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		157	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		158	No Abnormalities Detected		X	X	X	X	X	X	X	X	.	.	.	.	.	.	.
			Alopecia	Neck	.	.	.	.	.	.	.	.	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		159	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		160	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
3	f	161	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		162	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		163	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		164	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		165	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		166	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		167	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		168	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		169	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		170	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		171	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		172	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		173	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		174	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
3	f	175	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		176	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		177	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		178	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		179	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		180	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		181	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		182	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		183	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		184	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		185	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		186	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		187	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		188	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
3	f	189	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		190	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		191	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		192	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		193	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		194	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		195	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		196	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		197	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		198	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		199	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		200	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		201	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		202	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
3	f	203	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		204	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		205	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		206	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		207	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		208	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		209	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		210	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		211	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		212	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		213	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		214	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		215	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		216	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
3	f	217	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		218	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		219	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		220	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		221	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		222	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		223	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		224	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		225	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		226	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		227	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		228	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		229	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		230	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
3	f	231	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		232	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		233	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		234	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		235	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		236	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		237	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		238	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		239	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		240	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
4	f	241	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		242	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		243	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		244	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		245	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		246	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		247	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		248	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		249	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		250	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		251	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		252	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		253	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		254	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
4	f	255	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		256	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		257	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		258	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		259	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		260	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		261	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		262	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		263	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		264	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		265	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		266	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		267	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		268	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
4	f	269	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		270	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		271	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		272	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		273	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		274	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		275	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		276	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		277	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		278	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		279	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		280	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		281	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		282	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
4	f	283	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		284	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		285	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		286	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		287	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		288	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		289	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		290	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		291	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		292	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		293	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		294	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		295	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		296	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
4	f	297	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		298	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		299	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		300	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		301	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		302	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		303	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		304	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		305	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		306	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		307	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		308	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		309	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		310	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
4	f	311	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		312	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		313	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		314	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		315	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		316	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		317	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		318	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		319	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		320	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
5	f	321	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.
			Alopecia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		322	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		323	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		324	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		325	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		326	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		327	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		328	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		329	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		330	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		331	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		332	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		333	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
5	f	334	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		335	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		336	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		337	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		338	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		339	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		340	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		341	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		342	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		343	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		344	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		345	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		346	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
5	f	347	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	.	.	.	.	.
			Alopecia	Back	.	.	.	.	.	.	.	.	.	.	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		348	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	.	.	.	.	.
			Alopecia	Back	.	.	.	.	.	.	.	.	.	.	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		349	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		350	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		351	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		352	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		353	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		354	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		355	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		356	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		357	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		358	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		359	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
5	f	360	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		361	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		362	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		363	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		364	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		365	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		366	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		367	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		368	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		369	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		370	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		371	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		372	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		373	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
5	f	374	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		375	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		376	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		377	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		378	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		379	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		380	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		381	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		382	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		383	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		384	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		385	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		386	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		387	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
5	f	388	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		389	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		390	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		391	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		392	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		393	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		394	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		395	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		396	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		397	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		398	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		399	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		400	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
6	f	401	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		402	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		403	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		404	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		405	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		406	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		407	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		408	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		409	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	.	X	.
			Convulsions		.	.	.	.	.	.	.	.	.	.	.	.	C	.	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		410	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		411	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		412	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		413	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
6	f	414	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		415	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		416	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		417	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		418	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		419	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.
			Convulsions		.	.	.	.	.	.	.	.	.	.	.	.	.	C	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		420	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		421	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		422	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		423	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		424	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		425	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		426	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
6	f	427	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		428	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		429	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
		430	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		431	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		432	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		433	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		434	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		435	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		436	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		437	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		438	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		439	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		440	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
6	f	441	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		442	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		443	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		444	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		445	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		446	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		447	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		448	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		449	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		450	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		451	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		452	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		453	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		454	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
6	f	455	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		456	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		457	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		458	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		459	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		460	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		461	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		462	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		463	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		464	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		465	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		466	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		467	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		468	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
6	f	469	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		470	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		471	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		472	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		473	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		474	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		475	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		476	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		477	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		478	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		479	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		480	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
7	f	481	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		482	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		483	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		484	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	.
			Alopecia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		485	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		486	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		487	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		488	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		489	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		490	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		491	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		492	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		493	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
7	f	494	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		495	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		496	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		497	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		498	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		499	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		500	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		501	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		502	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		503	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		504	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		505	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		506	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		507	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
7	f	508	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		509	No Abnormalities Detected		X	X	X	X	X	.	.	.	X	X	X	X	X	X	.
			Scab	Tail	.	.	.	.	.	X	X	X	.	.	.	.	.	.	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		510	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		511	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		512	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		513	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		514	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		515	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		516	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		517	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		518	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		519	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		520	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
7	f	521	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		522	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		523	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		524	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		525	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	X	.
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
		526	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		527	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		528	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		529	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		530	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		531	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		532	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		533	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		534	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
7	f	535	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		536	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		537	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		538	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		539	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		540	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		541	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		542	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		543	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		544	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		545	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		546	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		547	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		548	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Clinical Observations

Day numbers relative to Start Date

Group	Sex	Animal	Clinical Sign	Site	1	8	15	22	29	36	43	50	57	64	71	78	85	91	92
7	f	549	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		550	No Abnormalities Detected		X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
			Scheduled euthanasia		.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
		551	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		552	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		553	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		554	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		555	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		556	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		557	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		558	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		559	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
		560	No Abnormalities Detected		X	X	X	X	X	X	X	X	X	X	X	X	X	.	X
			Scheduled euthanasia		.	.	.	.	.	.	.	.	.	.	.	.	.	.	X

Severity Codes: X = Present, C = Clonic

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Appendix D

Individual Body Weights

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
1	f	1	17.5	19.3	20.1	20.5	16.2	22.3	22.9	24.2
		2	15.8	16.4	17.3	18.2	14.0	19.1	19.8	21.1
		3	19.0	18.2	19.3	19.7	15.0	21.4	21.2	22.5
		4	18.2	18.3	19.1	19.4	16.0	20.7	21.4	21.7
		5	16.1	16.9	18.1	19.4	14.8	21.2	20.5	21.4
		6	16.8	17.0	18.1	19.0	14.9	20.0	20.3	20.4
		7	15.9	16.8	17.7	18.5	14.4	20.3	20.8	21.0
		8	17.5	17.6	18.0	18.7	14.5	19.7	20.9	21.1
		9	18.6	19.5	20.4	20.8	16.4	22.6	22.1	23.0
		10	15.8	16.8	18.1	18.8	14.2	19.8	21.5	20.8
		11	15.3	17.0	18.4	19.3	20.1	19.9	20.4	21.3
		12	17.3	18.3	20.0	20.8	21.1	22.1	22.4	22.5
		13	18.8	19.5	20.7	21.7	21.7	22.6	22.9	23.0
		14	18.8	18.8	20.8	21.5	22.0	22.4	23.8	22.9
		15	17.7	18.5	19.3	20.7	21.3	21.8	23.1	22.0
		16	19.5	20.1	20.6	21.5	20.4	20.6	21.6	21.9
		17	16.3	18.2	19.4	20.9	20.2	20.9	21.8	22.0
		18	18.5	20.0	20.6	21.7	22.6	22.4	23.7	23.5
		19	16.7	18.7	19.8	21.1	21.0	22.1	22.2	23.6
		20	18.0	19.0	20.2	22.0	22.4	21.8	22.3	23.5
		21	17.1	18.6	19.5	21.3	20.6	21.8	22.1	23.0
		22	18.5	19.0	19.5	20.6	21.1	22.3	22.4	24.0
		23	18.2	18.6	20.1	20.9	21.7	22.3	23.8	24.6
		24	16.9	18.0	19.2	20.5	20.9	21.8	22.5	22.4
		25	16.0	17.6	19.0	21.6	21.0	21.5	22.1	22.3
		26	18.3	18.6	18.7	19.9	20.9	21.8	22.0	22.6
		27	18.4	18.1	18.5	19.8	21.1	21.2	22.3	22.6
		28	18.7	18.6	19.7	21.3	21.1	21.0	23.3	24.6

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
1	f	29	19.3	19.4	19.9	20.5	21.6	21.7	23.2	23.2
		30	19.1	21.5	23.0	24.0	25.3	26.0	27.0	27.2
		31	16.5	17.8	18.9	20.4	20.3	21.0	21.8	21.1
		32	17.8	19.0	18.9	19.8	20.9	21.4	21.7	22.2
		33	17.9	18.2	19.5	19.8	20.7	21.2	22.4	22.0
		34	17.2	18.3	19.0	19.6	20.8	21.6	21.8	23.0
		35	16.6	17.5	19.2	19.7	20.3	21.2	21.6	22.4
		36	16.3	18.2	18.9	20.5	21.0	21.2	22.9	22.2
		37	17.9	19.9	19.9	21.0	21.5	22.5	22.5	24.7
		38	16.9	18.4	19.2	19.7	20.5	21.7	22.9	21.6
		39	17.8	18.8	19.6	20.5	21.9	23.3	23.1	23.7
		40	15.6	16.5	17.9	18.1	19.4	20.6	20.7	20.8
		41	17.6	19.7	19.5	20.0	20.7	22.0	22.6	22.3
		42	19.7	21.3	21.5	22.6	22.5	23.1	24.7	24.2
		43	17.4	19.5	19.7	20.2	20.8	21.3	22.1	23.2
		44	16.9	18.5	18.0	19.1	20.4	20.7	21.3	21.5
		45	19.2	20.8	21.1	21.7	23.0	23.6	23.7	24.5
		46	16.3	16.1	17.2	.	.	.	.	.
		47	15.7	13.3	16.8	.	.	.	.	.
		48	17.5	18.1	18.1	.	.	.	.	.
		49	14.9	13.8	16.8	.	.	.	.	.
		50	13.9	14.0	17.1	.	.	.	.	.
		51	15.9	16.7	18.7	.	.	.	.	.
		52	16.9	17.3	18.7	.	.	.	.	.
		53	14.1	14.5	14.4	.	.	.	.	.
		54	16.3	17.0	17.6	.	.	.	.	.
		55	17.3	17.9	19.0	.	.	.	.	.
		56	15.1	15.7	18.0	.	.	.	.	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
1	f	57	16.2	14.5	16.3	.	.	.	.	.
		58	16.6	16.8	18.9	.	.	.	.	.
		59	14.6	15.4	16.9	.	.	.	.	.
		60	18.3	17.4	18.7	.	.	.	.	.
		61	18.5	19.2	20.0	.	.	.	.	.
		62	17.1	17.6	18.2	.	.	.	.	.
		63	18.1	19.2	20.5	.	.	.	.	.
		64	15.6	15.9	17.1	.	.	.	.	.
		65	14.8	15.4	15.6	.	.	.	.	.
		66	17.6	18.3	14.2	.	.	.	.	.
		67	19.0	16.7	13.5	.	.	.	.	.
		68	17.9	18.4	13.8	.	.	.	.	.
		69	16.5	16.4	14.0	.	.	.	.	.
		70	13.6	17.2	12.6	.	.	.	.	.
		71	15.3	17.1	18.6	20.1	21.6	21.6	22.6	21.6
		72	17.1	18.0	19.1	20.0	21.2	20.8	21.8	22.3
		73	17.4	18.4	19.5	20.4	21.2	21.2	22.0	22.3
		74	14.4	15.2	16.8	18.4	18.9	19.9	20.1	20.4
		75	16.6	18.0	18.6	20.7	21.4	21.7	23.3	22.6
		76	16.8	17.6	18.4	19.6	20.5	21.2	22.5	23.0
		77	13.5	18.7	19.4	20.7	21.5	22.8	23.5	23.1
		78	16.0	17.6	18.2	19.2	19.9	20.8	20.8	21.9
		79	16.1	18.3	17.7	18.7	20.2	20.0	20.9	22.3
		80	15.7	17.1	17.5	18.9	19.5	20.2	21.3	21.1

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
1	f	1	25.6	26.2	26.5	26.0	26.5	28.5	22.3	.
		2	21.7	23.3	22.3	22.8	22.4	22.5	19.9	.
		3	23.7	25.6	23.2	22.9	24.0	26.0	21.4	.
		4	22.8	23.3	24.2	24.4	24.9	24.8	20.9	.
		5	24.2	25.0	23.6	23.8	25.0	23.9	20.8	.
		6	19.1	21.2	21.3	22.3	23.8	23.3	23.3	.
		7	21.5	21.8	22.4	23.0	24.2	23.8	25.0	.
		8	20.1	21.9	22.9	21.9	22.3	23.7	.	.
		9	23.6	24.1	24.4	24.8	25.4	25.0	26.8	.
		10	21.4	22.2	23.0	22.2	23.1	23.4	24.7	.
		11	20.9	22.2	22.0	22.6	24.0	21.5	24.9	.
		12	23.8	25.1	23.2	24.3	26.0	22.5	27.0	.
		13	24.3	24.9	24.9	24.3	25.1	21.9	26.0	.
		14	25.4	26.1	26.2	26.6	30.5	26.1	29.2	.
		15	24.0	24.4	23.8	24.6	25.5	21.7	27.5	.
		16	21.9	22.8	23.0	24.4	24.7	22.6	25.1	.
		17	23.7	23.1	23.6	25.1	25.7	22.6	26.9	.
		18	23.8	25.6	26.0	27.5	30.0	24.5	27.4	.
		19	24.7	23.8	24.5	26.3	24.9	22.9	26.9	.
		20	23.3	23.6	23.8	24.0	25.9	22.1	27.2	.
		21	23.3	24.1	24.8	24.8	25.4	25.4	26.0	.
		22	23.1	24.6	25.7	25.0	25.4	27.7	27.8	.
		23	25.3	25.2	26.6	24.9	25.7	28.3	28.5	.
		24	22.9	24.4	24.2	24.1	25.5	25.7	24.9	.
		25	22.2	23.1	23.0	22.1	22.9	23.3	23.9	.
		26	22.3	24.0	22.5	23.1	30.6	30.4	24.2	.
		27	23.1	23.7	24.4	25.3	26.3	27.5	28.5	.
		28	23.7	25.1	25.5	26.1	27.0	28.9	28.4	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
1	f	29	23.5	25.8	24.7	25.5	26.7	27.2	28.2	.
		30	27.7	29.1	29.6	32.1	24.6	24.6	32.3	.
		31	22.5	23.0	22.4	23.6	22.8	23.8	24.6	.
		32	24.5	24.4	23.4	25.5	24.0	25.3	25.9	.
		33	22.3	24.4	22.9	24.8	23.4	23.7	24.3	.
		34	23.2	24.5	23.6	24.0	24.2	25.2	25.9	.
		35	22.3	23.7	23.9	25.5	24.5	25.2	25.0	.
		36	22.8	25.1	24.7	25.0	25.4	27.0	27.7	.
		37	23.7	25.5	24.9	25.8	26.9	28.0	25.9	.
		38	23.2	24.8	24.3	25.2	26.7	26.7	28.2	.
		39	24.8	27.8	24.7	28.0	26.1	26.0	28.0	.
		40	21.1	22.4	22.0	22.4	23.2	22.6	23.0	.
		41	23.2	23.0	23.6	24.5	23.3	24.4	24.8	.
		42	25.9	24.7	26.3	29.2	26.1	26.6	29.7	.
		43	22.2	22.8	23.1	25.8	22.9	24.6	25.3	.
		44	22.0	22.2	23.0	23.9	22.3	24.6	23.7	.
		45	25.0	26.0	24.7	26.1	25.5	26.6	28.5	.
		46	.	.	.	.	.	.	.	.
		47	.	.	.	.	.	.	.	.
		48	.	.	.	.	.	.	.	.
		49	.	.	.	.	.	.	.	.
		50	.	.	.	.	.	.	.	.
		51	.	.	.	.	.	.	.	.
		52	.	.	.	.	.	.	.	.
		53	.	.	.	.	.	.	.	.
		54	.	.	.	.	.	.	.	.
		55	.	.	.	.	.	.	.	.
		56	.	.	.	.	.	.	.	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
1	f	57	.	.	.	.	.	.	.	.
		58	.	.	.	.	.	.	.	.
		59	.	.	.	.	.	.	.	.
		60	.	.	.	.	.	.	.	.
		61	.	.	.	.	.	.	.	.
		62	.	.	.	.	.	.	.	.
		63	.	.	.	.	.	.	.	.
		64	.	.	.	.	.	.	.	.
		65	.	.	.	.	.	.	.	.
		66	.	.	.	.	.	.	.	.
		67	.	.	.	.	.	.	.	.
		68	.	.	.	.	.	.	.	.
		69	.	.	.	.	.	.	.	.
		70	.	.	.	.	.	.	.	.
		71	21.9	22.9	23.8	22.8	24.2	23.5	.	23.0
		72	22.4	21.6	22.8	23.2	24.2	24.6	.	24.7
		73	24.0	22.9	24.1	24.6	25.2	26.0	.	28.3
		74	20.4	19.5	21.5	21.4	22.2	22.3	.	21.8
		75	23.3	23.3	24.0	25.3	24.9	24.6	.	25.9
		76	24.5	23.7	24.2	20.3	24.3	24.3	.	24.8
		77	24.5	24.3	24.9	23.1	25.5	26.9	.	27.1
		78	21.3	22.3	23.3	20.9	24.1	24.1	.	25.3
		79	22.3	24.4	23.9	21.3	24.2	24.5	.	24.8
		80	22.1	23.0	23.0	21.2	25.5	24.0	.	23.7

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
2	f	81	17.9	18.7	20.3	20.9	21.7	21.9	23.0	22.8
		82	19.3	19.2	20.3	21.9	21.6	20.8	21.6	22.4
		83	16.8	17.4	18.3	18.6	19.1	21.1	20.7	23.7
		84	17.8	18.7	19.8	21.4	21.8	22.6	23.3	21.5
		85	16.6	17.5	18.5	20.0	20.4	21.6	22.0	22.3
		86	17.5	17.8	19.0	20.6	21.7	22.1	22.1	23.7
		87	16.1	17.9	19.5	20.0	21.5	22.3	22.4	24.8
		88	17.2	18.5	18.4	20.2	19.5	19.6	20.5	21.7
		89	16.9	18.0	18.4	20.0	20.1	21.3	21.9	23.6
		90	18.1	18.9	19.2	20.7	21.6	21.4	22.0	23.7
		91	15.8	16.9	18.7	20.2	15.1	21.5	20.5	22.0
		92	15.9	17.6	18.9	19.8	14.9	22.3	21.6	22.5
		93	18.5	19.6	20.0	20.9	16.1	24.2	23.6	24.0
		94	15.7	16.9	18.2	19.0	15.2	20.3	21.5	21.8
		95	19.0	19.9	22.2	22.5	17.8	24.5	23.3	23.9
		96	16.3	16.9	17.8	18.3	14.9	18.2	18.2	19.7
		97	16.3	17.5	18.5	19.9	15.6	21.6	22.1	22.2
		98	17.1	18.0	18.6	20.1	14.9	20.6	20.8	22.7
		99	18.3	19.8	19.8	20.6	15.7	22.4	22.6	23.2
		100	17.7	18.3	18.5	19.5	14.1	20.8	21.1	21.8
		101	18.4	19.6	20.8	22.1	22.2	22.3	22.9	24.2
		102	19.3	19.9	21.1	21.4	23.2	23.0	23.1	24.8
		103	15.4	18.2	19.3	19.7	20.2	21.1	21.1	21.6
		104	18.8	20.7	20.4	21.6	21.8	22.3	23.4	24.1
		105	18.6	19.2	20.2	20.9	21.3	21.4	21.8	23.7
		106	16.6	19.5	19.7	20.9	21.3	21.9	22.4	24.1
		107	18.5	19.2	19.7	20.5	20.6	21.4	21.9	22.1
		108	18.0	19.1	19.3	20.5	21.4	21.5	23.2	24.6

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
2	f	109	19.2	21.2	21.1	21.9	22.1	22.8	23.6	23.6
		110	16.5	17.9	19.5	21.1	21.1	22.0	23.0	24.7
		111	16.9	17.8	19.2	21.2	20.6	21.7	22.3	22.9
		112	15.1	17.8*	18.6	20.7	22.1	21.9	24.2	23.5
		113	16.0	17.6	18.2	19.2	19.5	21.3	20.4	21.7
		114	17.9	19.7	20.3	21.3	22.0	22.6	23.6	24.3
		115	16.8	18.6	20.1	21.5	21.5	22.3	22.8	24.4
		116	17.8	18.4	19.6	21.2	21.3	21.9	23.4	24.4
		117	19.4	18.6	20.0	20.7	22.2	22.1	22.4	24.1
		118	18.8	19.0	20.0	21.1	21.9	22.6	23.4	23.9
		119	15.1	17.9	20.1	20.7	20.9	22.3	21.4	22.7
		120	18.3	18.1	18.8	19.7	20.9	21.5	21.7	23.9
		121	17.6	19.6	19.4	20.5	20.9	21.9	23.0	23.1
		122	15.6	18.7	19.1	19.5	19.8	20.8	20.9	21.5
		123	17.5	19.5	20.7	20.6	22.6	21.8	22.3	24.1
		124	18.7	19.3	20.8	20.8	21.4	21.9	22.8	24.9
		125	19.6	20.9	21.0	20.8	22.1	21.5	22.5	23.9
		126	16.9	18.1	18.9	.	.	.	.	.
		127	16.0	17.1	17.2	.	.	.	.	.
		128	14.3	16.8	17.3	.	.	.	.	.
		129	16.6	16.8	17.2	.	.	.	.	.
		130	17.7	18.2	18.0	.	.	.	.	.
		131	15.8	15.9	16.0	.	.	.	.	.
		132	16.3	17.0	17.4	.	.	.	.	.
		133	17.6	19.0	18.5	.	.	.	.	.
		134	16.8	17.3	16.6	.	.	.	.	.
		135	16.2	17.6	17.3	.	.	.	.	.
		136	17.4	18.2	18.4	.	.	.	.	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
2	f	137	17.1	17.0	18.1	.	.	.	.	.
		138	14.7	16.0	17.6	.	.	.	.	.
		139	14.7	15.4	16.3	.	.	.	.	.
		140	16.5	16.9	18.2	.	.	.	.	.
		141	15.5	16.2	17.1	.	.	.	.	.
		142	17.3	18.0	19.5	.	.	.	.	.
		143	15.9	16.4	18.1	.	.	.	.	.
		144	15.0	15.5	17.0	.	.	.	.	.
		145	17.9	18.9	20.2	.	.	.	.	.
		146	14.2	17.9	14.3	.	.	.	.	.
		147	15.2	15.5	12.9	.	.	.	.	.
		148	14.0	17.7	14.4	.	.	.	.	.
		149	17.2	17.7	14.9	.	.	.	.	.
		150	15.7	15.9	12.8	.	.	.	.	.
		151	13.6	17.3	18.6	19.1	20.6	20.1	22.3	23.6
		152	16.1	17.0	18.1	18.8	18.9	18.8	19.4	20.7
		153	15.6	16.9	18.0	19.1	20.0	19.4	21.9	22.5
		154	16.4	17.6	18.7	20.2	20.9	20.2	21.9	22.5
		155	18.5	19.1	20.8	22.5	23.5	21.8	25.1	24.7
		156	18.4	18.2	20.7	21.2	22.3	23.6	24.8	25.4
		157	13.7	18.6	19.0	19.2	21.4	21.3	20.9	21.3
		158	18.3	18.0	18.9	19.0	20.3	20.5	21.8	21.8
		159	16.8	19.7	19.6	20.2	20.8	21.3	20.9	23.8
		160	18.8	18.9	19.8	20.7	21.3	22.2	22.0	22.9

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
2	f	81	23.7	23.8	24.3	25.3	25.2	25.7	27.4	.
		82	22.6	23.8	23.0	24.2	23.0	24.7	24.9	.
		83	23.8	21.8	26.9	23.2	29.2	32.7	31.2	.
		84	27.5	25.4	23.7	27.7	22.9	24.0	23.8	.
		85	23.3	24.6	23.8	24.4	26.4	25.2	25.4	.
		86	23.2	23.6	23.8	24.6	24.7	24.6	26.3	.
		87	22.9	25.1	25.4	24.6	25.5	28.1	26.3	.
		88	21.2	21.2	21.6	22.1	22.2	21.6	.	.
		89	22.2	22.8	23.7	24.6	23.6	24.8	25.6	.
		90	23.1	24.9	24.3	25.3	25.6	26.1	27.1	.
		91	22.4	23.1	22.1	22.1	23.2	23.0	23.5	.
		92	23.8	24.0	24.0	24.8	26.7	26.3	27.9	.
		93	24.9	26.5	24.9	25.6	26.9	26.2	23.2	.
		94	21.3	22.5	22.5	22.7	24.6	22.6	27.7	.
		95	25.3	25.8	26.1	28.3	27.4	27.6	30.3	.
		96	21.9	21.8	20.9	21.5	21.2	21.7	22.2	.
		97	23.3	24.0	25.6	23.2	24.7	24.2	24.7	.
		98	22.9	23.4	23.7	23.6	24.3	24.1	24.4	.
		99	24.6	25.2	25.1	24.6	25.3	26.1	27.1	.
		100	23.0	23.7	24.0	23.5	24.6	23.7	24.9	.
		101	23.3	24.8	25.9	25.7	26.0	24.8	25.4	.
		102	25.6	26.1	27.5	27.3	31.0	27.3	28.4	.
		103	22.9	24.0	24.1	24.0	25.0	25.0	27.4	.
		104	23.5	24.7	25.9	26.7	26.5	25.3	26.7	.
		105	23.7	24.2	26.4	26.2	25.9	28.1	25.4	.
		106	24.0	24.5	23.7	24.8	25.6	26.2	26.4	.
		107	22.4	22.2	23.0	22.5	22.7	22.3	22.7	.
		108	24.8	26.0	23.9	25.9	25.3	24.9	25.6	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
2	f	109	25.0	25.7	25.7	26.9	26.6	27.7	29.6	.
		110	23.6	25.0	26.0	24.6	26.0	26.3	27.0	.
		111	24.4	23.9	24.7	26.2	27.8	27.3	31.0	.
		112	23.4	26.6	25.1	24.6	26.6	26.4	26.5	.
		113	22.5	23.8	24.9	23.5	24.7	26.1	26.1	.
		114	24.1	24.0	25.1	25.9	26.8	27.3	29.2	.
		115	24.8	24.2	25.8	28.7	27.4	27.7	29.5	.
		116	25.0	26.1	24.7	29.2	27.1	27.3	28.2	.
		117	24.4	24.7	24.7	24.0	26.5	24.6	25.2	.
		118	25.0	25.0	27.8	24.1	24.9	26.2	25.8	.
		119	24.3	25.0	25.2	25.8	25.7	24.3	25.8	.
		120	23.7	23.8	24.7	26.2	25.2	27.3	24.8	.
		121	23.5	25.3	24.3	26.0	25.3	25.3	27.0	.
		122	21.3	22.1	22.3	22.1	22.7	22.9	23.9	.
		123	23.4	23.1	23.2	25.0	24.4	25.1	25.4	.
		124	23.2	23.7	26.3	24.6	25.2	26.1	26.6	.
		125	23.2	22.9	23.5	23.5	24.0	24.4	26.7	.
		126	.	.	.	.	.	.	.	.
		127	.	.	.	.	.	.	.	.
		128	.	.	.	.	.	.	.	.
		129	.	.	.	.	.	.	.	.
		130	.	.	.	.	.	.	.	.
		131	.	.	.	.	.	.	.	.
		132	.	.	.	.	.	.	.	.
		133	.	.	.	.	.	.	.	.
		134	.	.	.	.	.	.	.	.
		135	.	.	.	.	.	.	.	.
		136	.	.	.	.	.	.	.	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
2	f	137	.	.	.	.	.	.	.	.
		138	.	.	.	.	.	.	.	.
		139	.	.	.	.	.	.	.	.
		140	.	.	.	.	.	.	.	.
		141	.	.	.	.	.	.	.	.
		142	.	.	.	.	.	.	.	.
		143	.	.	.	.	.	.	.	.
		144	.	.	.	.	.	.	.	.
		145	.	.	.	.	.	.	.	.
		146	.	.	.	.	.	.	.	.
		147	.	.	.	.	.	.	.	.
		148	.	.	.	.	.	.	.	.
		149	.	.	.	.	.	.	.	.
		150	.	.	.	.	.	.	.	.
		151	23.9	25.0	26.1	26.5	26.5	26.9	.	25.8
		152	21.0	21.6	22.1	23.8	23.2	22.6	.	22.8
		153	22.4	23.4	24.4	25.6	25.3	24.8	.	25.6
		154	22.7	23.5	23.9	25.4	25.3	24.9	.	28.9
		155	25.1	27.3	26.8	28.8	28.4	28.3	.	24.7
		156	25.0	25.9	29.6	27.8	27.2	29.0	.	28.8
		157	23.2	22.6	24.5	23.2	24.2	24.7	.	26.5
		158	22.3	22.7	23.2	24.0	24.2	24.3	.	25.0
		159	22.2	23.4	23.8	25.5	23.8	25.1	.	24.9
		160	22.8	23.8	24.6	27.1	25.6	25.6	.	27.3

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
3	f	161	16.9	16.9	18.3	19.7	18.7	20.8	20.8	21.3
		162	17.8	18.8	20.2	20.9	20.9	23.2	22.5	23.0
		163	18.6	18.8	20.7	20.8	20.7	22.7	23.4	23.0
		164	16.6	17.7	18.7	19.1	18.8	20.3	20.2	19.7
		165	18.4	17.9	19.1	20.0	20.4	21.3	21.8	21.7
		166	18.0	19.6	20.7	20.8	21.8	21.6	22.9	22.7
		167	18.2	17.6	18.8	19.3	20.0	20.2	20.5	21.7
		168	18.4	18.7	20.0	21.5	21.3	21.6	23.9	23.2
		169	19.0	19.4	20.3	21.0	22.2	20.9	22.4	22.4
		170	15.8	17.7	18.8	20.0	20.6	20.7	22.3	21.8
		171	16.0	17.4	18.2	19.8	20.3	20.5	21.1	21.4
		172	18.6	19.5	20.5	21.6	21.8	22.2	22.7	24.4
		173	16.8	17.6	17.8	18.9	19.6	20.4	20.9	22.6
		174	17.2	19.3	20.2	21.3	22.2	22.3	22.9	24.9
		175	17.4	17.8	18.7	18.9	19.8	20.7	20.9	21.8
		176	15.3	16.8	18.6	20.2	19.7	21.0	22.3	21.2
		177	17.9	17.4	18.8	19.2	19.7	20.2	21.2	21.0
		178	18.5	19.5	20.5	20.5	20.6	21.2	22.8	21.7
		179	17.5	20.3	21.7	22.5	22.7	23.8	24.8	24.2
		180	16.9	17.1	18.8	19.1	19.3	20.3	21.5	20.6
		181	17.2	18.2	19.0	20.8	18.4	20.0	21.1	21.6
		182	16.3	16.8	18.3	19.2	17.6	19.5	20.9	20.7
		183	17.9	19.2	20.0	20.8	19.5	21.6	22.7	22.5
		184	19.3	19.8	20.3	21.9	20.5	21.5	23.2	23.8
		185	15.6	19.5	20.4	21.7	20.5	21.0	23.6	23.4
		186	18.8	16.9	18.4	20.9	19.6	20.8	21.2	22.2
		187	17.1	18.6	19.2	19.9	20.5	21.3	23.0	21.5
		188	17.6	18.3	19.6	19.0	20.9	21.5	22.5	22.6

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
3	f	189	16.6	17.8	18.6	20.2	20.1	20.3	23.2	21.5
		190	19.4	18.8	18.9	20.3	21.4	21.6	23.2	23.2
		191	16.1	18.7	19.8	21.5	21.3	22.2	23.7	24.3
		192	17.5	18.9	20.5	19.5	20.6	23.3	24.7	25.2
		193	15.9	17.8	19.5	21.3	23.1	21.1	21.9	22.8
		194	16.9	19.1	19.7	20.9	21.4	22.4	22.8	23.6
		195	17.8	18.9	20.0	20.0	20.9	22.6	22.8	22.9
		196	16.7	17.8	19.1	20.5	20.3	20.7	21.6	21.8
		197	15.7	19.9	22.8	22.8	22.2	23.6	23.6	24.3
		198	19.2	20.0	20.4	20.9	22.0	23.0	22.8	24.6
		199	18.1	19.4	20.7	20.8	21.2	22.3	22.2	22.9
		200	16.4	18.6	19.0	20.1	20.4	21.3	21.3	21.6
		201	17.7	20.1	21.4	20.7	22.0	23.0	23.6	23.6
		202	18.6	20.3	21.6	22.6	22.5	22.7	23.6	25.7
		203	19.1	20.7	21.6	21.1	22.2	24.2	23.1	24.1
		204	18.8	19.9	20.1	21.0	21.5	22.3	22.2	23.5
		205	19.6	21.2	21.1	22.7	23.4	23.7	24.2	25.2
		206	16.6	17.7	17.4	.	.	.	.	.
		207	16.0	16.2	17.8	.	.	.	.	.
		208	15.9	16.3	16.3	.	.	.	.	.
		209	15.8	16.1	17.1	.	.	.	.	.
		210	13.7	15.4	16.2	.	.	.	.	.
		211	15.4	16.4	18.0	.	.	.	.	.
		212	16.8	17.0	18.3	.	.	.	.	.
		213	16.3	17.4	17.9	.	.	.	.	.
		214	15.7	19.1	20.4	.	.	.	.	.
		215	17.1	17.7	19.0	.	.	.	.	.
		216	18.1	18.6	18.9	.	.	.	.	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
3	f	217	17.3	17.9	17.8	.	.	.	.	.
		218	14.1	14.8	15.3	.	.	.	.	.
		219	16.6	17.5	19.0	.	.	.	.	.
		220	14.4	15.7	17.0	.	.	.	.	.
		221	17.6	19.6	19.8	.	.	.	.	.
		222	14.9	16.1	17.3	.	.	.	.	.
		223	16.9	17.9	18.6	.	.	.	.	.
		224	17.4	18.2	19.0	.	.	.	.	.
		225	15.6	17.6	18.7	.	.	.	.	.
		226	13.4	16.9	16.2	.	.	.	.	.
		227	18.4	19.2	17.9	.	.	.	.	.
		228	14.9	16.1	16.8	.	.	.	.	.
		229	17.0	18.7	17.9	.	.	.	.	.
		230	16.3	18.2	17.0	.	.	.	.	.
		231	14.6	18.9	19.4	20.9	22.3	24.1	22.8	24.0
		232	17.9	18.9	19.1	20.4	20.1	21.1	20.7	22.1
		233	16.4	17.5	18.0	19.9	21.1	21.4	22.0	23.0
		234	18.6	19.9	22.0	23.5	24.6	26.2	27.0	29.1
		235	16.1	17.0	17.4	18.5	18.9	20.1	20.8	21.5
		236	15.2	18.9	20.2	21.1	22.7	22.6	23.2	24.5
		237	16.4	16.8	17.4	17.4	18.8	19.3	19.9	20.7
		238	13.9	15.7	16.7	16.8	17.6	18.0	18.2	19.2
		239	17.6	18.4	20.0	20.1	21.7	21.8	22.2	23.2
		240	19.0	20.6	22.6	22.6	24.8	26.2	24.2	26.4

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
3	f	161	22.7	22.6	23.4	24.0	24.3	24.7	24.9	.
		162	25.5	26.3	26.4	27.8	28.9	28.5	30.3	.
		163	25.7	25.0	24.8	27.6	28.9	25.9	26.4	.
		164	21.8	22.2	23.7	22.5	27.4	22.6	24.6	.
		165	23.3	23.3	23.9	23.6	25.6	23.8	26.4	.
		166	22.9	22.8	22.6	23.5	23.4	22.7	24.3	.
		167	21.4	22.0	22.6	23.4	22.5	22.2	22.7	.
		168	23.0	24.2	24.3	24.5	23.8	24.9	24.9	.
		169	23.9	23.0	23.4	26.1	23.9	23.6	25.7	.
		170	22.6	23.9	23.6	24.6	24.6	24.3	24.9	.
		171	20.9	21.9	21.2	22.1	23.8	23.6	23.0	.
		172	24.2	25.4	25.0	25.4	26.8	27.8	26.3	.
		173	21.5	22.9	23.3	24.0	23.7	25.6	24.0	.
		174	25.1	25.1	25.3	25.8	26.0	26.2	27.0	.
		175	21.1	21.2	21.6	22.5	22.0	23.3	21.9	.
		176	22.5	24.9	23.9	23.2	25.0	26.3	25.4	.
		177	21.9	22.8	23.6	22.3	24.4	23.7	24.9	.
		178	22.2	23.8	24.4	23.7	24.6	26.0	25.7	.
		179	25.9	27.1	27.5	28.9	30.1	32.0	31.6	.
		180	22.6	22.5	22.6	23.2	24.2	25.8	24.2	.
		181	22.7	22.5	23.2	23.5	22.9	23.3	22.0	.
		182	22.4	23.0	23.1	23.8	24.3	24.9	22.8	.
		183	23.8	24.7	25.3	24.9	24.9	25.6	23.0	.
		184	24.4	26.3	26.1	26.4	26.2	27.9	24.8	.
		185	24.6	25.4	25.3	25.3	27.2	26.6	24.9	.
		186	22.2	22.8	22.6	22.8	22.5	20.5	22.7	.
		187	23.2	24.0	24.8	25.2	26.3	23.2	24.7	.
		188	25.3	25.5	24.1	24.6	24.3	23.3	26.4	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
3	f	189	23.4	24.1	24.0	26.2	23.8	22.2	24.6	.
		190	24.2	25.4	24.3	26.1	26.4	25.2	28.6	.
		191	25.0	25.2	26.0	26.8	27.4	27.2	27.7	.
		192	25.5	25.8	26.2	29.2	28.4	29.6	30.3	.
		193	23.1	22.3	24.1	23.5	24.2	24.8	24.6	.
		194	25.3	23.9	25.1	26.3	27.7	27.8	28.3	.
		195	24.5	24.1	23.6	25.1	24.3	25.0	24.2	.
		196	24.7	23.6	22.6	25.8	24.7	25.1	25.4	.
		197	25.9	26.4	25.1	27.8	28.7	30.8	27.9	.
		198	24.5	25.8	27.5	26.1	26.9	29.1	29.3	.
		199	24.1	24.9	22.9	25.4	25.5	27.9	26.6	.
		200	23.3	23.9	22.3	23.7	24.2	26.0	26.3	.
		201	22.6	24.2	23.5	24.3	24.0	25.7	24.5	.
		202	24.1	25.5	28.0	26.2	27.4	28.1	30.2	.
		203	24.4	24.5	24.8	25.7	25.2	25.7	27.8	.
		204	23.9	22.9	23.6	23.8	25.8	24.0	25.6	.
		205	26.3	26.1	26.4	30.0	28.5	28.5	31.0	.
		206	.	.	.	.	.	.	.	.
		207	.	.	.	.	.	.	.	.
		208	.	.	.	.	.	.	.	.
		209	.	.	.	.	.	.	.	.
		210	.	.	.	.	.	.	.	.
		211	.	.	.	.	.	.	.	.
		212	.	.	.	.	.	.	.	.
		213	.	.	.	.	.	.	.	.
		214	.	.	.	.	.	.	.	.
		215	.	.	.	.	.	.	.	.
		216	.	.	.	.	.	.	.	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
3	f	217	.	.	.	.	.	.	.	.
		218	.	.	.	.	.	.	.	.
		219	.	.	.	.	.	.	.	.
		220	.	.	.	.	.	.	.	.
		221	.	.	.	.	.	.	.	.
		222	.	.	.	.	.	.	.	.
		223	.	.	.	.	.	.	.	.
		224	.	.	.	.	.	.	.	.
		225	.	.	.	.	.	.	.	.
		226	.	.	.	.	.	.	.	.
		227	.	.	.	.	.	.	.	.
		228	.	.	.	.	.	.	.	.
		229	.	.	.	.	.	.	.	.
		230	.	.	.	.	.	.	.	.
		231	26.3	24.3	27.1	26.2	26.7	26.6	.	27.6
		232	22.0	22.9	23.5	23.5	24.9	24.7	.	24.1
		233	22.2	22.9	23.4	23.6	24.0	24.1	.	25.3
		234	29.7	30.4	31.2	32.1	33.6	33.2	.	34.4
		235	21.2	21.3	22.3	22.3	23.5	23.7	.	23.0
		236	24.5	25.5	27.2	30.0	28.0	28.4	.	30.7
		237	20.7	21.1	22.7	23.5	22.8	22.5	.	22.6
		238	19.8	20.7	20.6	20.6	20.6	20.7	.	21.1
		239	22.3	23.2	24.6	25.4	25.5	24.9	.	26.3
		240	27.0	29.7	28.1	29.3	33.1	29.4	.	31.7

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
4	f	241	19.0	19.7	20.8	20.1	21.3	22.3	21.8	24.7
		242	18.1	18.7	20.0	21.3	21.5	22.4	22.2	23.8
		243	17.5	19.4	20.4	21.9	22.1	22.4	22.8	22.5
		244	16.0	19.3	20.5	21.7	22.4	22.4	22.8	25.3
		245	16.8	19.2	20.3	20.0	21.0	21.3	21.4	22.0
		246	16.4	17.3	19.1	19.4	19.9	20.5	21.3	21.7
		247	17.0	17.3	19.8	19.8	20.1	20.9	20.6	21.7
		248	19.5	19.0	20.4	21.2	21.7	22.6	23.5	25.1
		249	15.8	17.1	18.1	18.6	19.8	19.4	19.9	21.5
		250	18.6	19.1	19.3	21.2	21.1	22.3	23.6	22.7
		251	18.3	19.1	19.9	21.1	21.1	21.6	22.4	23.0
		252	18.6	20.9	20.7	22.4	22.5	23.0	22.0	23.8
		253	18.5	19.7	20.3	21.8	21.3	21.3	22.9	22.0
		254	16.2	17.4	18.6	20.0	19.4	19.9	20.8	20.7
		255	18.2	19.4	21.0	21.8	22.3	23.6	23.1	23.9
		256	16.0	16.5	18.5	20.0	20.2	20.9	21.2	22.0
		257	18.4	20.4	21.9	22.3	22.5	22.5	23.2	24.0
		258	19.6	18.3	20.2	20.7	21.4	21.7	22.8	24.4
		259	17.9	18.7	21.7	21.8	22.3	22.7	23.0	23.9
		260	19.1	19.0	20.3	21.2	22.0	22.3	23.6	23.8
		261	17.7	18.8	20.1	21.4	21.6	20.8	22.8	21.3
		262	15.7	16.6	18.6	20.1	21.8	21.8	22.2	22.6
		263	17.5	19.7	20.0	21.3	21.7	22.2	22.8	23.0
		264	17.8	18.4	19.5	20.3	20.7	21.6	22.0	21.8
		265	19.3	20.9	21.8	22.6	24.5	23.3	25.3	25.0
		266	17.7	19.5	19.8	20.3	20.6	21.6	22.2	22.9
		267	17.4	17.6	19.1	19.5	20.4	20.5	21.7	23.0
		268	17.2	18.0	19.3	19.8	20.6	21.5	22.6	23.0

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
4	f	269	18.9	19.2	20.4	20.3	19.5	20.5	21.2	22.4
		270	15.7	16.2	17.9	18.5	19.5	19.6	20.1	21.5
		271	16.9	17.9	18.8	20.1	20.2	21.5	23.2	22.4
		272	16.6	18.4	19.8	21.4	21.5	22.2	22.1	24.1
		273	17.1	17.9	18.8	19.1	20.0	21.3	21.6	21.6
		274	18.6	19.4	20.8	20.8	21.9	24.1	21.3	23.7
		275	16.5	16.6	18.3	20.0	20.5	20.6	21.3	21.7
		276	18.8	19.1	20.5	21.2	21.8	22.2	23.4	23.9
		277	15.9	16.3	18.4	19.8	20.4	21.4	21.4	22.1
		278	16.7	17.6	20.0	20.2	20.7	21.6	21.6	21.8
		279	18.0	18.4	20.0	19.9	20.8	21.7	22.6	23.8
		280	15.5	17.8	18.0	19.8	19.8	21.2	20.5	22.3
		281	17.9	19.2	21.2	21.6	23.3	21.9	24.3	24.5
		282	17.8	19.2	20.0	21.1	20.8	21.3	22.9	22.5
		283	19.3	18.7	19.5	20.7	21.3	21.0	22.0	22.6
		284	16.9	19.4	20.1	20.7	21.4	22.1	22.5	22.2
		285	17.2	18.8	20.3	20.3	21.7	22.1	22.3	23.1
		286	16.8	17.5	18.9	.	.	.	.	.
		287	15.3	16.1	16.0	.	.	.	.	.
		288	14.1	15.8	16.5	.	.	.	.	.
		289	14.1	14.9	15.7	.	.	.	.	.
		290	16.4	16.8	18.2	.	.	.	.	.
		291	16.6	17.5	17.8	.	.	.	.	.
		292	15.9	16.3	16.1	.	.	.	.	.
		293	15.6	15.7	15.2	.	.	.	.	.
		294	13.7	14.2	14.3	.	.	.	.	.
		295	14.7	16.3	15.7	.	.	.	.	.
		296	15.7	16.7	18.4	.	.	.	.	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
4	f	297	17.1	17.7	20.0	.	.	.	.	.
		298	17.9	18.6	20.2	.	.	.	.	.
		299	17.0	17.9	18.3	.	.	.	.	.
		300	17.3	16.9	19.0	.	.	.	.	.
		301	16.9	17.8	13.9	.	.	.	.	.
		302	14.9	15.3	12.9	.	.	.	.	.
		303	18.6	19.1	14.8	.	.	.	.	.
		304	16.8	17.4	14.6	.	.	.	.	.
		305	19.0	18.6	15.3	.	.	.	.	.
		306	15.4	17.1	18.0	.	.	.	.	.
		307	18.4	18.7	19.1	.	.	.	.	.
		308	17.4	17.3	18.7	.	.	.	.	.
		309	16.1	15.4	16.0	.	.	.	.	.
		310	18.2	19.0	19.7	.	.	.	.	.
		311	16.3	16.8	17.7	18.5	19.5	19.6	21.6	20.7
		312	17.8	17.8	18.0	19.0	20.1	20.1	21.3	21.4
		313	13.3	18.1	18.7	19.7	20.6	21.7	22.1	22.8
		314	14.9	15.6	16.7	17.3	19.2	19.8	20.0	20.4
		315	16.0	16.1	17.3	19.1	21.2	20.1	22.0	23.0
		316	17.6	18.9	20.0	21.0	22.5	22.7	24.0	24.3
		317	15.9	17.4	18.7	18.9	20.6	21.0	21.9	22.9
		318	16.4	19.0	19.1	20.1	21.5	21.9	22.8	23.2
		319	16.3	17.1	18.2	18.8	20.1	20.1	21.5	21.5
		320	14.3	15.4	18.0	18.3	19.8	20.7	21.3	22.7

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
4	f	241	23.4	24.3	25.5	23.3	23.8	26.7	26.8	.
		242	24.1	24.6	25.0	25.4	25.8	26.9	27.2	.
		243	23.7	25.4	25.4	24.1	23.6	26.1	26.4	.
		244	23.2	25.7	25.0	25.0	23.7	27.8	27.5	.
		245	22.7	23.6	23.0	22.3	21.1	25.8	24.3	.
		246	21.1	22.4	21.3	22.3	22.5	23.2	23.8	.
		247	21.8	22.2	23.1	23.7	25.0	25.2	24.6	.
		248	26.7	26.3	28.6	32.3	29.0	31.4	32.7	.
		249	21.5	22.7	21.9	21.7	22.2	23.9	23.4	.
		250	22.9	24.6	25.9	24.0	23.8	24.5	24.9	.
		251	23.8	24.8	23.9	23.8	25.1	26.3	26.5	.
		252	24.9	26.0	26.4	27.2	28.3	28.7	29.5	.
		253	22.9	22.4	23.2	23.5	25.9	23.6	24.7	.
		254	22.0	22.0	21.5	21.7	24.6	22.8	23.8	.
		255	24.3	25.9	24.6	25.0	26.0	26.0	27.4	.
		256	22.9	25.7	24.0	22.1	22.7	24.7	23.3	.
		257	24.0	24.1	26.6	24.1	25.8	26.2	26.7	.
		258	23.8	23.6	24.8	24.6	27.0	24.7	28.7	.
		259	25.3	23.0	26.7	25.7	26.6	27.7	25.8	.
		260	23.4	24.5	26.1	25.4	24.3	25.1	27.5	.
		261	23.3	23.3	23.2	24.6	24.2	26.0	24.4	.
		262	23.8	24.5	24.1	24.6	24.6	25.4	26.6	.
		263	23.5	24.2	23.8	25.6	27.6	25.2	27.0	.
		264	23.6	23.1	23.0	23.7	23.5	26.5	24.3	.
		265	27.3	26.2	27.6	30.3	28.0	29.6	30.7	.
		266	23.7	24.7	24.8	23.7	24.0	27.7	26.1	.
		267	22.1	23.8	24.1	23.9	24.9	25.8	25.6	.
		268	23.3	23.6	26.7	24.9	25.7	27.2	28.1	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
4	f	269	22.6	22.6	25.1	25.0	25.7	25.1	26.4	.
		270	21.9	21.8	23.0	23.8	23.1	23.9	23.8	.
		271	23.6	24.0	23.8	25.9	25.4	27.1	24.8	.
		272	23.7	24.5	25.3	26.2	25.7	26.1	27.8	.
		273	21.6	23.4	24.4	24.3	25.1	24.5	25.7	.
		274	24.0	27.3	24.7	26.2	26.6	27.1	27.4	.
		275	22.6	22.2	22.0	23.1	24.3	23.2	23.7	.
		276	24.6	25.6	26.0	28.5	26.4	27.2	28.2	.
		277	23.4	24.2	24.9	26.7	24.8	26.0	27.5	.
		278	22.8	23.7	24.4	23.9	24.1	25.5	24.7	.
		279	26.0	24.3	25.4	27.3	28.1	29.2	27.4	.
		280	22.0	22.6	24.6	23.1	24.1	24.9	24.9	.
		281	24.0	25.0	25.8	27.8	26.5	27.0	29.4	.
		282	23.1	24.0	25.1	25.7	26.7	27.2	28.4	.
		283	22.5	22.6	22.6	21.7	22.5	23.8	23.6	.
		284	22.7	22.5	23.8	23.1	24.7	23.2	25.2	.
		285	22.6	22.4	23.7	24.7	25.0	24.8	26.6	.
		286	.	.	.	.	.	.	.	.
		287	.	.	.	.	.	.	.	.
		288	.	.	.	.	.	.	.	.
		289	.	.	.	.	.	.	.	.
		290	.	.	.	.	.	.	.	.
		291	.	.	.	.	.	.	.	.
		292	.	.	.	.	.	.	.	.
		293	.	.	.	.	.	.	.	.
		294	.	.	.	.	.	.	.	.
		295	.	.	.	.	.	.	.	.
		296	.	.	.	.	.	.	.	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
4	f	297	.	.	.	.	.	.	.	.
		298	.	.	.	.	.	.	.	.
		299	.	.	.	.	.	.	.	.
		300	.	.	.	.	.	.	.	.
		301	.	.	.	.	.	.	.	.
		302	.	.	.	.	.	.	.	.
		303	.	.	.	.	.	.	.	.
		304	.	.	.	.	.	.	.	.
		305	.	.	.	.	.	.	.	.
		306	.	.	.	.	.	.	.	.
		307	.	.	.	.	.	.	.	.
		308	.	.	.	.	.	.	.	.
		309	.	.	.	.	.	.	.	.
		310	.	.	.	.	.	.	.	.
		311	22.0	22.4	22.5	23.9	22.6	22.8	.	24.3
		312	21.3	22.5	22.3	23.6	23.0	22.9	.	23.4
		313	23.2	23.1	23.9	23.9	24.5	24.3	.	25.2
		314	21.2	21.3	21.7	22.1	21.6	21.7	.	23.7
		315	22.3	25.0	23.8	26.0	24.0	24.3	.	25.3
		316	24.8	24.9	25.5	25.7	24.0	26.1	.	28.6
		317	21.3	22.9	23.4	24.1	23.6	25.3	.	25.0
		318	24.4	24.3	24.7	26.7	24.0	26.2	.	27.7
		319	22.6	22.3	23.8	23.5	22.5	24.8	.	23.7
		320	21.4	22.6	22.9	24.2	21.4	24.2	.	23.4

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* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
5	f	321	16.6	16.9	18.3	18.4	18.9	19.4	20.1	21.0
		322	16.5	17.5	19.9	20.5	20.4	22.0	22.0	22.4
		323	18.4	18.5	20.3	21.0	21.2	22.1	22.8	22.8
		324	18.5	19.3	20.1	20.8	21.0	22.0	21.9	23.4
		325	19.1	19.0	20.4	20.9	20.9	22.5	22.7	23.1
		326	17.9	18.9	19.8	19.9	20.5	21.2	21.0	21.9
		327	17.4	18.3	18.5	20.2	21.5	21.2	21.5	22.8
		328	15.7	17.5	18.0	18.2	18.7	19.4	20.1	20.6
		329	16.4	16.4	17.7	18.1	18.5	20.1	20.0	21.8
		330	16.9	17.9	19.7	20.4	20.9	21.5	22.2	22.3
		331	15.8	17.5	18.6	19.6	20.4	20.4	20.9	20.9
		332	15.2	18.0	19.0	19.3	21.1	20.9	21.5	23.6
		333	18.0	19.4	19.7	21.0	20.8	21.9	21.9	22.1
		334	17.0	17.9	19.4	19.8	20.5	21.0	21.3	21.4
		335	17.7	18.2	19.3	20.0	21.1	20.6	21.8	20.8
		336	16.3	17.8	19.2	20.0	20.4	21.0	21.6	22.3
		337	17.1	17.5	19.1	19.5	20.2	20.3	21.0	21.2
		338	18.2	18.2	19.0	20.0	19.9	19.9	20.5	21.9
		339	15.8	15.7	17.5	18.7	18.8	20.4	20.6	21.0
		340	17.2	17.3	17.7	18.5	19.4	20.9	21.0	22.8
		341	16.1	16.7	18.0	18.5	19.5	19.8	21.8	18.3
		342	18.9	20.1	20.6	21.0	21.2	21.3	22.2	22.0
		343	18.2	18.9	19.3	20.5	20.7	20.9	21.9	21.8
		344	16.9	18.0	19.3	20.3	20.8	20.7	21.7	17.1
		345	18.7	18.2	18.9	20.2	20.5	21.3	22.4	19.5
		346	19.2	20.0	20.0	20.6	21.6	21.7	22.2	20.0
		347	16.0	19.7	20.5	21.6	22.1	22.5	23.8	21.6
		348	17.5	17.9	18.5	19.8	20.4	19.8	21.4	21.9

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
5	f	349	19.7	19.6	20.6	20.8	20.9	22.1	21.6	22.6
		350	17.7	19.1	20.1	20.9	21.1	21.7	21.9	22.3
		351	17.4	19.1	20.3	21.2	22.8	23.0	22.9	24.8
		352	19.0	20.2	21.3	19.8	23.0	23.8	23.9	24.4
		353	16.6	19.2	20.1	21.2	22.0	22.9	23.6	24.4
		354	17.3	18.8	18.9	20.7	20.0	20.4	21.3	21.2
		355	19.4	18.8	20.0	21.9	22.0	23.3	24.4	26.0
		356	18.7	19.7	20.5	20.1	20.9	21.4	23.5	22.4
		357	18.6	19.3	20.6	21.0	22.3	23.6	23.8	24.3
		358	17.8	19.4	20.4	21.5	22.6	24.9	23.5	23.8
		359	18.0	19.2	20.0	20.5	21.9	21.6	23.1	24.0
		360	18.3	19.6	20.1	20.5	21.8	22.9	24.4	24.4
		361	16.0	18.7	19.6	20.3	20.7	21.2	22.2	23.1
		362	17.8	19.2	18.9	20.5	21.1	21.7	22.8	24.2
		363	18.6	22.9	22.9	22.3	22.0	23.0	23.3	25.8
		364	19.3	21.3	21.9	22.9	22.8	23.5	24.5	25.4
		365	16.7	18.9	20.0	20.1	21.2	20.6	21.8	21.7
		366	17.1	16.9	17.7	.	.	.	.	.
		367	15.6	16.8	17.0	.	.	.	.	.
		368	14.6	17.9	18.6	.	.	.	.	.
		369	17.7	17.8	19.0	.	.	.	.	.
		370	16.0	16.6	18.6	.	.	.	.	.
		371	13.8	17.6	18.7	.	.	.	.	.
		372	13.3	17.3	17.7	.	.	.	.	.
		373	15.1	15.4	16.5	.	.	.	.	.
		374	15.3	18.6	20.4	.	.	.	.	.
		375	15.1	15.4	16.7	.	.	.	.	.
		376	16.3	14.9	16.9	.	.	.	.	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
5	f	377	15.7	14.4	17.3	.	.	.	.	.
		378	16.1	15.1	17.8	.	.	.	.	.
		379	16.3	15.6	18.1	.	.	.	.	.
		380	18.0	15.7	19.0	.	.	.	.	.
		381	15.9	16.8	18.2	.	.	.	.	.
		382	16.5	16.6	17.2	.	.	.	.	.
		383	13.6	16.6	17.6	.	.	.	.	.
		384	15.9	16.5	17.4	.	.	.	.	.
		385	17.3	17.8	19.1	.	.	.	.	.
		386	18.4	20.1	15.4	.	.	.	.	.
		387	16.2	17.0	14.0	.	.	.	.	.
		388	17.8	18.6	14.6	.	.	.	.	.
		389	14.4	17.0	13.8	.	.	.	.	.
		390	14.3	17.3	13.9	.	.	.	.	.
		391	17.5	17.8	20.0	20.5	20.4	22.8	21.9	23.0
		392	18.7	18.0	19.6	20.6	21.5	22.3	22.8	24.3
		393	16.9	17.2	18.6	19.3	21.0	20.6	21.4	21.2
		394	14.9	15.5	17.5	17.8	19.0	18.8	18.9	20.1
		395	17.1	17.7	19.0	20.0	20.2	21.6	21.9	24.5
		396	17.4	18.2	19.3	19.6	20.9	21.3	21.5	22.7
		397	16.9	18.8	19.3	20.6	21.2	21.8	22.0	22.9
		398	18.6	19.0	19.9	19.7	20.9	21.1	23.1	23.0
		399	16.7	17.9	18.2	19.8	20.5	20.8	21.6	23.4
		400	16.5	17.6	19.1	19.6	21.1	21.2	21.5	23.2

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
5	f	321	20.6	21.9	21.1	22.8	22.8	23.2	23.5	.
		322	21.4	22.6	22.2	22.9	22.6	23.8	23.5	.
		323	21.9	23.2	23.8	22.9	25.3	24.8	24.5	.
		324	23.1	23.4	23.7	25.6	26.7	24.8	25.3	.
		325	22.6	24.7	24.3	24.5	25.4	27.7	25.7	.
		326	22.4	23.2	23.0	22.9	23.3	24.3	24.3	.
		327	23.1	24.0	23.4	24.2	24.7	25.1	24.5	.
		328	20.8	21.9	20.3	20.7	21.1	21.9	22.9	.
		329	22.4	21.1	21.5	21.3	21.7	22.4	22.4	.
		330	22.3	24.0	22.6	23.7	24.5	25.3	24.7	.
		331	22.0	22.6	22.6	23.3	24.5	20.9	26.0	.
		332	22.3	23.8	24.1	24.1	25.0	21.4	28.4	.
		333	23.2	23.6	23.0	24.2	23.7	19.5	25.7	.
		334	22.0	23.2	23.8	24.4	25.7	19.8	25.9	.
		335	22.0	22.6	23.4	23.7	24.4	21.4	25.6	.
		336	22.9	22.5	22.6	22.7	23.2	25.9	23.1	.
		337	21.6	22.0	22.2	22.4	22.8	22.9	23.0	.
		338	20.9	23.3	22.0	22.0	23.0	23.6	21.8	.
		339	21.4	23.0	22.7	23.3	22.8	23.1	23.6	.
		340	21.3	22.4	22.7	22.2	22.3	23.1	20.3	.
		341	19.5	22.5	23.3	23.7	24.3	25.7	24.0	.
		342	23.2	24.6	24.7	25.1	25.4	25.8	26.6	.
		343	23.4	24.3	24.8	23.7	23.4	23.7	25.1	.
		344	22.0	22.9	23.4	23.3	24.0	22.7	23.2	.
		345	21.5	22.4	22.8	22.8	23.8	24.1	24.1	.
		346	23.6	24.6	24.1	24.9	26.6	26.6	27.2	.
		347	24.7	25.2	26.0	25.1	27.8	26.0	27.0	.
		348	22.3	22.9	24.0	24.9	26.3	27.2	28.0	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
5	f	349	23.0	23.8	22.7	25.3	24.5	23.8	24.8	.
		350	23.8	22.6	23.7	24.3	25.4	25.3	27.4	.
		351	24.4	25.3	26.3	26.3	28.2	28.9	26.5	.
		352	24.9	25.4	25.2	25.5	25.9	26.8	27.0	.
		353	24.7	26.4	25.5	25.9	26.3	29.0	24.1	.
		354	22.1	21.8	22.5	23.9	23.3	24.3	28.5	.
		355	25.5	26.2	26.1	27.0	28.0	29.1	29.8	.
		356	22.6	22.9	22.6	22.5	22.7	24.0	23.9	.
		357	25.2	25.6	25.5	26.4	27.8	26.2	26.0	.
		358	24.3	24.8	25.6	27.3	25.6	25.5	27.4	.
		359	23.1	24.4	25.1	24.8	25.0	25.0	25.6	.
		360	23.3	22.7	24.3	24.5	26.1	24.2	24.4	.
		361	23.0	23.3	25.9	24.5	25.4	24.9	26.3	.
		362	24.1	24.1	26.5	26.4	25.7	26.2	29.1	.
		363	24.7	24.5	24.5	26.2	26.2	27.2	26.6	.
		364	24.6	24.1	25.2	25.5	26.1	25.8	27.4	.
		365	22.0	21.6	24.1	22.9	23.4	25.4	23.9	.
		366	.	.	.	.	.	.	.	.
		367	.	.	.	.	.	.	.	.
		368	.	.	.	.	.	.	.	.
		369	.	.	.	.	.	.	.	.
		370	.	.	.	.	.	.	.	.
		371	.	.	.	.	.	.	.	.
		372	.	.	.	.	.	.	.	.
		373	.	.	.	.	.	.	.	.
		374	.	.	.	.	.	.	.	.
		375	.	.	.	.	.	.	.	.
		376	.	.	.	.	.	.	.	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
5	f	377	.	.	.	.	.	.	.	.
		378	.	.	.	.	.	.	.	.
		379	.	.	.	.	.	.	.	.
		380	.	.	.	.	.	.	.	.
		381	.	.	.	.	.	.	.	.
		382	.	.	.	.	.	.	.	.
		383	.	.	.	.	.	.	.	.
		384	.	.	.	.	.	.	.	.
		385	.	.	.	.	.	.	.	.
		386	.	.	.	.	.	.	.	.
		387	.	.	.	.	.	.	.	.
		388	.	.	.	.	.	.	.	.
		389	.	.	.	.	.	.	.	.
		390	.	.	.	.	.	.	.	.
		391	25.0	24.0	24.7	25.5	26.9	25.8	.	25.2
		392	24.7	26.3	26.9	26.4	27.5	28.2	.	27.3
		393	21.5	23.2	23.6	24.5	23.2	23.5	.	24.4
		394	19.7	20.8	20.6	20.8	21.4	22.3	.	22.1
		395	22.9	24.3	26.2	25.7	25.3	26.2	.	27.3
		396	22.4	23.9	23.9	23.3	24.6	23.6	.	25.0
		397	24.0	22.8	24.6	24.8	25.2	25.5	.	25.4
		398	23.2	24.7	25.1	24.0	23.7	26.8	.	27.7
		399	21.7	23.8	23.3	24.0	24.4	24.4	.	26.0
		400	22.9	23.6	23.9	23.7	25.4	23.7	.	24.7

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
6	f	401	16.1	18.1	18.8	19.3	20.4	22.0	21.5	22.1
		402	16.9	19.7	19.5	20.3	20.9	21.7	21.9	22.8
		403	16.1	19.1	19.6	20.2	20.5	21.7	21.3	21.6
		404	17.6	18.1	19.0	19.8	20.6	21.1	21.3	22.0
		405	16.8	17.6	18.8	19.4	20.3	21.0	21.5	22.0
		406	17.7	18.0	18.5	18.2	18.5	19.3	19.0	20.3
		407	17.0	18.0	19.3	20.7	20.5	21.0	22.0	22.1
		408	16.9	18.2	18.3	18.6	19.3	19.9	20.2	21.1
		409	16.4	16.8	17.9	18.8	19.0	20.1	20.5	21.2
		410	18.0	18.5	18.4	19.5	20.5	21.1	21.2	22.0
		411	19.2	19.6	19.5	20.2	20.5	21.2	21.2	22.7
		412	18.8	18.9	19.4	20.3	20.8	21.2	21.7	22.6
		413	18.2	18.4	18.8	19.4	19.5	20.3	19.8	20.8
		414	17.7	18.7	19.4	20.1	21.2	22.2	21.8	22.6
		415	17.3	17.6	18.3	18.6	18.9	20.1	19.8	20.6
		416	17.8	19.4	20.9	20.9	18.1	22.0	21.7	22.0
		417	15.4	17.3	17.6	18.4	16.4	19.2	20.2	20.5
		418	18.4	18.8	19.5	19.3	17.0	20.3	21.0	21.9
		419	17.8	18.4	19.0	19.4	17.7	20.4	21.9	22.2
		420	18.5	19.3	20.1	20.6	18.7	21.4	23.2	23.1
		421	19.5	20.6	21.4	22.7	21.9	22.1	23.8	23.8
		422	15.9	16.7	18.3	19.4	17.7	19.8	20.6	21.1
		423	16.0	17.0	17.8	18.3	17.3	19.1	20.7	20.4
		424	17.1	18.4	18.5	19.1	17.9	20.0	21.6	22.1
		425	17.9	20.6	20.9	21.1	19.6	21.8	21.8	22.1
		426	15.8	18.9	19.6	20.1	19.5	21.3	23.3	22.6
		427	16.7	18.0	19.4	20.0	18.7	20.7	21.6	21.4
		428	18.3	19.9	20.3	20.8	20.6	22.1	22.5	23.3

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
6	f	429	18.9	19.5	18.9	19.2	18.9	19.9	19.5	19.8
		430	16.0	17.7	18.3	19.4	18.8	20.5	23.5	21.5
		431	18.7	18.9	20.6	20.7	21.6	22.2	23.3	22.2
		432	15.5	17.5	19.5	19.7	20.7	21.0	21.2	21.9
		433	17.2	18.5	19.4	20.3	20.8	22.5	21.7	21.8
		434	17.3	18.5	20.3	20.5	20.9	21.9	21.7	22.4
		435	18.5	20.5	21.0	21.3	21.3	22.3	22.1	22.0
		436	19.3	19.7	20.2	20.5	20.5	20.8	21.4	22.0
		437	19.2	20.4	21.5	22.2	22.8	22.6	22.9	24.1
		438	17.9	18.9	19.4	20.6	20.3	21.5	22.1	22.5
		439	19.7	20.5	21.1	22.0	22.6	22.7	24.4	25.2
		440	18.6	19.3	20.4	21.3	21.2	21.9	22.8	22.7
		441	18.2	20.0	19.7	20.5	21.5	21.6	23.4	22.9
		442	16.6	18.4	19.5	20.2	20.6	20.9	21.8	22.3
		443	19.0	19.9	20.2	19.2	21.5	21.6	22.2	20.9
		444	17.5	18.7	18.8	20.7	19.9	20.0	20.7	20.6
		445	16.6	18.1	18.4	19.4	19.5	20.4	20.6	22.7
		446	15.8	16.3	18.1	.	.	.	.	.
		447	16.2	17.5	18.6	.	.	.	.	.
		448	15.6	16.3	17.7	.	.	.	.	.
		449	16.0	16.4	17.7	.	.	.	.	.
		450	16.9	17.7	18.8	.	.	.	.	.
		451	14.1	15.4	16.4	.	.	.	.	.
		452	16.7	16.5	16.3	.	.	.	.	.
		453	16.8	17.1	15.5	.	.	.	.	.
		454	16.6	16.3	16.0	.	.	.	.	.
		455	17.7	17.9	17.7	.	.	.	.	.
		456	16.3	16.3	17.8	.	.	.	.	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
6	f	457	14.9	18.3	19.2	.	.	.	.	.
		458	16.0	16.9	17.8	.	.	.	.	.
		459	14.6	14.9	16.4	.	.	.	.	.
		460	13.5	15.7	16.7	.	.	.	.	.
		461	17.3	18.6	18.3	.	.	.	.	.
		462	16.5	17.2	16.6	.	.	.	.	.
		463	17.0	17.0	18.6	.	.	.	.	.
		464	14.9	18.0	18.2	.	.	.	.	.
		465	18.0	19.9	20.1	.	.	.	.	.
		466	15.2	15.3	14.0	.	.	.	.	.
		467	15.6	16.5	14.2	.	.	.	.	.
		468	17.4	18.3	17.0	.	.	.	.	.
		469	14.4	15.2	13.3	.	.	.	.	.
		470	18.2	19.5	18.7	.	.	.	.	.
		471	15.3	15.9	16.9	18.8	19.3	20.3	20.2	20.2
		472	18.6	19.1	20.4	21.2	22.1	22.8	23.6	23.5
		473	16.3	17.0	17.9	18.6	19.4	19.9	20.1	20.5
		474	18.5	19.8	20.7	21.6	22.8	24.3	24.3	24.9
		475	17.1	17.4	18.6	19.9	21.8	22.5	22.4	22.3
		476	13.6	17.0	17.5	18.4	19.2	19.6	19.3	20.9
		477	13.8	16.9	17.6	18.0	19.6	20.1	19.3	21.4
		478	17.6	19.0	19.0	20.0	21.5	21.6	21.6	22.4
		479	16.2	16.2	17.5	18.5	19.2	20.3	19.1	21.0
		480	18.7	18.6	19.6	21.0	21.4	21.8	20.9	22.7

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
6	f	401	23.2	23.0	22.9	23.3	23.7	24.3	24.1	.
		402	22.5	23.2	23.3	23.6	24.3	25.7	25.9	.
		403	22.5	22.7	22.3	22.7	23.9	23.3	23.9	.
		404	22.9	24.0	21.9	23.0	24.1	25.1	25.8	.
		405	23.4	24.1	23.5	24.2	25.7	27.1	27.3	.
		406	20.6	21.3	20.8	19.8	20.9	23.1	23.5	.
		407	22.4	22.5	22.8	21.6	23.6	23.6	22.6	.
		408	21.6	21.6	21.8	21.1	22.0	23.1	24.1	.
		409	21.1	21.6	21.7	20.5	21.5	24.2	25.5	.
		410	21.9	23.5	22.8	21.7	24.4	24.5	25.1	.
		411	23.5	23.3	22.8	23.0	24.5	23.8	23.7	.
		412	22.4	22.0	22.5	22.5	23.8	23.1	24.0	.
		413	21.4	22.1	21.7	22.1	24.1	23.2	23.1	.
		414	23.8	23.9	23.3	23.6	24.9	25.9	24.5	.
		415	21.1	20.8	21.1	21.6	22.9	23.5	23.2	.
		416	22.4	23.7	23.7	24.0	24.4	26.0	25.1	.
		417	21.5	21.7	22.2	22.3	23.7	23.6	23.6	.
		418	21.9	24.1	22.5	23.1	23.8	26.2	23.5	.
		419	21.8	23.2	22.7	23.3	24.0	24.2	22.6	.
		420	23.6	25.8	24.6	24.8	25.2	25.9	25.0	.
		421	25.4	24.9	25.2	25.9	28.8	24.8	27.8	.
		422	21.9	20.4	22.4	21.6	21.8	20.8	23.0	.
		423	20.6	23.0	21.3	22.0	22.4	21.2	23.1	.
		424	21.2	21.8	22.9	23.2	23.3	21.9	24.1	.
		425	24.3	22.3	24.6	24.8	24.5	23.7	26.6	.
		426	23.2	24.6	25.1	24.7	23.9	22.4	26.2	.
		427	23.0	22.4	22.9	23.4	23.4	20.9	23.8	.
		428	23.7	24.1	24.4	24.6	25.2	22.1	27.3	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
6	f	429	20.7	21.5	21.6	21.3	20.3	18.9	22.7	.
		430	22.6	23.7	24.4	26.0	23.4	21.4	25.5	.
		431	22.5	23.3	23.0	23.5	23.5	23.7	25.1	.
		432	22.0	22.4	23.9	22.9	23.4	23.9	24.6	.
		433	23.4	22.6	23.7	24.0	23.9	25.1	26.6	.
		434	24.1	24.9	24.7	25.5	25.1	25.8	25.2	.
		435	22.9	23.9	23.8	24.2	24.9	25.8	26.5	.
		436	24.2	23.6	24.1	24.4	28.2	24.4	24.6	.
		437	25.0	25.5	25.7	26.4	27.4	25.8	26.5	.
		438	22.9	23.2	23.8	25.5	24.7	24.8	25.9	.
		439	24.8	25.5	26.2	27.0	24.8	28.1	27.5	.
		440	23.5	24.0	23.7	26.0	24.4	25.3	26.2	.
		441	23.6	24.4	25.8	25.2	26.6	24.9	25.0	.
		442	23.8	24.3	23.9	25.2	25.7	25.3	25.4	.
		443	22.1	21.7	23.1	24.5	25.5	23.5	24.4	.
		444	22.1	21.2	21.0	21.8	21.8	22.5	23.5	.
		445	21.5	22.4	22.4	23.9	22.6	23.1	24.9	.
		446	.	.	.	.	.	.	.	.
		447	.	.	.	.	.	.	.	.
		448	.	.	.	.	.	.	.	.
		449	.	.	.	.	.	.	.	.
		450	.	.	.	.	.	.	.	.
		451	.	.	.	.	.	.	.	.
		452	.	.	.	.	.	.	.	.
		453	.	.	.	.	.	.	.	.
		454	.	.	.	.	.	.	.	.
		455	.	.	.	.	.	.	.	.
		456	.	.	.	.	.	.	.	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
6	f	457	.	.	.	.	.	.	.	.
		458	.	.	.	.	.	.	.	.
		459	.	.	.	.	.	.	.	.
		460	.	.	.	.	.	.	.	.
		461	.	.	.	.	.	.	.	.
		462	.	.	.	.	.	.	.	.
		463	.	.	.	.	.	.	.	.
		464	.	.	.	.	.	.	.	.
		465	.	.	.	.	.	.	.	.
		466	.	.	.	.	.	.	.	.
		467	.	.	.	.	.	.	.	.
		468	.	.	.	.	.	.	.	.
		469	.	.	.	.	.	.	.	.
		470	.	.	.	.	.	.	.	.
		471	20.5	21.1	22.3	22.1	21.8	22.3	.	22.7
		472	23.5	24.2	26.4	24.3	25.6	25.1	.	26.6
		473	20.3	20.9	21.3	21.8	21.5	22.0	.	22.7
		474	24.7	24.7	27.0	26.0	25.4	26.4	.	28.8
		475	22.9	24.0	23.8	23.9	23.7	23.6	.	24.3
		476	20.6	22.2	21.5	22.0	21.6	23.7	.	22.8
		477	21.8	23.3	22.6	23.3	22.8	23.8	.	23.2
		478	23.3	24.4	24.2	24.0	23.6	25.9	.	27.5
		479	20.7	20.7	21.9	21.8	21.7	22.8	.	22.6
		480	23.2	23.9	24.1	24.2	23.7	25.7	.	25.8

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* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
7	f	481	17.5	18.2	19.4	20.1	20.2	21.0	21.2	22.4
		482	16.0	16.7	17.7	18.2	18.7	19.2	20.2	20.5
		483	19.2	19.0	19.4	19.4	20.2	20.3	20.4	20.6
		484	18.7	19.1	20.2	21.0	20.2	21.1	20.3	21.6
		485	19.4	19.7	20.4	21.0	21.5	22.0	22.0	22.1
		486	16.8	17.8	18.7	19.3	19.6	20.3	20.6	20.5
		487	18.4	19.1	19.6	19.5	20.4	21.5	21.3	21.5
		488	17.7	19.1	20.3	20.4	19.9	20.8	21.2	21.5
		489	16.9	18.3	18.8	17.5	17.5	21.7	22.7	23.3
		490	15.7	16.6	17.2	17.5	20.8	17.9	19.0	18.8
		491	18.5	19.1	19.8	19.7	20.5	21.6	21.8	22.1
		492	16.9	17.4	18.1	18.0	18.8	19.4	19.8	20.2
		493	18.6	19.3	19.7	21.3	22.2	23.0	22.9	23.4
		494	17.3	16.4	17.1	17.1	18.1	18.8	19.0	19.7
		495	17.0	16.1	16.2	16.4	17.2	18.2	17.8	18.8
		496	16.4	18.2	19.1	18.8	18.3	19.7	21.0	20.6
		497	17.2	18.4	18.7	19.1	18.8	20.2	20.5	20.9
		498	18.5	19.0	19.2	19.8	20.1	20.7	20.8	21.8
		499	16.1	17.4	18.1	18.8	18.8	19.5	20.2	20.3
		500	16.7	17.5	18.5	18.7	19.4	20.2	20.7	20.9
		501	18.6	18.5	20.3	20.9	20.7	21.4	22.8	21.3
		502	17.5	18.7	19.7	21.3	21.3	22.2	23.0	22.6
		503	19.3	19.3	20.1	21.3	21.6	21.6	22.1	22.1
		504	19.0	18.2	18.6	19.8	19.5	20.4	21.1	20.7
		505	17.8	18.8	19.8	20.8	21.6	22.1	24.0	22.5
		506	17.8	19.1	19.5	20.1	20.3	21.3	22.2	22.9
		507	18.8	19.3	19.1	19.0	19.3	19.8	22.5	21.0
		508	18.2	18.1	18.7	19.6	19.9	20.1	21.9	21.6

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
7	f	509	19.5	21.1	21.5	22.7	22.0	22.5	24.6	23.6
		510	16.6	17.6	18.1	18.8	18.8	19.6	20.3	20.0
		511	18.0	18.8	20.1	20.0	20.2	22.3	22.1	22.5
		512	17.2	19.4	20.2	20.7	21.1	22.3	22.5	23.0
		513	18.9	19.6	20.0	20.3	20.2	20.9	21.0	22.5
		514	18.2	19.0	19.3	19.8	19.8	21.0	20.8	21.8
		515	15.3	16.7	17.6	18.2	18.9	19.8	19.9	20.5
		516	16.0	17.0	17.5	18.1	19.1	20.2	19.9	20.6
		517	15.9	17.0	17.6	18.1	18.2	18.8	19.0	18.7
		518	19.7	20.4	21.3	18.7	22.1	24.0	22.9	23.2
		519	17.2	18.3	18.6	20.7	19.0	19.6	20.7	20.0
		520	17.7	18.5	20.6	21.8	20.9	21.5	21.9	22.3
		521	16.5	21.7	21.6	19.5	22.4	22.6	23.0	24.3
		522	16.2	17.9	18.6	21.4	19.9	20.0	21.0	21.4
		523	15.7	18.0	18.0	18.8	18.7	19.9	19.9	20.5
		524	18.1	20.5	21.2	22.4	22.5	22.0	22.9	23.2
		525	17.9	19.3	20.0	20.0	20.8	21.1	21.3	22.3
		526	14.3	14.7	15.5	.	.	.	.	.
		527	17.0	17.4	18.5	.	.	.	.	.
		528	15.8	16.2	18.1	.	.	.	.	.
		529	13.3	13.5	14.2	.	.	.	.	.
		530	15.6	16.6	18.3	.	.	.	.	.
		531	18.6	19.6	19.6	.	.	.	.	.
		532	13.8	18.0	18.7	.	.	.	.	.
		533	16.2	16.8	17.6	.	.	.	.	.
		534	17.3	18.9	18.8	.	.	.	.	.
		535	17.3	18.7	19.5	.	.	.	.	.
		536	15.7	15.5	15.8	.	.	.	.	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	Week -1	1	8	15	22	29	36	43
7	f	537	16.2	17.2	17.6	.	.	.	.	.
		538	13.8	14.9	16.0	.	.	.	.	.
		539	16.6	16.4	17.0	.	.	.	.	.
		540	16.3	15.8	17.0	.	.	.	.	.
		541	16.4	16.5	16.4	.	.	.	.	.
		542	17.8	17.8	18.2	.	.	.	.	.
		543	16.0	16.0	16.5	.	.	.	.	.
		544	14.6	16.7	17.3	.	.	.	.	.
		545	16.0	17.1	17.3	.	.	.	.	.
		546	18.3	18.3	18.8	.	.	.	.	.
		547	16.5	16.7	17.3	.	.	.	.	.
		548	14.9	17.2	17.9	.	.	.	.	.
		549	14.8	17.8	18.8	.	.	.	.	.
		550	17.5	18.1	18.7	.	.	.	.	.
		551	18.5	19.5	19.7	20.0	21.5	22.4	22.3	22.8
		552	15.5	16.7	16.5	17.3	18.6	17.9	19.4	19.5
		553	16.5	16.8	17.9	18.6	19.0	20.7	21.1	20.6
		554	17.0	17.0	17.1	18.4	19.9	19.9	21.1	21.3
		555	18.0	18.0	18.8	19.5	21.0	20.5	21.2	22.1
		556	16.8	17.6	17.8	18.1	19.4	18.8	19.5	20.1
		557	17.5	18.3	19.5	20.0	21.4	20.7	21.6	22.1
		558	15.2	16.5	17.4	18.3	20.6	19.8	20.3	21.0
		559	14.7	18.5	19.2	19.6	21.2	21.1	21.5	22.3
		560	18.8	18.5	19.5	20.2	21.7	20.7	21.8	22.6

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
7	f	481	22.8	22.3	22.9	22.9	23.8	24.2	24.0	.
		482	20.4	20.5	21.8	20.9	21.3	21.4	21.2	.
		483	21.8	21.1	21.0	21.4	20.5	21.4	21.5	.
		484	21.1	21.4	22.2	22.7	21.8	22.6	23.0	.
		485	21.9	22.1	24.1	22.9	22.5	23.1	23.2	.
		486	21.4	21.6	22.1	20.8	22.3	23.1	21.5	.
		487	21.9	23.2	23.7	22.2	23.4	23.6	21.8	.
		488	22.1	22.3	23.0	23.3	22.6	21.9	21.7	.
		489	22.9	23.4	24.6	24.3	26.1	25.7	24.2	.
		490	19.1	20.6	22.2	21.5	20.9	21.2	20.3	.
		491	22.2	24.0	23.1	23.2	25.4	24.9	22.9	.
		492	20.9	21.2	20.7	21.2	21.9	22.1	22.4	.
		493	23.1	24.0	24.2	24.8	26.4	25.6	25.6	.
		494	20.9	20.9	21.4	22.3	22.4	22.2	24.9	.
		495	18.7	19.3	19.6	20.2	20.5	20.7	20.8	.
		496	19.2	22.0	21.2	21.8	22.1	21.8	22.9	.
		497	18.9	21.6	21.0	22.0	22.2	21.0	22.4	.
		498	19.1	23.0	23.3	22.9	22.8	22.7	22.4	.
		499	19.0	21.5	20.5	21.1	21.5	21.2	21.8	.
		500	18.7	21.7	21.2	22.1	22.0	21.7	22.5	.
		501	22.1	23.3	23.1	24.9	24.3	24.1	24.3	.
		502	23.1	23.4	23.0	23.7	21.6	23.9	24.8	.
		503	23.7	21.6	22.0	24.0	24.4	23.0	23.3	.
		504	20.9	23.7	21.0	22.5	23.8	24.3	21.8	.
		505	21.9	22.4	24.3	23.5	23.4	21.6	25.3	.
		506	23.6	24.7	23.9	25.3	25.5	25.0	25.2	.
		507	21.2	21.4	21.1	22.6	23.5	21.9	22.1	.
		508	22.2	22.7	22.7	23.3	23.9	23.7	25.1	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
7	f	509	24.6	24.7	24.0	26.0	26.4	25.2	24.6	.
		510	20.5	21.6	21.7	24.0	22.7	21.9	23.0	.
		511	22.2	22.5	22.4	23.5	23.3	22.8	23.2	.
		512	23.3	23.9	23.8	24.5	25.0	25.6	27.1	.
		513	22.4	22.5	22.2	23.9	23.9	25.2	24.3	.
		514	21.2	21.7	23.5	24.4	23.2	23.6	24.4	.
		515	20.9	21.2	20.9	21.2	21.2	21.8	21.1	.
		516	20.7	25.0	21.3	22.4	22.1	21.9	23.1	.
		517	19.3	23.4	19.6	20.7	20.7	21.4	22.0	.
		518	24.2	28.9	24.4	26.8	24.9	25.3	26.4	.
		519	20.3	24.7	20.9	22.0	21.7	21.5	22.2	.
		520	21.8	26.4	22.0	23.1	23.2	23.2	23.4	.
		521	25.0	24.3	25.1	26.0	26.0	26.7	27.6	.
		522	22.5	22.0	21.5	22.6	22.8	22.1	22.9	.
		523	21.3	20.3	20.4	20.3	21.2	21.1	21.5	.
		524	23.3	24.8	23.5	25.0	24.3	24.4	26.8	.
		525	23.1	22.5	22.2	22.7	23.3	23.6	23.8	.
		526	.	.	.	.	.	.	.	.
		527	.	.	.	.	.	.	.	.
		528	.	.	.	.	.	.	.	.
		529	.	.	.	.	.	.	.	.
		530	.	.	.	.	.	.	.	.
		531	.	.	.	.	.	.	.	.
		532	.	.	.	.	.	.	.	.
		533	.	.	.	.	.	.	.	.
		534	.	.	.	.	.	.	.	.
		535	.	.	.	.	.	.	.	.
		536	.	.	.	.	.	.	.	.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Body Weights (g)

Day numbers relative to Start Date

Group	Sex	Animal	50	57	64	71	78	85	91	92
7	f	537	.	.	.	.	.	.	.	.
		538	.	.	.	.	.	.	.	.
		539	.	.	.	.	.	.	.	.
		540	.	.	.	.	.	.	.	.
		541	.	.	.	.	.	.	.	.
		542	.	.	.	.	.	.	.	.
		543	.	.	.	.	.	.	.	.
		544	.	.	.	.	.	.	.	.
		545	.	.	.	.	.	.	.	.
		546	.	.	.	.	.	.	.	.
		547	.	.	.	.	.	.	.	.
		548	.	.	.	.	.	.	.	.
		549	.	.	.	.	.	.	.	.
		550	.	.	.	.	.	.	.	.
		551	23.3	23.6	26.2	24.8	24.9	26.5	.	25.9
		552	19.1	20.0	21.7	22.3	21.2	21.5	.	22.3
		553	20.8	21.8	21.9	22.0	22.4	22.3	.	22.5
		554	23.0	22.3	23.0	24.0	23.7	23.3	.	24.3
		555	22.2	22.7	24.2	23.9	23.4	23.5	.	24.5
		556	20.3	20.6	18.1	21.2	20.5	21.8	.	21.7
		557	22.8	25.0	21.9	23.8	22.0	24.0	.	24.8
		558	21.3	23.2	21.6	21.6	21.6	24.0	.	22.5
		559	21.9	22.6	23.8	22.5	21.9	24.5	.	24.8
		560	22.6	23.4	21.2	23.9	22.8	25.0	.	26.3

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Body Weights (g)

Comments and Markers

Measurement	Group	Sex	Animal	Day	Type	Marker	Comment
Bodyweight	2	f	112	1	Result		Temporary animal #274 was used as replacement animal.

* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Appendix E

Individual Food Consumption

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Food Consumption by cage (grams/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: / To:	1 / 8	8 / 15	15 / 22	22 / 29	29 / 36	36 / 43	43 / 50	50 / 57	57 / 64	64 / 71	71 / 78	78 / 85	85 / 91	85 / 92
1	f	1	5		3	4	3	4	4	4	5	7*	7*	4	5	5	4	.
		2	5		3	3	3	4	4	4	3	4	4	4	3	5	6	.
		3	5		4	8*	4	4	3	4	5	4	3	4	4	4	5	.
		4	5		4	4	4	4	3	4	4	8*	4	5	7*	5*	5	.
		5	5		4	4	3	4	4	4	4	4	4	3	6	7*	4	.
		6	5		4	5	4	3	4	5	5*	4	4	4	6	4	4	.
		7	5		4	3	4	4	4	4	4	5	4	5*	5	2	4	.
		8	5		4	3	4	4	4	4	4	6	3	5	4	4	4	.
		9	5		4	4	4	4	4	5	5	8*	5	5	7*	4	6*	.
		10	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		11	5		4	.	.	.	.	.	.	.	.	.	.	.	.	.
		12	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		13	5		4	.	.	.	.	.	.	.	.	.	.	.	.	.
		14	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		15	5		3	3	3	4	4	3	4	3	4	3	3	4	.	4
		16	5		4	3	3	3	3	3	3	3	4	4	4	4	.	4

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Food Consumption by cage (grams/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: To:	1 8	8 15	15 22	22 29	29 36	36 43	43 50	50 57	57 64	64 71	71 78	78 85	85 91	85 92
2	f	17	5		3	4	4	4	4	4	4	4	4	4	4	4	5	.
		18	5		3	4	4	4	3	4	7	10*	4	4	6	4	5	.
		19	5		4	4	3	5	3	4	4	4	4	6*	6*	5*	7*	.
		20	5		3	3	3	4	3	4	4	4	4	3	4	4	4	.
		21	5		4	4	3	4	3	4	5	4	9*	4	4	4	4	.
		22	5		4	3	3	5	2	4	5	4	6	6	4	4	4	.
		23	5		4	5*	4	4	5	4	4	5	9*	5	6	4	4	.
		24	5		3	3	3	3	3	4	4	6*	4	8*	5	6*	3	.
		25	5		4	3	3	3	4	4	3	4	4	4	4	4	5*	.
		26	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		27	5		4	.	.	.	.	.	.	.	.	.	.	.	.	.
		28	5		5	.	.	.	.	.	.	.	.	.	.	.	.	.
		29	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		30	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		31	5		4	3	3	4	4	3	4	4	4	5	4	4	.	6*
		32	5		3	4	3	4	4	4	4	4	4	8*	6	4	.	4

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Food Consumption by cage (grams/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: / To:	1 / 8	8 / 15	15 / 22	22 / 29	29 / 36	36 / 43	43 / 50	50 / 57	57 / 64	64 / 71	71 / 78	78 / 85	85 / 91	85 / 92
3	f	33	5		8*	6*	3	3	3	3	4	7*	4	5	8*	10*	5	.
		34	5		4	4	4	4	4	4	4	4	4	4	4	4	4	.
		35	5		4	3	4	4	3	4	7	4	3	5*	6*	4	6*	.
		36	5		3	3	3	3	3	4	3	4	4	3	9*	4	4	.
		37	5		4	4	3	4	7	2	4	4	11*	7	7*	8*	7*	.
		38	5		4	4	4	5	7*	7*	5	9*	9*	7*	5	6	6	.
		39	5		4	3	4	4	4	4	4	5	4	5	5	4	4	.
		40	5		4	4	4	4	3	7*	7*	5	8*	8*	10*	7*	6	.
		41	5		5	6	4	4	4	4	4	4	4	4	4	4	5*	.
		42	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		43	5		4	.	.	.	.	.	.	.	.	.	.	.	.	.
		44	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		45	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		46	5		4	.	.	.	.	.	.	.	.	.	.	.	.	.
		47	5		3	3	3	4	3	4	4	3	4	4	4	4	.	3
		48	5		4	3	3	3	3	4	4	4	4	6*	4	3	.	4

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Food Consumption by cage (grams/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: / To:	1 8	8 15	15 22	22 29	29 36	36 43	43 50	50 57	57 64	64 71	71 78	78 85	85 91	85 92
4	f	49	5		4	4	4	4	5	6	3	4	7*	7	14*	8*	5	.
		50	5		4	3	4	3	4	3	4	4	5	5	3	4	6	.
		51	5		4	4	5	4	3	4	4	5	9*	4	4	5*	7*	.
		52	5		5	6*	4	4	3	4	5*	3	4	6	6*	9*	4	.
		53	5		4	3	4	3	3	4	4	3	4	4	5	4	4	.
		54	5		4*	4	3	3	3	4	4	5*	13*	7	8*	7*	7*	.
		55	5		5*	4	4	4	10*	4	5	4	8*	6*	7*	9*	4	.
		56	5		5*	3	3	4	6	3	8*	5	14*	9*	5	8*	7*	.
		57	5		4	3	4	3	4	3	3	4	5*	4	6	4	6*	.
		58	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		59	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		60	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		61	5		2	.	.	.	.	.	.	.	.	.	.	.	.	.
		63	5		3	3	3	3	3	4	4	6*	3	7	3	4	.	7*
		64	5		4	4	6*	6	6	6*	10*	7*	10*	5*	7*	5	.	5

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Food Consumption by cage (grams/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: / To:	1 / 8	8 / 15	15 / 22	22 / 29	29 / 36	36 / 43	43 / 50	50 / 57	57 / 64	64 / 71	71 / 78	78 / 85	85 / 91	85 / 92
5	f	65	5		4	4	3	4	3	4	5*	4	8*	5	6	4	7*	.
		66	5		3	3	3	4	3	3	4	4	6	4	3	4	6*	.
		67	5		14*	4	4	4	3	4	4	4	4	4	6*	5*	5	.
		68	5		4	4	4	4	4	4	3	9*	7*	7*	4	5	4	.
		69	5		4	3	3	3	3	3	3	4	4	3	4	4	3	.
		70	5		5	4	3	5	4	4	4	4	4	4	7*	5*	4	.
		71	5		5*	4	4	4	4	4	4	5	4	5	4	8*	3	.
		72	5		4	4	6*	4	4	4	5	4	4	4	4	5	6	.
		73	5		3	5	4	3	4	4	4	4	4	4*	4	4	5*	.
		74	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		75	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		76	5		4	.	.	.	.	.	.	.	.	.	.	.	.	.
		77	5		4*	.	.	.	.	.	.	.	.	.	.	.	.	.
		78	5		5*	.	.	.	.	.	.	.	.	.	.	.	.	.
		79	5		4	4	4	4	5*	4	7*	8*	4	5	4	4	.	4
		80	5		5	3	3	3	4	4	7*	4	4	4	4	4	.	4

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Food Consumption by cage (grams/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: To:	1 8	8 15	15 22	22 29	29 36	36 43	43 50	50 57	57 64	64 71	71 78	78 85	85 91	85 92
6	f	81	5		4	11*	5	4	3	3	4	5	5*	4	4	5	10*	.
		82	5		4	4	5*	4	3	4	5	5	5	5*	6	6	9*	.
		83	5		4	6*	4	3	3	6	4	5	8*	4	8*	4	4	.
		84	5		6*	4*	4	6	9*	4	4*	8*	9*	4	10*	6	5	.
		85	5		4	4	3	4	8*	3	4	3	5	6	8*	5*	4	.
		86	5		4	3	4	8*	7*	6*	3	7*	7*	12*	4*	5*	6	.
		87	5		4	5	4	5	6	3	4	10*	8*	7	4	5	6	.
		88	5		11*	12*	6	6	6	6	10*	10*	10*	11*	12*	16*	7*	.
		89	5		4	4	9*	5	6	6	13*	6*	6	9*	10*	5	6*	.
		90	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		91	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		92	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		93	5		3	.	.	.	.	.	.	.	.	.	.	.	.	.
		94	5		5*	.	.	.	.	.	.	.	.	.	.	.	.	.
		95	5		5	4	5	6	5*	4	4	5*	9*	5	4*	3	.	8*
		96	5		4	5	4	4	5	4	9*	6*	5*	5	5	4	.	4

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Food Consumption by cage (grams/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: 1 To: 8	8 15	15 22	22 29	29 36	36 43	43 50	50 57	57 64	64 71	71 78	78 85	85 91	85 92
7	f	97	5	4	5	4	4	3	7*	7*	9*	6*	5	6*	6	10*	.
		98	5	4	3	6*	3	3	3	4	3	4	3	5	4	6	.
		99	5	4	3	4	7*	3	3	3	3	8*	4	5	6	3	.
		100	5	13*	4	3	6	7*	4	4*	4	12*	5	7*	5*	6	.
		101	5	5	4	5	4	3	4	3	4	8*	4	6*	3	3	.
		102	5	4	5	3	3	3	4	4	3	7*	6*	7*	5	3	.
		103	5	4*	3	3	3	3	3	3	4	4	4	3	4	4	.
		104	5	4	3	3	3	4	3	3	3	5*	4	5	4	3	.
		105	5	7*	8*	4	4	4	5	8*	9*	6	6*	14*	9*	7*	.
		106	5	3	.	.	.	.	.	.	.	.	.	.	.	.	.
		107	5	3	.	.	.	.	.	.	.	.	.	.	.	.	.
		108	5	5*	.	.	.	.	.	.	.	.	.	.	.	.	.
		109	5	3	.	.	.	.	.	.	.	.	.	.	.	.	.
		110	5	3	.	.	.	.	.	.	.	.	.	.	.	.	.
		111	5	3	4	3	3	3	3	4	5	5	6	4*	3	.	3
		112	5	4	3	5	5	3	4	4	9*	3	4	6	4	.	6*

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
1	f	1	56	Remaining I/E/S	E	
				Remaining Result		Food spilled
			63	Remaining I/E/S	E	
				Remaining Result		Food spilled
		3	13	Remaining I/E/S	E	
				Remaining Result		Food spilled
		4	54	Remaining I/E/S	E	
				Remaining Result		Food spilled
			77	Remaining I/E/S	E	
				Remaining Result		Food spilled
			78	Remaining I/E/S	E	
				Remaining Result		Food spilled
			85	Remaining I/E/S	E	
				Remaining Result		Food spilled
		5	84	Remaining I/E/S	E	
				Remaining Result		Food spilled
		6	50	Remaining Result		Feeder empty not spilled
		7	71	Remaining I/E/S	E	
				Remaining Result		Food spilled
		9	56	Remaining I/E/S	E	
				Remaining Result		Food spilled
			77	Remaining Result		Feeder empty not spilled
			91	Remaining I/E/S	E	
				Remaining Result		Food spilled
2	f	18	51	Remaining I/E/S	E	
				Remaining Result		Food spilled
		19	78	Remaining I/E/S	E	

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Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
2	f	19	78	Remaining Result		Food spilled
			85	Remaining I/E/S	E	
				Remaining Result		Food spilled
			71	Remaining I/E/S	E	
				Remaining Result		Food spilled
			91	Remaining I/E/S	E	
				Remaining Result		Food spilled
		21	60	Remaining I/E/S	E	
				Remaining Result		Food spilled
		23	15	Remaining I/E/S	E	
				Remaining Result		feed crumbled in cage
			59	Remaining I/E/S	E	
				Remaining Result		Food spilled
		24	57	Remaining I/E/S	E	
				Remaining Result		Food spilled
			69	Remaining I/E/S	E	
				Remaining Result		Food spilled
			83	Remaining I/E/S	E	
				Remaining Result		Food spilled
		25	91	Remaining I/E/S	E	
				Remaining Result		Food spilled
		31	92	Remaining I/E/S	E	
				Remaining Result		Food spilled
		32	70	Remaining I/E/S	E	
				Remaining Result		Food spilled
3	f	33	7	Remaining I/E/S	E	
				Initial/Top-Up Result		Food spilled
			14	Remaining I/E/S	E	
				Remaining Result		food spilled

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
3	f	33	52	Remaining I/E/S	E	
				Remaining Result		Food spilled
			73	Remaining I/E/S	E	
				Remaining Result		Food spilled
			79	Remaining I/E/S	E	
				Remaining Result		Food spilled
		35	78	Remaining I/E/S	E	
				Remaining Result		Food spilled
			71	Remaining I/E/S	E	
				Remaining Result		Food spilled
			91	Remaining I/E/S	E	
				Remaining Result		Food spilled
		36	77	Remaining I/E/S	E	
				Remaining Result		Food spilled
			78	Remaining I/E/S	E	
				Remaining Result		Food spilled
		37	84	Remaining I/E/S	E	
				Remaining Result		Food spilled
			91	Remaining Result		Feeder empty not spilled
			60	Remaining I/E/S	E	
				Remaining Result		Food spilled
			72	Remaining I/E/S	E	
				Remaining Result		Food spilled
		38	71	Remaining I/E/S	E	
				Remaining Result		Food spilled
			60	Remaining I/E/S	E	
				Remaining Result		Food spilled
			57	Remaining I/E/S	E	

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Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
3	f	38	57	Remaining Result		Food spilled
			70	Remaining I/E/S	E	
				Remaining Result		Food spilled
			35	Remaining I/E/S	E	
				Remaining Result		Food spilled
			43	Remaining Result		Feeder empty not spilled
			53	Remaining I/E/S	E	
				Remaining Result		Food spilled
		40	78	Remaining I/E/S	E	
				Remaining Result		Food spilled
			59	Remaining I/E/S	E	
				Remaining Result		Food spilled
			69	Remaining I/E/S	E	
				Remaining Result		Food spilled
			83	Remaining I/E/S	E	
				Remaining Result		Food spilled
			39	Remaining I/E/S	E	
				Remaining Result		Food spilled
			48	Remaining I/E/S	E	
				Remaining Result		Food spilled
			75	Remaining I/E/S	E	
				Remaining Result		Food spilled
		41	91	Remaining I/E/S	E	
				Remaining Result		Food spilled
		48	70	Remaining I/E/S	E	
				Remaining Result		Food spilled
4	f	49	63	Remaining I/E/S	E	
				Remaining Result		Food spilled

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
4	f	49	78	Remaining I/E/S	E	
				Remaining Result		Food spilled
			84	Remaining Result		Feeder empty not spilled
			73	Remaining I/E/S	E	
				Remaining Result		Food spilled
			76	Remaining I/E/S	E	
				Remaining Result		Food spilled
		51	85	Remaining I/E/S	E	
				Remaining Result		Food spilled
			91	Remaining I/E/S	E	
				Remaining Result		Food spilled
			61	Remaining I/E/S	E	
				Remaining Result		Food spilled
		52	78	Remaining I/E/S	E	
				Remaining Result		Food spilled
			15	Remaining I/E/S	E	
				Remaining Result		Food spilled
			48	Remaining Result		Feeder empty not spilled
			82	Remaining Result		Feeder empty not spilled
		54	84	Remaining I/E/S	E	
				Remaining Result		Food spilled
			91	Remaining Result		Feeder empty not spilled
			60	Remaining I/E/S	E	
				Remaining Result		Food spilled

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
4	f	54	57	Remaining I/E/S	E	
				Remaining Result		Food spilled
			76	Remaining I/E/S	E	
				Remaining Result		Food spilled
			6	Remaining I/E/S	E	
				Remaining Result		A small amount of food was found at the buttom of the cage.
			62	Remaining I/E/S	E	
				Remaining Result		Food spilled
		55	78	Remaining I/E/S	E	
				Remaining Result		Food contaminated
			59	Remaining I/E/S	E	
				Remaining Result		Food spilled
			69	Remaining I/E/S	E	
				Remaining Result		Food spilled
			83	Remaining I/E/S	E	
				Remaining Result		Food spilled
			75	Remaining I/E/S	E	
				Remaining Result		Food spilled
			6	Remaining I/E/S	E	
				Remaining Result		Some food was found in the cage.
			34	Remaining I/E/S	E	
				Remaining Result		Food spilled
		56	71	Remaining I/E/S	E	
				Remaining Result		Food spilled
			91	Remaining I/E/S	E	
				Remaining Result		Food spilled
			59	Remaining I/E/S	E	
				Remaining Result		Food spilled
			69	Remaining I/E/S	E	

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
4	f	56	69	Remaining Result		Food spilled
			83	Remaining I/E/S	E	
				Remaining Result		Food spilled
			48	Remaining I/E/S	E	
				Remaining Result		Food spilled
			61	Remaining I/E/S	E	
				Remaining Result		Food spilled
			6	Remaining I/E/S	E	
				Remaining Result		food spilled
		57	91	Remaining I/E/S	E	
				Remaining Result		Food spilled
			58	Remaining I/E/S	E	
				Remaining Result		Food spilled
		63	91	Remaining I/E/S	E	
				Remaining Result		Food spilled
			57	Remaining I/E/S	E	
				Remaining Result		Food spilled
		64	56	Remaining I/E/S	E	
				Remaining Result		Food spilled
			78	Remaining Result		Feeder empty not spilled
			70	Remaining I/E/S	E	
				Remaining Result		Food spilled
			43	Remaining I/E/S	E	
				Remaining Result		Food spilled
			48	Remaining I/E/S	E	
				Remaining Result		Food spilled
			62	Remaining I/E/S	E	
				Remaining Result		Food spilled

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
4	f	64	58	Remaining I/E/S	E	
				Remaining Result		Food spilled
			21	Remaining I/E/S	E	
				Remaining Result		Food spilled
			46	Remaining I/E/S	E	
				Remaining Result		Food spilled
			64	Remaining I/E/S	E	
				Remaining Result		Food spilled
5	f	65	50	Remaining Result		Feeder empty not spilled
			58	Remaining I/E/S	E	
				Remaining Result		Food spilled
			87	Remaining I/E/S	E	
				Remaining Result		Food spilled
		66	91	Remaining I/E/S	E	
				Remaining Result		Food spilled
		67	78	Remaining I/E/S	E	
				Remaining Result		Food spilled
			85	Remaining I/E/S	E	
				Remaining Result		Food spilled
			7	Remaining I/E/S	E	
				Initial/Top-Up Result		food spilled due to animals nesting in feeder.
			5	Remaining I/E/S	E	
				Initial/Top-Up Result		Food spilled
		68	54	Remaining I/E/S	E	
				Remaining Result		Food spilled
			71	Remaining I/E/S	E	
				Remaining Result		Food spilled
			61	Remaining I/E/S	E	

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
5	f	68	61	Remaining Result		Food spilled
		70	85	Remaining Result		Feeder empty not spilled
			76	Remaining I/E/S	E	
				Remaining Result		Food spilled
		71	83	Remaining I/E/S	E	
				Remaining Result		Food spilled
			5	Remaining I/E/S	E	
				Remaining Result		A small amount of food was found at the bottom of the cage.
		72	20	Remaining I/E/S	E	
				Remaining Result		Feed spilled and contaminated with water.
		73	91	Remaining I/E/S	E	
				Remaining Result		Food spilled
			68	Remaining I/E/S	E	
				Remaining Result		Food spilled
		77	8	Remaining I/E/S	E	
				Remaining Result		Food spilled
		78	6	Remaining I/E/S	E	
				Remaining Result		feed crumbled in cage
		79	36	Remaining Result		Feeder empty not spilled
			47	Remaining I/E/S	E	
				Remaining Result		Food spilled
			55	Remaining Result		Feeder empty not spilled
		80	46	Remaining I/E/S	E	
				Remaining Result		Food spilled
6	f	81	63	Remaining I/E/S	E	
				Remaining Result		Food spilled

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
6	f	81	14	Remaining I/E/S	E	
				Remaining Result		food spilled
			87	Remaining I/E/S	E	
				Remaining Result		Food spilled
		82	71	Remaining Result		Feeder empty not spilled
			91	Remaining I/E/S	E	
				Remaining Result		Food spilled
			20	Remaining I/E/S	E	
				Remaining Result		feed crumbled in bottom of cage
			86	Remaining I/E/S	E	
				Remaining Result		Food spilled
		83	77	Remaining I/E/S	E	
				Remaining Result		Food spilled
			78	Remaining I/E/S	E	
				Remaining Result		Food spilled
			61	Remaining I/E/S	E	
				Remaining Result		Food spilled
			12	Remaining I/E/S	E	
				Remaining Result		food spilled
		84	54	Remaining I/E/S	E	
				Remaining Result		Food spilled
			77	Remaining I/E/S	E	
				Remaining Result		Food spilled
			78	Remaining I/E/S	E	
				Remaining Result		Food spilled
			50	Remaining Result		Feeder empty not spilled
			7	Remaining I/E/S	E	

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* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
6	f	84	7	Initial/Top-Up Result		food spilled due to animals nesting in feeder.
			35	Remaining I/E/S	E	
				Remaining Result		Food spilled
			61	Remaining I/E/S	E	
				Remaining Result		Food spilled
			12	Remaining I/E/S	E	
				Remaining Result		food spilled
		85	78	Remaining I/E/S	E	
				Remaining Result		Food contaminated
			85	Remaining Result		Feeder empty not spilled
			76	Remaining I/E/S	E	
				Remaining Result		Food spilled
			34	Remaining I/E/S	E	
				Remaining Result		Food spilled
		86	84	Remaining Result		Feeder empty not spilled
			71	Remaining I/E/S	E	
				Remaining Result		Food spilled
			60	Remaining I/E/S	E	
				Remaining Result		Food spilled
			57	Remaining I/E/S	E	
				Remaining Result		Food spilled
			70	Remaining I/E/S	E	
				Remaining Result		Food spilled
			73	Remaining I/E/S	E	
				Remaining Result		Food spilled
			39	Remaining I/E/S	E	
				Remaining Result		Food spilled

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
6	f	86	34	Remaining I/E/S	E	
				Remaining Result		Food spilled
			26	Remaining I/E/S	E	
				Remaining Result		Food spilled
		87	59	Remaining I/E/S	E	
				Remaining Result		Food spilled
			57	Remaining I/E/S	E	
				Remaining Result		Food spilled
			52	Remaining I/E/S	E	
				Remaining Result		Food spilled
		88	13	Remaining I/E/S	E	
				Remaining Result		food spilled in animal's cage.
			78	Remaining I/E/S	E	
				Remaining Result		Food spilled
			71	Remaining I/E/S	E	
				Remaining Result		Food spilled
			91	Remaining I/E/S	E	
				Remaining Result		Food spilled
			15	Remaining I/E/S	E	
				Remaining Result		feed crumbled in cage
			59	Remaining I/E/S	E	
				Remaining Result		Food spilled
			57	Remaining I/E/S	E	
				Remaining Result		Food spilled
			83	Remaining I/E/S	E	
				Remaining Result		Food spilled
			52	Remaining I/E/S	E	
				Remaining Result		Food spilled
			48	Remaining I/E/S	E	

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
6	f	88	48	Remaining Result		Food spilled
			75	Remaining I/E/S	E	
				Remaining Result		Food spilled
			6	Remaining I/E/S	E	
				Remaining Result		food spilled due to animals nesting in feeder.
			8	Remaining I/E/S	E	
				Remaining Result		Some food was in the buttom of the cage.
			10	Remaining I/E/S	E	
				Remaining Result		food spilled
			80	Remaining I/E/S	E	
				Remaining Result		Food spilled
		89	56	Remaining I/E/S	E	
				Remaining Result		Food spilled
			77	Remaining Result		Feeder empty not spilled
			91	Remaining I/E/S	E	
				Remaining Result		Food spilled
			17	Remaining I/E/S	E	
				Remaining Result		Feed spilledin cage and contaminated with water. Empty feeder weighed.
			22	Remaining I/E/S	E	
				Remaining Result		some food in the buttom of the cage.
			45	Remaining I/E/S	E	
				Remaining Result		Food spilled
			49	Remaining I/E/S	E	
				Remaining Result		Food spilled
			66	Remaining I/E/S	E	
				Remaining Result		Food spilled
		94	6	Remaining I/E/S	E	

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
6	f	94	6	Remaining Result		feed crumbled in cage
		95	63	Remaining I/E/S	E	
				Remaining Result		Food spilled
			78	Remaining I/E/S	E	
				Remaining Result		Feeder empty not spilled
			91	Remaining I/E/S	E	
				Remaining Result		Food spilled
			57	Remaining I/E/S	E	
				Remaining Result		Food spilled
			92	Remaining I/E/S	E	
				Remaining Result		Food spilled
			34	Remaining Result		Feeder empty not spilled
			64	Remaining I/E/S	E	
				Remaining Result		Food spilled
		96	56	Remaining I/E/S	E	
				Remaining Result		Food spilled
			58	Remaining I/E/S	E	
				Remaining Result		Food spilled
			46	Remaining I/E/S	E	
				Remaining Result		Food spilled
7	f	97	63	Remaining I/E/S	E	
				Remaining Result		Food spilled
			78	Remaining I/E/S	E	
				Remaining Result		Food spilled
			50	Remaining Result		Feeder empty not spilled
			52	Remaining I/E/S	E	

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
7	f	97	52	Remaining Result		Food spilled
			87	Remaining I/E/S	E	
				Remaining Result		Food spilled
			42	Remaining I/E/S	E	
				Remaining Result		Food spilled
		98	20	Remaining I/E/S	E	
				Remaining Result		feed crumbled in cage
		99	61	Remaining I/E/S	E	
				Remaining Result		Food spilled
			27	Remaining I/E/S	E	
				Remaining Result		Food spilled
		100	63	Remaining I/E/S	E	
				Remaining Result		Food spilled
			77	Remaining I/E/S	E	
				Remaining Result		Food spilled
			78	Remaining I/E/S	E	
				Remaining Result		Food spilled
			85	Remaining Result		Feeder empty not spilled
			50	Remaining Result		Feeder empty not spilled
			7	Remaining I/E/S	E	
				Initial/Top-Up Result		Food spilled due to animals nesting in feeder.
			35	Remaining I/E/S	E	
				Remaining Result		Food spilled
			61	Remaining I/E/S	E	
				Remaining Result		Food spilled
			5	Remaining I/E/S	E	
				Remaining Result		food spilled

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
7	f	101	60	Remaining I/E/S	E	
				Remaining Result		Food spilled
			76	Remaining I/E/S	E	
				Remaining Result		Food spilled
		102	60	Remaining I/E/S	E	
				Remaining Result		Food spilled
			70	Remaining I/E/S	E	
				Remaining Result		Food spilled
			76	Remaining I/E/S	E	
				Remaining Result		Food spilled
		103	5	Remaining I/E/S	E	
				Remaining Result		A small amount of food was found at the buttom of the cage.
		104	61	Remaining I/E/S	E	
				Remaining Result		Food spilled
		105	56	Remaining I/E/S	E	
				Remaining Result		Food spilled
			77	Remaining Result		Feeder empty not spilled
			85	Remaining Result		Feeder empty not spilled
			71	Remaining I/E/S	E	
				Remaining Result		Food spilled
			91	Remaining I/E/S	E	
				Remaining Result		Food spilled
			7	Remaining I/E/S	E	
				Remaining Result		food spilled
			14	Remaining I/E/S	E	
				Remaining Result		feed crumbled in cage
			72	Remaining I/E/S	E	

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Food Consumption by cage (grams/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
7	f	105	72	Remaining Result		Food spilled
			80	Remaining I/E/S	E	
				Remaining Result		Food spilled
			45	Remaining I/E/S	E	
				Remaining Result		Food spilled
			2	Remaining I/E/S	E	
				Remaining Result		A small amount of food was found at the bottom of the cage.
		108	7	Remaining I/E/S	E	
				Remaining Result		feed crumbled in cage
		111	78	Remaining I/E/S	E	
				Remaining Result		Food spilled
		112	56	Remaining I/E/S	E	
				Remaining Result		Food spilled
			57	Remaining I/E/S	E	
				Remaining Result		Food spilled
			92	Remaining I/E/S	E	
				Remaining Result		Food spilled

* = Result to left has an associated comment or marker
Marker = E implies value excluded from means
Food Consumption Units are g/animal/day.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Appendix F

Individual Water Consumption

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: 1 To: 8	From: 8 To: 15	From: 15 To: 22	From: 22 To: 29	From: 29 To: 36	From: 36 To: 43	From: 43 To: 50	From: 50 To: 57	From: 57 To: 64	From: 64 To: 71	From: 71 To: 78	From: 78 To: 85
1	f	1	5	4	5	2	18*	5	5	5	5	5	5	6	5
		2	5	5	5	15*	6	5	25*	24*	5	6	5	5	16*
		3	5	6	5	7*	5	5	9	6	6	16*	5	6	13*
		4	5	5	5	5	5	5	10*	6	22*	16*	6	6	16*
		5	5	.	.	4	6	16*	4	5	5	6	5	6	5
		6	5	.	.	19*	5	16*	15*	6	11*	5	5	6	5
		7	5	5	5	15*	5	5	23*	15*	5	6*	23*	5	20*
		8	5	5	5	4	5	5	5	5	6	5	5	5	7
		9	5	6	6	6	6	-4*	6	6	6	6	6	25*	5
		10	5	6	.	.	.	.	.	.	.	.	.	.	.
		11	5	5	.	.	.	.	.	.	.	.	.	.	.
		12	5	7	.	.	.	.	.	.	.	.	.	.	.
		13	5	18*	.	.	.	.	.	.	.	.	.	.	.
		14	5	2	.	.	.	.	.	.	.	.	.	.	.
		15	5	13*	5	5	17*	5	4	5	4	5	4	4	5
		16	5	4	5	4	14*	5	5	5	15*	5	25*	6	5

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: 85 To: 91	From: 85 To: 92
1	f	1	5	3	.
		2	5	5	.
		3	5	6	.
		4	5	6	.
		5	5	35*	.
		6	5	5	.
		7	5	34*	.
		8	5	5	.
		9	5	17*	.
		10	5	.	.
		11	5	.	.
		12	5	.	.
		13	5	.	.
		14	5	.	.
		15	5	.	6
		16	5	.	8

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: 1 To: 8	8 15	15 22	22 29	29 36	36 43	43 50	50 57	57 64	64 71	71 78	78 85
2	f	17	5	5	5	5	6	5	15*	7	5	5	5	5	5
		18	5	5	6	5	18*	5	5	5	5	6	5	5	5
		19	5	6	17*	2	18*	5	29*	8*	5	5	5	6	5
		20	5	5	5	2	18*	5	5	5	5	5	5	5	16*
		21	5	.	.	5	15*	16*	5	5	10*	47*	16*	7	4
		22	5	.	.	5	9	2	15*	6	6	5	7	6	6
		23	5	7	6	5	19*	16*	6	15*	6	6	6	25*	5
		24	5	5	5	6	5	5	16*	5	5	5	4	5	5
		25	5	5	5	5	5	20*	5	5	5	5	5	15*	5
		26	5	4	.	.	.	.	.	.	.	.	.	.	.
		27	5	35*	.	.	.	.	.	.	.	.	.	.	.
		28	5	5	.	.	.	.	.	.	.	.	.	.	.
		29	5	4	.	.	.	.	.	.	.	.	.	.	.
		30	5	2	.	.	.	.	.	.	.	.	.	.	.
		31	5	5	7	22*	14*	5	5	5	5	8	6	4	5
		32	5	3	5	5	5	6	6	6	5	6	5	5	16*

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: To:	85 91	85 92
2	f	17	5		5	.
		18	5		12	.
		19	5		5	.
		20	5		5	.
		21	5		5	.
		22	5		16*	.
		23	5		6	.
		24	5		5	.
		25	5		6	.
		26	5		.	.
		27	5		.	.
		28	5		.	.
		29	5		.	.
		30	5		.	.
		31	5		.	5
		32	5		.	6

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Day numbers relative to Start Date

			No In	From:	1	8	15	22	29	36	43	50	57	64	71	78
Group	Sex	Cage	Cage	To:	8	15	22	29	36	43	50	57	64	71	78	85
3	f	33	5		5	5	4	5	5	12*	5	5	5	6	6	4
		34	5		5	5	5	8	11*	8*	6	16*	18*	6	7	5
		35	5		4	5	4	5	5	5	19*	5	13*	6	5	5
		36	5		4	5	19*	18*	5	12*	5	5	6	5	5	5
		37	5		.	.	15*	14*	11*	14*	5	5	15*	15*	16*	5
		38	5		.	.	7	5	5	13	15*	6	6	5	15*	4
		39	5		6	5	30*	6	16*	5	5	16*	6	5	6	5
		40	5		5	5	5	5	5	8	6	15*	5	5	6	7
		41	5		5	2	5	6	5	6	6	16*	5	14*	5	5
		42	5		7	.	.	.	.	.	.	.	.	.	.	.
		43	5		41*	.	.	.	.	.	.	.	.	.	.	.
		44	5		5	.	.	.	.	.	.	.	.	.	.	.
		45	5		5	.	.	.	.	.	.	.	.	.	.	.
		46	5		28*	.	.	.	.	.	.	.	.	.	.	.
		47	5		19*	18*	5	5	6	6	5	5	5	5	5	16*
		48	5		5	15*	5	-5*	5	5	26*	5	5	5	5	5

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Water Consumption by Cage (mL/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: / To:	85 / 91	85 / 92
3	f	33	5		5	.
		34	5		6	.
		35	5		5	.
		36	5		4	.
		37	5		4	.
		38	5		6	.
		39	5		5	.
		40	5		5	.
		41	5		5	.
		42	5		.	.
		43	5		.	.
		44	5		.	.
		45	5		.	.
		46	5		.	.
		47	5		.	5
		48	5		.	6

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: 1 To: 8	From: 8 To: 15	From: 15 To: 22	From: 22 To: 29	From: 29 To: 36	From: 36 To: 43	From: 43 To: 50	From: 50 To: 57	From: 57 To: 64	From: 64 To: 71	From: 71 To: 78	From: 78 To: 85
4	f	49	5	5	5	5	5	15*	5	5	5	5	5	15*	6
		50	5	5	5	5	5	17*	17*	6	5	9*	5	17*	6
		51	5	5	5	6	5	5	16*	14*	6	5	5	5	16*
		52	5	5	5	5	4	5	7	5	7	6	32*	13*	26*
		53	5	.	.*	5	5	5	27*	5	11*	7	17*	5	5
		54	5	.	.*	4	5	15*	5	16*	5	24*	5	5	5
		55	5	5	6	5	5	6	5	5	6	5	5	11	27*
		56	5	16*	5	5	14*	12*	16*	5	5	28*	6	5	5
		57	5	5	5	5	8*	5	4	5	17*	15*	5	5	4
		58	5	4	.	.	.	.	.	.	.	.	.	.	.
		59	5	4	.	.	.	.	.	.	.	.	.	.	.
		60	5	5	.	.	.	.	.	.	.	.	.	.	.
		61	5	2	.	.	.	.	.	.	.	.	.	.	.
		63	5	4	4	6	4	5	15*	18*	5	5	5	4	4
		64	5	38*	9*	16*	6	6	5	46*	5	16*	6	5	6

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: / To:	85 / 91	85 / 92
4	f	49	5		16*	.
		50	5		5	.
		51	5		5	.
		52	5		5	.
		53	5		4	.
		54	5		5	.
		55	5		6	.
		56	5		17*	.
		57	5		16*	.
		58	5		.	.
		59	5		.	.
		60	5		.	.
		61	5		.	.
		63	5		.	27*
		64	5		.	9

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: / To:	1 / 8	8 / 15	15 / 22	22 / 29	29 / 36	36 / 43	43 / 50	50 / 57	57 / 64	64 / 71	71 / 78	78 / 85
5	f	65	5		5	5	5	5	5	5	15*	4	36*	5	6	5
		66	5		5	11*	42*	16*	4	14*	5	5	14*	5	5	6
		67	5		5	5	15*	5	5	4	5	5	16*	6	5	14*
		68	5		5	5	5	5	16*	5	5	15*	21*	5	5	5
		69	5		.	.	30*	16*	5	3	4	5	14*	18*	5	5
		70	5		.	.	4	5	5	5	5	5	5	5	16*	5
		71	5		17*	5	8*	5	6	5	5	5	10*	5	6	16*
		72	5		5	5	30*	19*	15*	17*	16*	5	7	5	5	16*
		73	5		5	5	27*	5	5	5	5	14*	5	15*	5	7
		74	5		27*	.	.	.	.	.	.	.	.	.	.	.
		75	5		5	.	.	.	.	.	.	.	.	.	.	.
		76	5		22*	.	.	.	.	.	.	.	.	.	.	.
		77	5		4	.	.	.	.	.	.	.	.	.	.	.
		78	5		2	.	.	.	.	.	.	.	.	.	.	.
		79	5		5	4	5	7	5	5	5	16	15*	4	4	6
		80	5		40*	5	5	5	5	4	5	5	5	5	5	5

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: To:	85 91	85 92
5	f	65	5		17*	.
		66	5		9	.
		67	5		6	.
		68	5		3	.
		69	5		4	.
		70	5		5	.
		71	5		5	.
		72	5		14*	.
		73	5		5	.
		74	5		.	.
		75	5		.	.
		76	5		.	.
		77	5		.	.
		78	5		.	.
		79	5		.	5
		80	5		.	7

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: To:	1 8	8 15	15 22	22 29	29 36	36 43	43 50	50 57	57 64	64 71	71 78	78 85
6	f	81	5		4	4	4	4	4	7	4	4	4	8	4	4
		82	5		5	5	5	5	4	4	5	5	4	4	4	4
		83	5		4	15*	16*	4	13*	4	5	25*	22*	4	4	15*
		84	5		4	4	13*	4	4	4	5	5	14*	3	35*	4
		85	5		.	.	29*	4	4	5	4	4	4	4	4	14*
		86	5		.	.	4	16*	4	4	5	5	5	4	13*	22*
		87	5		4	4	12*	6	4	4	4	5	14*	4	4	24*
		88	5		7	4	3	15*	4	5	4	4	6	4	4	4
		89	5		17*	4	16*	14*	5	5	14*	4	4	5	4	6
		90	5		3	.	.	.	.	.	.	.	.	.	.	.
		91	5		16*	.	.	.	.	.	.	.	.	.	.	.
		92	5		3	.	.	.	.	.	.	.	.	.	.	.
		93	5		6*	.	.	.	.	.	.	.	.	.	.	.
		94	5		3	.	.	.	.	.	.	.	.	.	.	.
		95	5		32*	4	4	13*	4	4	14*	3	4	4	4	4
		96	5		4	4	4	4	3	4	5	4	14*	4	4	4

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: 85 To: 91	From: 85 To: 92
6	f	81	5	5	.
		82	5	4	.
		83	5	4	.
		84	5	3	.
		85	5	4	.
		86	5	5	.
		87	5	4	.
		88	5	4	.
		89	5	4	.
		90	5	.	.
		91	5	.	.
		92	5	.	.
		93	5	.	.
		94	5	.	.
		95	5	.	4
		96	5	.	25*

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From:	1	8	15	22	29	36	43	50	57	64	71	78
				To:	8	15	22	29	36	43	50	57	64	71	78	85
7	f	97	5		3	4	3	4	3	15*	4	13*	4	3	3	3
		98	5		3	3	3	15*	4	14*	4	6	8*	3	4	5
		99	5		3	5	3	15*	4	3	3	3	11*	3	3	23*
		100	5		3	16*	2	4	3	3	3	8	22*	3	9*	3
		101	5		.	.	3	3	3	-17*	4	3	3	3	3	3
		102	5		.	.*	17*	16*	3	4	4	4	4	4	4	14*
		103	5		16*	9	15*	4	4	3	14*	14*	13*	13*	3	4
		104	5		3	3	2	3	4	4*	14*	3	17*	3	3	16*
		105	5		16*	3	3	4	4	4	4	23*	3	3	3	3
		106	5		11*	.	.	.	.	.	.	.	.	.	.	.
		107	5		3	.	.	.	.	.	.	.	.	.	.	.
		108	5		18*	.	.	.	.	.	.	.	.	.	.	.
		109	5		15*	.	.	.	.	.	.	.	.	.	.	.
		110	5		3	.	.	.	.	.	.	.	.	.	.	.
		111	5		3	3	3	5	4	3	3	4	4	3	3	7
		112	5		27*	3	3	9	13*	3	25*	3	2	3	3	3

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Water Consumption by Cage (mL/animal/day)

Day numbers relative to Start Date

Group	Sex	Cage	No In Cage	From: 85 To: 91	From: 85 To: 92
7	f	97	5	15*	.
		98	5	3	.
		99	5	3	.
		100	5	3	.
		101	5	3	.
		102	5	4	.
		103	5	3	.
		104	5	11	.
		105	5	3	.
		106	5	.	.
		107	5	.	.
		108	5	.	.
		109	5	.	.
		110	5	.	.
		111	5	.	9
		112	5	.	3

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
1	f	1	24	Remaining I/E/S	E	
				Remaining Result		Water spilled
		2	16	Remaining I/E/S	E	
				Remaining Result		Water spilled
			40	Remaining I/E/S	E	
				Remaining Result		Water spilled
				Remaining Result		Water spilled
			44	Remaining I/E/S	E	
				Remaining Result		Water spilled Excluded from calculations per study director request
			47	Remaining Result		Water spilled
			82	Remaining I/E/S	E	
				Remaining Result		Water spilled
		3	19	Remaining I/E/S	E	
				Remaining Result		Water spilled
			57	Remaining I/E/S	E	
				Remaining Result		Water spilled
			85	Remaining I/E/S	E	
				Remaining Result		Water spilled
		4	36	Initial/Top-Up I/E/S	E	
			39	Remaining I/E/S	E	
			43	Remaining I/E/S	E	
			53	Remaining Result		Water bottle empty not spilled
			54	Remaining I/E/S	E	
				Remaining Result		Water spilled
			58	Remaining I/E/S	E	
				Remaining Result		Water spilled
			79	Remaining I/E/S	E	
				Remaining Result		Water spilled

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
1		5	30	Remaining I/E/S	E	
				Remaining Result		Water spilled
			89	Remaining I/E/S	E	
				Remaining Result		Water spilled
			90	Remaining I/E/S	E	
				Remaining Result		Water spilled
			91	Remaining I/E/S	E	
				Remaining Result		Water spilled
		6	16	Remaining I/E/S	E	
				Remaining Result		Water spilled
			36	Initial/Top-Up I/E/S	E	
			39	Remaining I/E/S	E	
			43	Remaining I/E/S	E	
			53	Remaining I/E/S	E	
				Remaining Result		Water spilled
			33	Remaining I/E/S	E	
				Remaining Result		Water spilled
		7	82	Remaining I/E/S	E	
				Remaining Result		Water spilled
			19	Remaining I/E/S	E	
				Remaining Result		Water spilled
			36	Remaining I/E/S	E	
				Remaining Result		Water spilled
				Remaining Result		Water spilled
			89	Remaining I/E/S	E	
				Remaining Result		Water spilled

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
1	f	7	90	Remaining I/E/S	E	
				Remaining Result		Water spilled
			91	Remaining I/E/S	E	
				Remaining Result		Water spilled
			48	Remaining I/E/S	E	
				Remaining Result		Water spilled
			59	Remaining I/E/S	E	
				Remaining Result		Water spilled
			67	Remaining Result		Water spilled
			69	Remaining I/E/S	E	
				Remaining Result		Water spilled
		9	32	Remaining I/E/S	E	
				Remaining Result		Water spilled
			75	Remaining I/E/S	E	
				Remaining Result		Water spilled
			78	Remaining Result		Water bottle empty not spilled
			88	Remaining I/E/S	E	
				Remaining Result		Water spilled
		13	2	Remaining I/E/S	E	
				Remaining Result		Water spilled
			3	Remaining I/E/S	E	
				Remaining Result		Water spilled
		15	8	Remaining I/E/S	E	
				Remaining Result		Water spilled
			25	Remaining I/E/S	E	
				Remaining Result		Water spilled
		16	69	Remaining I/E/S	E	
				Remaining Result		Water spilled

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
1	f	16	25	Remaining I/E/S	E	
			22	Initial/Top-Up I/E/S	E	
			56	Remaining I/E/S	E	
				Remaining Result		Water spilled
			68	Remaining I/E/S	E	
				Remaining Result		Water spilled
2	f	17	40	Remaining I/E/S	E	
				Remaining Result		Water spilled
		18	23	Remaining I/E/S	E	
				Remaining Result		Water spilled
		19	36	Remaining I/E/S	E	
				Remaining Result		Water spilled
			43	Remaining I/E/S	E	
				Remaining Result		Water spilled Excluded from calculations per study director request
			12	Remaining I/E/S	E	
				Remaining Result		water spilled
			27	Remaining I/E/S	E	
				Remaining Result		Water spilled
			45	Remaining I/E/S	E	
				Remaining Result		Water spilled
		20	82	Remaining I/E/S	E	
				Remaining Result		Water spilled
			23	Remaining I/E/S	E	
				Remaining Result		Water spilled
		21	53	Remaining I/E/S	E	
				Remaining Result		Water spilled

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
2	f	21	58	Remaining I/E/S	E	
				Remaining Result		Water spilled
				Remaining Result		Water spilled
			30	Remaining I/E/S	E	
				Remaining Result		Water spilled
			68	Remaining I/E/S	E	
				Remaining Result		Water spilled
			27	Remaining I/E/S	E	
				Remaining Result		Water spilled
		22	36	Initial/Top-Up I/E/S	E	
			39	Remaining I/E/S	E	
			43	Remaining I/E/S	E	
			91	Remaining I/E/S	E	
				Remaining Result		Water spilled
		23	44	Remaining I/E/S	E	
				Remaining Result		Water spilled
			43	Initial/Top-Up I/E/S	E	
			23	Remaining I/E/S	E	
				Remaining Result		Water spilled
			31	Remaining I/E/S	E	
				Remaining Result		Water spilled
			46	Remaining I/E/S	E	
			50	Remaining I/E/S	E	
			73	Remaining I/E/S	E	
				Remaining Result		Water spilled bottle broken
		24	36	Initial/Top-Up I/E/S	E	
			39	Remaining I/E/S	E	

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
2	f	24	43	Remaining I/E/S	E	
			37	Remaining I/E/S	E	
		25	32	Remaining I/E/S	E	
				Remaining Result		Water spilled
			75	Remaining I/E/S	E	
				Remaining Result		Water spilled
		27	5	Remaining I/E/S	E	
				Remaining Result		Water spilled
			6	Remaining I/E/S	E	
				Remaining Result		Water spilled
			7	Remaining I/E/S	E	
				Remaining Result		Water spilled
		31	19	Remaining I/E/S	E	
				Remaining Result		Water spilled
			15	Remaining I/E/S	E	
				Remaining Result		Water spilled
			29	Remaining I/E/S	E	
				Remaining Result		Excluded from calculations per study director request Water spilled
		32	82	Remaining I/E/S	E	
				Remaining Result		Water spilled
3	f	33	40	Remaining I/E/S	E	
				Remaining Result		Water spilled
		34	36	Remaining I/E/S	E	
				Remaining Result		Water spilled
			54	Remaining I/E/S	E	
				Remaining Result		Water spilled

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
3	f	34	30	Remaining I/E/S	E	
				Remaining Result		Water spilled
			60	Remaining I/E/S	E	
				Remaining Result		Water spilled
		35	43	Remaining I/E/S	E	
				Remaining Result		Water spilled Excluded from calculations per study director request
				Remaining Result		Water spilled Excluded from calculations per study director request
				Remaining I/E/S	E	Animals pushed bedding up to spout causing the bottle to leak out several times.
			60	Remaining I/E/S	E	
				Remaining Result		Water spilled
		36	23	Remaining I/E/S	E	
				Remaining Result		Water spilled
			18	Remaining I/E/S	E	
				Remaining Result		Water spilled
			38	Remaining I/E/S	E	
				Remaining Result		Water spilled
		37	58	Remaining I/E/S	E	
				Remaining Result		Water spilled
			30	Remaining I/E/S	E	
				Remaining Result		Water spilled
			25	Remaining I/E/S	E	
			22	Initial/Top-Up I/E/S	E	
				Remaining I/E/S	E	
				Remaining Result		Water spilled
			68	Remaining I/E/S	E	
				Remaining Result		Water spilled

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
3	f	37	37	Remaining I/E/S	E	
				Remaining Result		Water spilled
			29	Remaining I/E/S	E	
			72	Remaining I/E/S	E	
				Remaining Result		Water spilled
		38	45	Remaining I/E/S	E	
				Remaining Result		Water spilled
			74	Remaining I/E/S	E	
				Remaining Result		Water spilled
		39	16	Remaining I/E/S	E	
				Remaining Result		Water spilled
			32	Remaining I/E/S	E	
				Remaining Result		Water spilled
			20	Remaining I/E/S	E	
				Remaining Result		Water spilled
			51	Remaining I/E/S	E	
				Remaining Result		Water spilled
		40	51	Remaining I/E/S	E	
				Remaining Result		Water spilled
		41	54	Remaining I/E/S	E	
				Remaining Result		Water spilled
			71	Remaining I/E/S	E	
				Remaining Result		Water spilled
		43	8	Remaining I/E/S	E	
				Remaining Result		Water spilled
			7	Remaining I/E/S	E	
				Remaining Result		Water spilled
		46	6	Remaining I/E/S	E	

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
3	f	46	6	Remaining Result		Water spilled
			7	Remaining I/E/S	E	
				Remaining Result		Water spilled
		47	82	Remaining I/E/S	E	
				Remaining Result		Water spilled
			4	Remaining I/E/S	E	
				Remaining Result		Water spilled
			9	Remaining I/E/S	E	
				Remaining Result		Water spilled
		48	44	Remaining I/E/S	E	
				Remaining Result		Water spilled
				Remaining Result		Water spilled
			23	Remaining I/E/S	E	
				Remaining Result		Water spilled
			9	Remaining I/E/S	E	
				Remaining Result		Water spilled
4	f	49	31	Remaining I/E/S	E	
				Remaining Result		Water spilled
			76	Remaining I/E/S	E	
				Remaining Result		Water spilled
			86	Remaining I/E/S	E	
				Remaining Result		Water spilled
		50	40	Remaining I/E/S	E	
			36	Initial/Top-Up I/E/S	E	
				Remaining I/E/S	E	
			39	Remaining I/E/S	E	
			43	Remaining I/E/S	E	

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
4	f	50	30	Remaining I/E/S	E	
				Remaining Result		Water spilled
			72	Remaining I/E/S	E	
				Remaining Result		Water spilled
			64	Remaining I/E/S	E	
				Remaining Result		Water spilled
		51	39	Remaining I/E/S	E	
				Remaining Result		Water spilled
			79	Remaining I/E/S	E	
				Remaining Result		Water spilled
			46	Remaining I/E/S	E	
				Remaining Result		Water spilled
		52	79	Remaining I/E/S	E	
				Remaining Result		Water spilled
			69	Remaining I/E/S	E	
				Remaining Result		Water spilled
			68	Remaining I/E/S	E	
				Remaining Result		Water spilled
			71	Remaining I/E/S	E	
				Remaining Result		Water spilled
			77	Remaining I/E/S	E	
				Remaining Result		Water spilled
			81	Remaining I/E/S	E	
				Remaining Result		Water spilled
		53	36	Initial/Top-Up I/E/S	E	
			39	Remaining I/E/S	E	
			43	Remaining I/E/S	E	
			53	Remaining I/E/S	E	
				Remaining Result		Water spilled

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
4	f	53	67	Remaining I/E/S	E	
				Remaining Result		Water spilled
			12	Remaining I/E/S	E	
				Remaining Result		Water spilled
			37	Initial/Top-Up I/E/S	E	
		54	47	Remaining I/E/S	E	
				Remaining Result		Water spilled
			36	Remaining I/E/S	E	
			32	Remaining I/E/S	E	
			29	Initial/Top-Up I/E/S	E	
			60	Remaining I/E/S	E	
				Remaining Result		Water spilled
			13	Remaining I/E/S	E	
				Remaining Result		water spilled
			14	Remaining I/E/S	E	
				Remaining Result		Water spilled
			62	Remaining I/E/S	E	
				Remaining Result		Water spilled
		55	79	Remaining I/E/S	E	
				Remaining Result		Water spilled
				Remaining Result		Water spilled
		56	39	Remaining I/E/S	E	
				Remaining Result		Water spilled. Data excuded as per BSOP-IL061.
			58	Remaining I/E/S	E	
				Remaining Result		Water spilled
			32	Remaining I/E/S	E	
				Remaining Result		Water spilled
			25	Remaining I/E/S	E	
				Remaining Result		Water spilled

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
4	f	56	7	Remaining I/E/S	E	
				Remaining Result		Water spilled
			86	Remaining I/E/S	E	
				Remaining Result		Water spilled
			61	Remaining I/E/S	E	
				Remaining Result		Water spilled
		57	54	Remaining I/E/S	E	
				Remaining Result		Water spilled
			58	Remaining I/E/S	E	
				Remaining Result		Water spilled
			22	Remaining I/E/S	E	
				Remaining Result		Water spilled
			87	Remaining I/E/S	E	
				Remaining Result		Water spilled
		63	40	Remaining I/E/S	E	
				Remaining Result		Water spilled
			47	Remaining I/E/S	E	
				Remaining Result		Water spilled
			43	Remaining I/E/S	E	
				Remaining Result		Water spilled
			89	Remaining I/E/S	E	
				Remaining Result		Water spilled
			91	Remaining I/E/S	E	
				Remaining Result		Water spilled
		64	16	Remaining I/E/S	E	
				Remaining Result		Water spilled
			44	Remaining I/E/S	E	
				Remaining Result		Water spilled
				Remaining Result		Water spilled

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
4	f	64	47	Remaining I/E/S	E	
				Remaining Result		Water spilled
			58	Remaining I/E/S	E	
				Remaining Result		Water spilled
			48	Remaining I/E/S	E	
				Remaining Result		Water spilled
			2	Remaining I/E/S	E	
				Remaining Result		Water spilled
			3	Remaining I/E/S	E	
				Remaining Result		Water spilled
			7	Remaining I/E/S	E	
				Remaining Result		Water spilled
			13	Remaining I/E/S	E	
				Remaining Result		Water spilled
5	f	65	44	Remaining I/E/S	E	
				Remaining Result		Water spilled Excluded from calculations per study director request
			58	Remaining I/E/S	E	
				Remaining Result		Water spilled
			61	Remaining I/E/S	E	
				Remaining Result		Water spilled
				Remaining Result		Water spilled
			87	Remaining I/E/S	E	
				Remaining Result		Water spilled
		66	16	Remaining I/E/S	E	
				Remaining Result		Water spilled
			19	Remaining I/E/S	E	

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
5	f	66	19	Remaining Result		Water spilled
			23	Remaining I/E/S	E	
				Remaining Result		Water spilled
			12	Remaining I/E/S	E	
				Remaining Result		Water spilled
			37	Remaining I/E/S	E	
				Remaining Result		Water spilled
			60	Remaining I/E/S	E	
				Remaining Result		Water spilled
			20	Remaining I/E/S	E	
				Remaining Result		Water spilled
		67	82	Remaining I/E/S	E	
				Remaining Result		Water spilled
			18	Remaining I/E/S	E	
				Remaining Result		Water spilled
			61	Remaining I/E/S	E	
				Remaining Result		Water spilled
		68	50	Remaining I/E/S	E	
				Remaining Result		Water spilled
			29	Remaining I/E/S	E	
				Remaining Result		Water spilled
			61	Remaining I/E/S	E	
				Remaining Result		Water spilled
		69	19	Remaining I/E/S	E	
				Remaining Result		Water spilled
			58	Remaining I/E/S	E	
				Remaining Result		Water spilled
			68	Remaining I/E/S	E	
				Remaining Result		Water spilled
			17	Remaining I/E/S	E	
				Remaining Result		Water spilled
			26	Remaining I/E/S	E	
				Remaining Result		Water spilled
		70	75	Remaining I/E/S	E	
				Remaining Result		Water spilled

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
5	f	71	82	Remaining I/E/S	E	
				Remaining Result		Water spilled
			59	Remaining I/E/S	E	
				Remaining Result		Water spilled
			5	Remaining I/E/S	E	
				Remaining Result		water spilled
			18	Remaining I/E/S	E	
				Remaining Result		Water spilled
		72	82	Remaining I/E/S	E	
				Remaining Result		Water spilled
			19	Remaining I/E/S	E	
				Remaining Result		Water spilled
			36	Initial/Top-Up I/E/S	E	
			39	Remaining I/E/S	E	
			43	Remaining I/E/S	E	
			48	Remaining I/E/S	E	
				Remaining Result		Water spilled
			88	Remaining I/E/S	E	
				Remaining Result		Water spilled
			22	Remaining I/E/S	E	
				Remaining Result		Water spilled
			31	Remaining I/E/S	E	
				Remaining Result		Water spilled
			37	Remaining I/E/S	E	
			20	Remaining I/E/S	E	
				Remaining Result		Water spilled
		73	16	Remaining I/E/S	E	
				Remaining Result		Water spilled
			54	Remaining I/E/S	E	
				Remaining Result		Water spilled
			68	Remaining I/E/S	E	
				Remaining Result		Water spilled
			18	Remaining I/E/S	E	
				Remaining Result		Water spilled

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
5	f	74	2	Remaining I/E/S	E	
				Remaining Result		Water spilled; bottle broke
		76	5	Remaining I/E/S	E	
				Remaining Result		Water spilled
		79	58	Remaining I/E/S	E	
				Remaining Result		Water spilled
		80	2	Remaining I/E/S	E	
				Remaining Result		Water spilled
			3	Remaining I/E/S	E	
				Remaining Result		Water spilled
			5	Remaining I/E/S	E	
				Remaining Result		Water spilled

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
6	f	83	19	Remaining I/E/S	E	
				Remaining Result		Water spilled
			54	Remaining I/E/S	E	
				Remaining Result		Water spilled
			81	Remaining I/E/S	E	
				Remaining Result		Water spilled
			13	Remaining I/E/S	E	
				Remaining Result		Water spilled
			61	Remaining I/E/S	E	
				Remaining Result		Water spilled
				Remaining Result		Water spilled
			35	Remaining I/E/S	E	
				Remaining Result		Water spilled
			52	Remaining I/E/S	E	
				Remaining Result		Water spilled
		84	78	Remaining I/E/S	E	
				Remaining Result		Water spilled bottle broken
			22	Remaining I/E/S	E	
				Remaining Result		Water spilled
			72	Remaining I/E/S	E	
				Remaining Result		Water spilled
			61	Remaining I/E/S	E	
				Remaining Result		Water spilled
		85	16	Remaining I/E/S	E	
				Remaining Result		Water spilled
			79	Remaining I/E/S	E	
				Remaining Result		Water spilled
			21	Remaining I/E/S	E	
				Remaining Result		Water spilled

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Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
6	f	86	79	Remaining I/E/S	E	
				Remaining Result		Water spilled
			73	Remaining I/E/S	E	
				Remaining Result		Water spilled
			26	Remaining I/E/S	E	
				Remaining Result		Water spilled
			80	Remaining I/E/S	E	
				Remaining Result		Water spilled
		87	82	Remaining I/E/S	E	
				Remaining Result		Water spilled
				Remaining Result		Water spilled
			58	Remaining I/E/S	E	
				Remaining Result		Water spilled
			22	Remaining I/E/S	E	
			18	Remaining I/E/S	E	
		88	25	Remaining I/E/S	E	
				Remaining Result		Water spilled
		89	45	Remaining I/E/S	E	
				Remaining Result		Water spilled
			5	Remaining I/E/S	E	
				Remaining Result		Water spilled
			17	Remaining I/E/S	E	
				Remaining Result		Water spilled
			26	Remaining I/E/S	E	
				Remaining Result		Water spilled
		91	3	Remaining I/E/S	E	
				Remaining Result		Water spilled
		93	2	Remaining I/E/S	E	
				Remaining Result		Water spilled

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
6	f	95	44	Remaining I/E/S	E	
				Remaining Result		Water spilled
			25	Initial/Top-Up Result		See study comments form dated 4/11/10 by JWS.
			5	Remaining I/E/S	E	
				Remaining Result		Water spilled
			6	Remaining I/E/S	E	
				Remaining Result		Water spilled
			28	Remaining I/E/S	E	
				Remaining Result		Water spilled Excluded from calculations per study director request
		96	58	Remaining I/E/S	E	
				Remaining Result		Water spilled
			86	Remaining I/E/S	E	
				Remaining Result		Water spilled
			87	Remaining I/E/S	E	
				Remaining Result		Water spilled
7	f	97	36	Remaining I/E/S	E	
				Remaining Result		Water spilled
			87	Remaining I/E/S	E	
				Remaining Result		Water spilled
			55	Remaining I/E/S	E	
				Remaining Result		Water spilled
		98	39	Initial/Top-Up Result		See study comment form dated 4/10/10 written by JWS.
			23	Remaining I/E/S	E	
				Remaining Result		Water spilled
			37	Initial/Top-Up I/E/S	E	
				Remaining Result		Water spilled
			64	Remaining I/E/S	E	
				Remaining Result		Water spilled

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
7	f	99	82	Remaining I/E/S	E	
				Remaining Result		Water spilled
			57	Remaining I/E/S	E	
				Remaining Result		Water spilled
			23	Remaining I/E/S	E	
				Remaining Result		Water spilled
			81	Remaining I/E/S	E	
				Remaining Result		Water spilled
		100	58	Remaining I/E/S	E	
				Remaining Result		Water spilled
			12	Remaining I/E/S	E	
				Remaining Result		Water spilled
			71	Remaining I/E/S	E	
				Remaining Result		Water spilled
			63	Remaining I/E/S	E	
				Remaining Result		Water spilled
		101	36	Initial/Top-Up I/E/S	E	
			39	Remaining I/E/S	E	
			43	Remaining I/E/S	E	
		102	16	Remaining I/E/S	E	
				Remaining Result		Water spilled
			79	Remaining I/E/S	E	
				Remaining Result		Water spilled
			26	Remaining I/E/S	E	
				Remaining Result		Water spilled
			10	Remaining I/E/S	E	
				Remaining Result		Water spilled
		103	44	Remaining I/E/S	E	
				Remaining Result		Water spilled
			59	Remaining I/E/S	E	
				Remaining Result		Water spilled
			67	Remaining I/E/S	E	
				Remaining Result		Water spilled
			5	Remaining I/E/S	E	
				Remaining Result		water spilled

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Water Consumption by Cage (mL/animal/day)

Comments and Markers

Group	Sex	Cage	Day	Type	Marker	Comment
		103	20	Remaining I/E/S	E	
				Remaining Result		Water spilled
			51	Remaining I/E/S	E	
				Remaining Result		Water spilled
104	47	Remaining I/E/S		E		
				Remaining Result		Water spilled
			79	Remaining I/E/S	E	
				Remaining Result		Water spilled
			37	Remaining I/E/S	E	
				Remaining Result		Water spilled
			61	Remaining I/E/S	E	
				Remaining Result		Water spilled
		105	54	Remaining I/E/S	E	
				Remaining Result		Water spilled
			2	Remaining I/E/S	E	
				Remaining Result		water spilled
			55	Remaining I/E/S	E	
				Remaining Result		Water spilled
		106	5	Remaining I/E/S	E	
				Remaining Result		Water spilled
		108	5	Remaining I/E/S	E	
				Remaining Result		Water spilled
		109	6	Remaining I/E/S	E	
				Remaining Result		Water spilled
		112	44	Remaining I/E/S	E	
				Remaining Result		Water spilled
			30	Remaining I/E/S	E	
				Remaining Result		Water spilled
			2	Remaining I/E/S	E	
				Remaining Result		Water spilled
			3	Remaining I/E/S	E	
				Remaining Result		Water spilled
			45	Remaining I/E/S	E	
				Remaining Result		Water spilled

Water Consumption Units are mL/animal/day.
Marker = E implies value excluded from means
* = Result to left has an associated comment or marker

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Appendix G

Immunology Contributing Scientist Report

Immunology Contributing Scientist Report for

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

(Amended)

Submitted by:

Richard D. May, Ph.D.
Immunologist
Southern Research
Birmingham, Alabama

Southern Research Study Number: 13026.01.01

April 1, 2011

Immunology Contributing Scientist Report for

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

(Amendment 2)

General:

- After the study report had been amended on February 2, 2010, a protein assay was run on the homogenates used for analysis of 8-isoprostane and cytokines in oral cavity and duodenum. The report is being amended for a second time to add this information.
- After the study report had been amended on February 2, 2010, the Study Director decided that presentation of 8-OHdG values normalized to DNA content would be more meaningful than simple presentation of the 8-OHdG concentration in the homogenates. Therefore, the 8-OHdG data were recalculated, and the data table and text were amended accordingly.
- Page numbers shown below refer to the pages in the Contributing Scientist Report as first amended.
- Page numbers throughout the report have been updated to reflect the addition of the Amendment.
- Minor typographical errors (e.g., inconsistency in format of reported temperatures) have been corrected throughout the report.

Amendment Page: The header of the amendment page used for the first amendment of this report as been revised from “Amendment” to “Amendment 1.”

Table of Contents: The Table of Contents was amended to add a Reference section, Table G11, and Attachment G3. Page numbers in the Table of Contents have been amended to reflect other changes in the report.

Page 6: A new section has been added to describe the assay of protein concentrations in the samples used for analysis of 8-isoprostane and cytokines/chemokines.

Page 6 (Statistics): This section has been amended to note that for 8-OHdG samples having DNA concentrations lower than the recommended limit, the ng 8-OHdG/mg DNA were calculated but were not used for calculation of group means and standard deviations or for statistical analysis. The section was also amended to remove reference to samples having values lower than the detectable limit of the assay.

Page 7 (8-Isoprostane Levels in Oral Cavity and Duodenum Homogenates): This paragraph has been amended to note that because the 8-isoprostane assay performed in this study measured only free 8-isoprostane, the Study Director made the decision to not include statistical analysis of the data in the summary table). The paragraph has also been amended to describe the possible limits that having only free 8-isoprostane levels may place on interpretation of the data.

Page 7 (8-OHdG Levels in Oral Cavity and Duodenum Tissues): This paragraph has been amended to note that 8-OHdG levels are now reported normalized to DNA. The presentation of the results has been amended to reflect the results of the statistical analysis of the normalized data.

Page 8 (Cytokine/Chemokine Levels in Serum, Oral Cavity, and Duodenum**):** Due to the high number of samples that had cytokine/chemokine values below the detectable limit, statistical analysis of the data was considered to be of limited usefulness. Therefore, references to statistical significance were removed from the text.

Page 8 (Results): A new section has been added to state that the results of the protein assays performed on tissue homogenates used for 8-isoprostane and cytokine/chemokine analysis are presented in Table G11.

Page 9: A new section has been added to provide the reference for the statement regarding relative amounts of free versus bound 8-isoprostane in plasma.

Page 9 (Conclusions): As noted above, due to the fact that only free (rather than total) 8-isoprostane was measured, the Study Director decided not to include statistical analysis of the 8-isoprostane data. The text of the Conclusions was amended to reflect the changes in the Results section. Similarly the Conclusions regarding cytokine/chemokine values were amended to remove reference to statistical significance.

Page 9 (Conclusions): The text of the Conclusions was amended to note that 8-OHdG levels, expressed in terms of ng 8-OHdG/mg DNA, were not different between the vehicle and SDD-treated groups for oral cavity or duodenum samples.

A Reference section has been added to include the reference regarding relative levels of free verus bound 8-isoprostane.

Pages 13-15 (Table G3): For the 8-OHdG ELISA assays, the volume of homogenization buffer used was the same for each sample, regardless of the weight of the tissue sample being homogenized. The results of the assay report out in units of ng 8-OHdG/mL homogenate. The Study Director originally felt that inter-group comparison of 8-OHdG levels expressed in these terms was useful for detecting inter-group differences, and these were the units originally included in the report and on which statistical analysis was run. However, because the amount of de-oxygenated base in the sample is a function of the original DNA content of the samples, the Study Director determined that a more meaningful comparison could be made using data normalized to the amount of DNA in each sample. This normalization was performed on the data. Table G3 has been amended to show the normalized data, expressed in terms of ng 8-OHdG/mg DNA rather than ng 8-OHdG/mL homogenate. The footnote of the table has been amended to note that the DNA concentration for some samples was lower than recommended by the ELISA kit manufacturer, and that the resultant 8-OHdG/DNA values were excluded from calculation of the group means and standard deviations.

Page 16 (Table G4): The 8-OHdG summary results reported in Table G4 of the original report have been replaced by 8-OHdG values that have been normalized to the amount of DNA in the homogenates used for the 8-OHdG assay. Statistical analysis was performed on the normalized data. The footnote describing the statistical analysis of the summary 8-OHdG data has been amended accordingly.

Page 16 (Table G4): The results of the statistical analysis of the 8-isoprostane data have been removed from the table, as described in the amended Results section for this parameter. The table footnote describing the statistical analysis has been amended accordingly.

Pages 25-26 (Table G6); Pages 36-37 (Table G8); Pages 47-48 (Table G10): Due to the high number of samples that had cytokine/chemokine values below the detectable limit, statistical analysis of the data was considered to be of limited usefulness. Therefore, indications of statistical significance were removed from the tables and references to statistical tests were removed from the footnotes.

Table G11: A new table, Table G11, has been added to provide the protein concentrations of the homogenates used for analysis of free 8-isoprostane and cytokines in oral cavity and duodenum.

Attachment G3: A new attachment, Attachment G3, has been added to provide manufacturer's instructions for the BCA protein assay kit used to determine the protein concentrations of the homogenates used for analysis of 8-isoprostane and cytokines in oral cavity and duodenum.

Submitted by:

4/1/11

Richard D. May, Ph.D. — Date
Immunologist
Southern Research

Immunology Contributing Scientist Report for

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

(Amendment)

Pages 10-11 and 12 (Tables G1 and G2): The column headers for transferrin in these two tables incorrectly listed the units as "ng/mL." The headers have now been corrected to read "mg/mL.". In addition, for clarification, the headings that read "Transfer" were changed to "Transferrin."

Pages 17-24 and 39-46 (Tables G5 and G9): Several of the cytokine/chemokine values in the original individual animal data tables were incorrect, and have been corrected as shown.

Group	Animal	Matrix	Cytokine	(Original) Incorrect Value	(Changed to) Correct Value
2	98	Serum	G-CSF	118.0	118.6
3	180	Serum	IL-6	3.5	3.4
6	416	Serum	IP-10	45.6	75.6
6	417	Serum	KC	27.8	21.8
7	499	Serum	IL-1β	67.1	67.4
3	189	Duodenum	IL-1α	88.8	BDL
3	189	Duodenum	IL-1β	BDL	88.8
7	499	Duodenum	IL-12(p70)	2.1	5.1
7	508	Duodenum	KC	BDL	15.0
7	508	Duodenum	MCP-1	15.0	BDL

Pages 17-24, 28-35, 39-46 (Tables G5, G7, and G9): The footnotes on the individual animal data tables for cytokines/chemokines in the serum, oral cavity, and duodenum originally stated incorrectly that "A value of 3.2 was used in the calculation of the group mean and SD for groups containing BDL samples." This portion of the footnote has been removed from each of these three tables.

Pages 25-27, 36-38, 47-49 (Tables G6, G8, and G10): The group mean and SD values have been revised based on the changes in the individual values noted above.

Pages 47-49 (Table G10): The word "Homogenates" was not included in the title. The title of the table has been corrected and now reads, "Summary Cytokine/Chemokine Analysis of Duodenum Homogenates."

Submitted by:

2/2/11

Richard D. May, Ph.D. — Date
Immunologist
Southern Research

TABLE OF CONTENTS

LIST OF TABLES AND ATTACHMENTS

1.0 SIGNATURE PAGE

Immunology Contributing Scientist Report for

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

Southern Research Study Number: 13026.01.01

12/27/10

Richard D. May, Ph.D. Date
Immunologist
Southern Research

2.0 INTRODUCTION

The objective of this aspect of the study was to examine Day 91 samples, as follows: (1) ferritin and transferrin plasma levels from selected study animals by enzyme-linked immunosorbent assay (ELISA), (2) 8-iso-prostaglandin F2α (8-isoprostane, or 8-iso) levels of oral cavity and duodenum homogenates from selected study animals by ELISA, (3) 8-hydroxydeoxyguanosine (8-OHdG) levels in the DNA extracted from oral cavity and duodenum tissues from selected study animals by ELISA, and (4) cytokines/chemokines levels in serum and oral cavity and duodenum homogenates by multiplexing.

3.0 METHODS AND MATERIALS

Homogenate Preparation of Oral Cavity and Duodenum Tissues: Protease Inhibitor Cocktail I [containing 4-(2-Aminoethyl) benzenesulfonyl fluoride hydrochloride (AEBSF), EDTA, bestatin, E-64, leupeptin, and aprotinin] was obtained from Millipore Corporation (Billerica, MA). Tris, Tween 20, and NaCl were purchased from Sigma-Aldrich (St. Louis, MO). Phenylmethanesulfonyl fluoride (PMSF) was purchased from MP Biomedicals (Santa Ana, CA). 2-Propanol and NaOH were obtained from Fisher Scientific (Pittsburgh, PA). Homogenization buffer solution was prepared by weighing out PMSF and dissolved in 2-propanol. The solution was vortexed ~30 seconds and set aside. Tris was weighed and transferred to a beaker, to which deionized (DI) water was added. While stirring, the pH was adjusted to 7.5 with 1N NaOH. NaCl, Tween 20, and 1 mL of the PMSF/2-propanol solution were added to the Tris/DI water solution. Protease Inhibitor Cocktail I was reconstituted by the addition of 10 mL of DI water, vortexed ~30 seconds, and added to the Tris/DI water/NaCl/Tween 20/PMSF solution. The final solution was stirred ~7 minutes to insure uniform mixture. The final solution was clear. The final concentrations of the constituents in the homogenization buffer were 20 mmol/L Tris, 150 mmol/L NaCl, 1% 2-propanol, 0.174 mg/mL PMSF, 0.05% Tween-20, 2 mM AEBSF, 1 mM EDTA, 130 μM bestatin, 14 μM E-64, 1 μM leupeptin, and 0.3 μM aprotinin. Tissues were then homogenized in 0.3 mL using an Omni THQ homogenizer (Omni International, Kennesaw, GA) and a disposable hard tissue tip. After homogenization, samples were frozen at -80 °C until the supernatants were assayed for free 8-isoprostane and various cytokines and chemokines, as described below.

DNA Extraction of Oral Cavity and Duodenum Tissues: Gentra PureGene Tissue Kits were purchased from Qiagen (Valencia, CA) and used to extract DNA from the tissues. 300 µL of cell lysis buffer (included in the Qiagen kit) were added to each tissue vial. The tissues were then homogenized using the Omni THQ homogenizer and a disposable hard tissue tip. DNA was then extracted following the manufacturer's instructions. Genomic DNA samples were rehydrated with 50 µL of DNA hydration solution (included in the Qiagen kit). DNA concentrations were then determined using the PicoGreen kit (Invitrogen (Carlsbad, CA) and a Bio-Rad Versafluor fluorimeter (Hercules, CA). Extracted DNA was dissolved in water and converted to single-stranded DNA by incubating the samples at 95 ºC for 5 minutes and then chilling them on ice. After this, samples were digested to nucleosides by incubating the denatured DNA with 20 units of nuclease P1 (Sigma-Aldrich) for 2 hours at 37 ºC in 20 mM sodium acetate, pH 5.2, followed by treatment with 10 units of alkaline phosphatase (Sigma-Aldrich) for 1 hour at 37 ºC in 100 mM Tris, pH 7.5. Finally, the reaction mixture was centrifuged for 5 minutes at 6000 x g; samples were frozen at -80 °C until they were assayed for 8-OHdG, as described below.

Ferritin, Transferrin, 8-Isoprostane, and 8-OHdG ELISAs: Commercial ELISA kits to measure mouse ferritin and transferrin in plasma were purchased from ALPCO (Salem, NH). Commercial ELISA kits to measure 8-isoprostane and 8-OHdG in oral cavity and duodenum homogenates were obtained from Cell Biolabs (San Diego, CA). These assays were performed according to the manufacturer's instructions, except as noted below; kit inserts are included in Attachment G1. For assays of 8-isoprostane, the hydrolysis step (samples are incubated at 45 ºC for 2 hours with 1 part 10 N NaOH for every 4 parts of liquid sample, followed by the addition of 100 µL of 10 N HCl per 500 µL of hydrolyzed sample) that is a part of the homogenate preparation was omitted. As a result, the assay measured free 8-isoprostane levels rather than total 8-isoprostane levels.

The 8-OHdG ELISA assays were performed twice. For the first assay run, the step in which extracted DNA is converted to single-stranded DNA, as described above, was inadvertently omitted. When this error was discovered, the residual oral cavity and duodenum homogenate samples were thawed and the assays were repeated with the conversion step included. The results of the first assay were considered to be invalid based on conversations with the manufacturer of the ELISA kit (documented in the study records). According to the kit manufacturer, the freezing and subsequent re-thawing of the samples for the second assay should have no impact on the outcome of the assay. The results from the repeat assay are reported herein.

Cytokine/Chemokine Analyses: A Milliplex kit was purchased from Millipore. Oral cavity and duodenum homogenates and sera were analyzed for the 22 cytokines/chemokines listed below on a Luminex 200 (Austin, TX). These assays were performed according to the manufacturer's instructions; kit inserts are included in Attachment G2.

Protein Assay: Protein content was measured in the homogenates used for analysis of 8-isoprostane and cytokines/chemokines, using a Micro-BCA Protein Assay Kit purchased from Thermo Scientific (Rockford, IL). The assays were performed according to the manufacturer's instructions, which are included in Attachment G3.

Statistics: Statistics were performed using Provantis, utilizing ANOVA and the Dunnett Test for significance. For 8-OHdG samples that had DNA levels below the minimum recommended by the kit manufacturer, values of ng 8-OHdG/mg DNA were calculated but were not included in the calculation of group means and standard deviations or in the statistical analysis of the data.

Cytokines and Chemokines Analyzed in this Study

Complete Name	Abbreviation
Granulocyte-colony stimulating factor	G-CSF
Granulocyte/macrophage-colony stimulating factor	GM-CSF
Interferon-gamma	IFN-γ
Interleukin-1-alpha	IL-1α
Interleukin-1-beta	IL-1β
Interleukins 2, 4, 5, 6, 7, 9, and 10	IL-2, IL-4, IL-5, IL-6, IL-7, IL-9, and IL-10
Interleukin 12 p70 subunit	IL-12 (p70)
Interleukins 13, 15, and 17	IL-13, IL-15, IL-17
Chemokine (C-X-C motif) ligand 10 or IFN-γ-induced protein 10	CXCL10 or IP-10
chemokine (C-X-C motif) ligand 1	CXCL1, GROα, or KC

monocyte chemotactic protein-1	MCP-1
macrophage inflammatory protein-1-alpha	MIP-1α
chemokine (C-C motif) ligand 5	CCL5 or RANTES
Tumor necrosis factor-alpha	TNF-α

4.0 RESULTS AND DISCUSSION

Iron Analysis (Ferritin and Transferrin Plasma Levels): Plasma samples prepared from blood taken on Day 91 were diluted with kit assay buffer at 1:40 for ferritin and at 1:100,000 for transferrin and were assayed in an effort to examine iron analysis following treatment with sodium dichromate dihydrate (SDD). The individual and summary data are presented in Table G1 and Table G2, respectively. The statistical analyses indicated that there were no differences among the groups in terms of circulating ferritin or transferrin levels.

8-Isoprostane Levels in Oral Cavity and Duodenum Homogenates: Homogenates of oral cavity and duodenum tissues taken on Day 91 were diluted 1:10 with kit assay buffer and were analyzed for free 8-isoprostane in an effort to determine if SDD treatment caused any oxidative stress, as assessed by this eicosanoid. The individual and summary data are presented in Table G3 and Table G4, respectively. As noted above, the hydrolysis step that is a part of the homogenate preparation was omitted, and as a result, the assay measured free 8-isoprostane levels rather than total 8-isoprostane levels. It has been reported that less than half of the total isoprostane in plasma is present in the free (non-esterified) form.[(1)] Thus, the measurement of only free 8-isoprostane may not completely reflect the impact of Cr(VI) exposure on levels of this molecule. The Study Director felt that presentation of statistical analysis of the data may suggest a greater degree of certainty about the effects of Cr(VI) on 8-isoprostane than the data warrant. Therefore, statistical analysis of the 8-isoprostane data is not presented. The data suggest that in the oral cavity there were no apparent inter-group differences in the levels of free 8-isoprostane. Similarly, the data suggest that in the duodenum there were no apparent differences among groups dosed with 0 to 60 mg/L of SDD. However, the levels of free 8-isoprostane in samples from Groups 6-7 appeared to be higher than those in the control and lower dose groups . The relationship of this apparent difference to Cr(VI) administration cannot be determined.

8-OHdG Levels in Oral Cavity and Duodenum Tissues: DNA samples that had been extracted from oral cavity and duodenum tissues taken on Day 91 were diluted with kit assay buffer and were analyzed for 8-OHdG in an effort to determine if SDD treatment caused any oxidative DNA damage, as assessed by assaying for this marker of oxidative stress. The results from the assay were normalized to the amount of DNA in each sample; individual results are presented in Table G3 and summary results are presented in Table G4. There were no statistically or biologically significant changes in 8-OHdG levels in either oral cavity or duodenum.

Cytokine/Chemokine Levels in Serum, Oral Cavity, and Duodenum: Undiluted serum and homogenates of oral cavity and duodenum tissues taken on Day 91 were analyzed for their levels of 22 cytokines/chemokines by multiplexing. As shown in Table G5 (individual data) and Table G6 (summary data), many of the analytes were at low or background levels in the serum. Those with notable levels were G-CSF, GM-CSF, IL-1α, IL-13, IL-15, IP-10, KC (the murine equivalent of human IL-8), MIP-1α, and RANTES. However, there appeared to be no differences among the groups in terms of these or the other cytokines/chemokines in the serum. As shown in Table G7 (individual data) and Table G8 (summary data), most of the analytes were at low or background levels in the oral cavity homogenates. Those with notable levels were G-CSF, IL-1α, IL-6, IL-15, IP-10, and KC. Other than somewhat lower levels of IL-15 in Groups 3 and 4 (4 and 14 mg/L of SDD), there appeared to be no differences among the groups in terms of these or the other cytokines/chemokines in the oral cavity homogenates. That the levels of IL-15 in Groups 5-7 were not different from the vehicle control suggested that the results seen in Group 3 and 4 were not biologically significant for IL-15 in the oral cavity homogenates. As shown in Table G9 (individual data) and Table G10 (summary data), most of the analytes were at low or background levels in the duodenum homogenates. Those with notable levels were GM-CSF, IL-1α, IL-1β, IL-9, IL-15, IP-10, KC, MIP-1α, MCP-1, and RANTES. However, other than the results for IL-1β, there appeared to be no differences among the groups in terms of these or the other cytokines/chemokines in the duodenum homogenates. For the inflammatory cytokine IL-1β, there was an apparent decrease in all SDD-treated groups in comparison with the vehicle control group.

Protein Concentrations in Tissue Homogenates: The results of the protein assays performed on tissue homogenates used for assay of 8-isoprostane and cytokines/chemokines are presented in Table G11.

5.0 CONCLUSIONS

The objective of this phase of the study was to examine Day 91 samples for: 1) ferritin and transferrin plasma levels to look at iron content, 2) free 8-isoprostane levels of oral cavity and duodenum homogenates of selected study animals by ELISA, 3) 8-OHdG levels of the DNA extracted from oral cavity and duodenum tissues and 4) cytokines/chemokines levels in serum and oral cavity and duodenum homogenates. The major findings of this part of the study were:

1) Ferritin and transferrin plasma levels did not appear to be altered from the vehicle control in any of the SDD treatment groups.

2) Free 8-isoprostane levels measured in the oral cavity homogenates of animals from SDD treatment groups were similar to those in samples from the vehicle control group.

3) Free 8-isoprostane levels measured in the duodenum homogenates of animals in SDD treatment groups whose doses ranged from 0.3 to 60 mg/L were similar to those from the vehicle control group.. However, the levels of free 8-isoprostane measured in the duodenum homogenates from animals in Groups 6-7 appeared to be higher than those in the control and lower dose groups.

4) 8-OHdG levels in oral cavity and duodenum tissues, expressed in terms of ng 8-OHdG/mg DNA, did not appear to be altered from the vehicle control in any of the SDD treatment groups.

5) Other than an apparent decrease in the inflammatory cytokine IL-1β in the duodenum in all groups treated with SDD, no other remarkable changes occurred in the serum,

oral cavity, or duodenum of any of the groups with respect to the 22 cytokines/chemokines analyzed.

6.0 PARTICIPATING PERSONNEL

Parrish L. Payne, B.S.

Nicolas W. Powers, M.S.

Richard D. May, Ph.D.

7.0 REFERENCE

1. Morrow, J.D., Frei, B., Longmire, A.W., Gaziano, J.M., Lynch, S.M., Shyr, Y., Strauss, W.E., Oates, J.A., Roberts, L.J. 2nd. (1995). Increase in circulating products of lipid peroxidation (F_2-isoprostane) in smokers. *N. Eng. J. Med.* **332,** 1198-1203.

Table G1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Plasma Ferritin and Transferrin Levels

Day: 92 relative to Start Date

Group	Sex	Animal	Ferritin Levels ng/mL	Transferrin Levels mg/mL
1	f	76	453.00	3.84
		77	424.00	3.54
		78	429.00	3.55
		79	321.00	3.66
		80	341.00	3.75
2	f	156	375.00	3.59
		157	355.00	3.75
		158	367.00	3.44
		159	482.00	3.29
		160	392.00	4.13
3	f	236	283.00	3.86
		237	307.00	3.69
		238	323.00	3.33
		239	455.00	4.08
		240	382.00	3.60
4	f	316	254.00	3.81
		317	413.00	3.40
		318	301.00	3.42
		319	345.00	3.44
		320	BDL	3.55

BDL = Below detectable level (i.e., less than the lowest standard in the ELISA kit, which was 6.25 ng/mL).
A value of 6.25 was used in the calculation of the group mean and SD for groups containing BDL samples.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Plasma Ferritin and Transferrin Levels

Day: 92 relative to Start Date

Group	Sex	Animal	Ferritin Levels ng/mL	Transferrin Levels mg/mL
5	f	396	246.00	3.60
		397	319.00	3.72
		398	249.00	3.67
		399	223.00	3.54
		400	279.00	3.49
6	f	476	307.00	3.34
		477	275.00	3.30
		478	594.00	3.67
		479	310.00	3.70
		480	273.00	3.70
7	f	556	377.00	3.77
		557	411.00	3.72
		558	272.00	2.97
		559	303.00	5.02
		560	222.00	3.40

BDL = Below detectable level (i.e., less than the lowest standard in the ELISA kit, which was 6.25 ng/mL).
A value of 6.25 was used in the calculation of the group mean and SD for groups containing BDL samples.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G2

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary of Plasma Ferritin and Transferrin Levels

Day: 92 relative to Start Date

Group	Sex		Ferritin Levels ng/mL	Transferrin Levels mg/mL
1	f	Mean	393.600	3.668
		S.D.	58.616	0.129
		N	5	5
2	f	Mean	394.200	3.640
		S.D.	50.889	0.323
		N	5	5
3	f	Mean	350.000	3.712
		S.D.	69.130	0.281
		N	5	5
4	f	Mean	328.250	3.524
		S.D.	67.623	0.170
		N	4	5
5	f	Mean	263.200	3.604
		S.D.	37.003	0.093
		N	5	5
6	f	Mean	351.800	3.542
		S.D.	136.494	0.204
		N	5	5
7	f	Mean	317.000	3.776
		S.D.	76.945	0.765
		N	5	5

Statistics Test: One Way Analysis of Variance: * - 5% significance level

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual 8-OHdG and 8-Isoprostane Analyses in Tissue Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	8-OHdG Oral Cav ng/mg DNA	8-OHdG Duodenum ng/mg DNA	8-Iso Oral Cav ng/mL	8-Iso Duodenum ng/mL
1	f	16	102	209	4.87	24.30
		17	143	244	3.61	20.50
		18	1733*	219	3.80	10.30
		19	106	160	3.18	20.90
		20	113	189	4.31	29.20
		26	155	254	4.08	28.50
		27	90*	221	2.59	19.00
		28	136	209	2.61	38.30
		29	212	284	0.76	20.70
		30	773	320	2.12	27.00
2	f	96	98	167	3.32	34.80
		97	339	268	2.90	31.70
		98	185	234	4.54	30.90
		99	103	144	5.99	24.80
		100	98	201	3.66	21.20
		106	826	184	2.15	20.50
		107	499	149	3.57	29.20
		108	712	200	2.30	18.10
		109	454	198	1.50	24.10
		110	743	185	1.29	28.20
3	f	176	105	263	4.21	30.00
		177	92	207	1.14	20.40
		178	91	207	1.81	29.90
		179	105	236	3.18	25.40
		180	141	200	2.21	25.00
		186	7622*	190	0.92	23.70
		187	420	263	1.92	24.00
		188	1137	175	1.53	27.50
		189	385	477	2.77	20.10
		190	5065*	221	1.51	17.00

* – The DNA concentration for this sample was such that the amount of DNA in the reaction was lower than the limit recommended by the manufacturer of the ELISA kit (2 μg/reaction). This value was excluded from calculation of the group mean and SD.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual 8-OHdG and 8-Isoprostane Analyses in Tissue Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	8-OHdG Oral Cav ng/mg DNA	8-OHdG Duodenum ng/mg DNA	8-Iso Oral Cav ng/mL	8-Iso Duodenum ng/mL
4	f	256	127	1034*	2.48	5.60
		257	117	234	4.74	11.80
		258	117	371	3.34	28.10
		259	78	249	3.79	5.60
		260	90	269	4.48	29.90
		266	733	185	2.34	31.30
		267	829	189	1.84	30.40
		268	440	295	3.03	20.20
		269	445	222	1.45	23.20
		270	1006	227	2.12	21.70
5	f	336	128	384	2.77	45.70
		337	99	199	2.28	24.90
		338	58	226	3.06	34.40
		339	57	174	3.28	41.00
		340	107	213	3.87	26.20
		346	229	397	1.48	25.30
		347	1023	341	1.63	53.00
		348	489	255	1.96	22.60
		349	219	417	2.50	46.70
		350	634	288	2.43	23.50
6	f	416	53	571	4.40	21.60
		417	102	184	3.68	37.60
		418	43	543	2.89	41.10
		419	46	204	4.22	26.40
		420	155*	281	2.15	25.90
		426	753	264	3.99	57.60
		427	422	152	3.37	49.50
		428	447	240	1.67	62.20
		429	284	238	2.87	56.10
		430	224	207	3.96	46.70

* – The DNA concentration for this sample was such that the amount of DNA in the reaction was lower than the limit recommended by the manufacturer of the ELISA kit (2 µg/reaction). This value was excluded from calculation of the group mean and SD.

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual 8-OHdG and 8-Isoprostane Analyses in Tissue Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	8-OHdG in Duodenum ng/mL	8-OHdG in Oral Cav ng/mL	8-Iso in Oral Cav ng/mL	8-Iso in Duodenum ng/mL
7	f	496	155	260	1.96	48.60
		497	158	234	1.84	48.80
		498	83	208	3.89	49.60
		499	127	276	4.08	41.70
		500	182	210	3.03	60.50
		506	1424	255	2.93	40.70
		507	194	336	2.68	66.10
		508	413	308	3.60	.
		509	970*	12205*	2.27	44.00
		510	356	220	2.24	52.10

* – The DNA concentration for this sample was such that the amount of DNA in the reaction was lower than the limit recommended by the manufacturer of the ELISA kit (2 µg/reaction). This value was excluded from calculation of the group mean and SD.

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table G4

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary of 8-OHdG and 8-Isoprostane Analyses in Tissue Homogenates

Day: 91 relative to Start Date

Group	Sex		8-OHdG Duodenum ng/mg DNA	8-OHdG Oral Cav ng/mg DNA	8-Iso Duodenum ng/mL	8-Iso Oral Cav ng/mL
1	f	Mean	230.9	217.5	23.870	3.193
		S.D.	46.5	227.2	7.499	1.209
		N	10	8	10	10
2	f	Mean	193.0	405.7	26.350	3.122
		S.D.	37.4	284.7	5.462	1.431
		N	10	10	10	10
3	f	Mean	243.9	309.5	24.300	2.120
		S.D.	86.9	360.5	4.248	1.010
		N	10	8	10	10
4	f	Mean	249.0	398.2	20.780	2.961
		S.D.	57.6	349.6	9.936	1.114
		N	9	10	10	10
5	f	Mean	289.4	304.3	34.330	2.526
		S.D.	89.4	317.3	11.386	0.746
		N	10	10	10	10
6	f	Mean	288.4	263.8	42.470	3.320
		S.D.	146.6	241.5	14.396	0.910
		N	10	9	10	10
7	f	Mean	256.3	343.6	50.233	2.852
		S.D.	44.3	419.2	8.429	0.799
		N	9	9	9	10

Statistics Test for 8-OHdG: Dunnett Test: * - 5% significance level (Group 1 to Groups 2-7)
Because the 8-isoprostane data reflect only free 8-isoprostane, statistical analysis results for 8-isoprostane are not included in this table.
Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G5

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Serum

Day: 91 relative to Start Date

Group	Sex	Animal	G-CSF pg/mL	GM-CSF pg/mL	IFN-γ pg/mL	IL-10 pg/mL	IL-12(p70) pg/mL	IL-13 pg/mL	IL-15 pg/mL	IL-17 pg/mL	IL-1α pg/mL	IL-1ß pg/mL	IL-2 pg/mL
1	f	16	87.3	65.7	BDL	BDL	BDL	25.3	26.4	BDL	9.5	BDL	BDL
		17	141.0	27.8	BDL	BDL	BDL	14.1	28.0	BDL	1789.4	BDL	BDL
		18	242.9	65.7	6.9	BDL	3.9	28.2	16.0	BDL	18.5	BDL	6.1
		19	227.2	22.0	BDL	BDL	5.9	19.7	51.0	BDL	60.8	BDL	BDL
		20	109.4	BDL	10.8	BDL	6.9	31.0	66.9	BDL	92.0	BDL	BDL
		26	237.7	32.7	4.6	BDL	BDL	28.2	3.2	BDL	54.2	BDL	BDL
		27	129.8	BDL	BDL	BDL	8.7	16.9	12.2	BDL	44.6	BDL	BDL
		28	192.4	65.7	BDL	BDL	3.9	11.3	BDL	BDL	81.9	4.8	BDL
		29	231.7	27.8	BDL	BDL	BDL	14.1	143.4	BDL	11.8	BDL	BDL
		30	193.9	BDL	BDL	BDL	BDL	16.9	BDL	BDL	27.1	BDL	BDL
2	f	96	159.5	BDL	BDL	BDL	BDL	16.9	17.8	BDL	25.0	BDL	BDL
		97	219.4	22.0	BDL	BDL	BDL	25.3	14.2	BDL	46.9	BDL	BDL
		98	118.6	BDL	BDL	BDL	BDL	22.5	BDL	BDL	620.3	BDL	BDL
		99	154.3	BDL	BDL	BDL	BDL	19.7	17.8	BDL	143.4	BDL	BDL
		100	199.3	BDL	BDL	BDL	6.9	19.7	10.2	8.1	63.4	BDL	BDL
		106	267.4	183.3	31.7	BDL	31.7	42.5	17.8	BDL	15.6	7.9	19.2
		107	148.6	177.9	BDL	BDL	6.1	13.0	15.4	BDL	14.9	BDL	BDL
		108	213.5	BDL	BDL	BDL	BDL	16.9	BDL	BDL	51.6	4.8	BDL
		109	94.5	57.5	BDL	14.9	BDL	16.9	12.2	BDL	6.4	BDL	BDL
		110	195.5	27.8	BDL	BDL	BDL	14.1	19.6	BDL	7.2	BDL	BDL

* = Result to left has an associated comment or marker
BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G5

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Serum

Day: 91 relative to Start Date

Group	Sex	Animal	G-CSF pg/mL	GM-CSF pg/mL	IFN-γ pg/mL	IL-10 pg/mL	IL-12(p70) pg/mL	IL-13 pg/mL	IL-15 pg/mL	IL-17 pg/mL	IL-1α pg/mL	IL-1ß pg/mL	IL-2 pg/mL
3	f	176	151.5	BDL	BDL	BDL	BDL	16.9	BDL	BDL	520.6	BDL	BDL
		177	184.7	27.8	BDL	BDL	6.9	21.1	23.0	BDL	68.2	3.2	BDL
		178	218.9	BDL	BDL	BDL	BDL	22.5	19.6	BDL	BDL	4.8	BDL
		179	129.6	BDL	BDL	BDL	BDL	14.1	52.5	BDL	4.7	BDL	BDL
		180	123.8	151.3	20.4	3.7	21.9	48.2	23.0	BDL	697.8	BDL	10.2
		186	113.1	22.0	BDL	BDL	15.0	22.5	BDL	BDL	22.5	3.2	BDL
		187	365.9	BDL	BDL	BDL	BDL	14.1	BDL	BDL	63.4	BDL	BDL
		188	134.8	BDL	BDL	BDL	BDL	31.0	1406.9	BDL	105.4	BDL	BDL
		189	161.1	14.6	9.6	BDL	BDL	31.0	12.2	BDL	38.2	31.9	BDL
		190	177.0	14.6	BDL	BDL	20.2	14.1	3.2	BDL	BDL	4.8	BDL
4	f	256	78.1	BDL	BDL	BDL	BDL	19.7	16.0	BDL	333.4	BDL	BDL
		257	153.3	BDL	BDL	BDL	5.9	16.9	47.4	BDL	10000.0	BDL	BDL
		258	217.0	32.7	BDL	BDL	BDL	16.9	BDL	BDL	128.0	BDL	BDL
		259	109.1	14.6	BDL	11.7	BDL	19.7	BDL	BDL	541.7	BDL	BDL
		260	174.6	BDL	BDL	BDL	BDL	22.5	14.2	BDL	44.6	BDL	BDL
		266	121.0	BDL	BDL	BDL	3.9	11.3	3.2	BDL	100.1	BDL	BDL
		267	146.4	32.7	BDL	BDL	BDL	14.1	BDL	BDL	27.8	BDL	BDL
		268	160.5	41.0	BDL	BDL	BDL	11.3	BDL	BDL	116.1	BDL	9.0
		269	79.3	14.6	BDL	BDL	3.9	11.3	12.2	BDL	34.1	BDL	BDL
		270	137.0	98.2	BDL	BDL	BDL	16.9	BDL	BDL	23.6	BDL	BDL

* = Result to left has an associated comment or marker
BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G5

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Serum

Day: 91 relative to Start Date

Group	Sex	Animal	G-CSF pg/mL	GM-CSF pg/mL	IFN-γ pg/mL	IL-10 pg/mL	IL-12(p70) pg/mL	IL-13 pg/mL	IL-15 pg/mL	IL-17 pg/mL	IL-1α pg/mL	IL-1ß pg/mL	IL-2 pg/mL
5	f	336	181.1	BDL	BDL	BDL	23.5	16.9	5.8	BDL	19.3	3.2	BDL
		337	57.9	14.6	16.3	BDL	6.9	48.2	14.2	BDL	BDL	BDL	6.9
		338	102.4	BDL	BDL	BDL	BDL	16.9	5.8	BDL	BDL	BDL	BDL
		339	150.2	BDL	7.7	BDL	5.9	31.0	61.2	BDL	4.3	BDL	BDL
		340	144.4	BDL	BDL	BDL	BDL	19.7	8.1	BDL	42.9	BDL	BDL
		346	132.5	14.6	BDL	19.0	10.1	8089.2	5.8	13.0	2183.4	72.4	BDL
		347	83.7	125.2	BDL	BDL	BDL	14.1	36.7	BDL	11.8	BDL	BDL
		348	303.3	32.7	BDL	BDL	BDL	14.1	24.7	BDL	3.9	BDL	BDL
		349	126.5	BDL	BDL	BDL	BDL	14.1	17.8	BDL	61.4	BDL	BDL
		350	205.9	22.0	BDL	BDL	5.9	14.1	BDL	BDL	38.2	BDL	BDL
6	f	416	76.4	BDL	BDL	BDL	BDL	5.8	BDL	BDL	42.2	BDL	BDL
		417	95.2	BDL	BDL	23.0	129.6	16.9	BDL	15.7	360.7	62.2	BDL
		418	147.2	BDL	BDL	BDL	4.9	16.9	10.2	BDL	102.9	4.8	BDL
		419	87.4	BDL	BDL	BDL	3.9	11.3	5.8	BDL	33.4	BDL	BDL
		420	116.1	BDL	BDL	BDL	6.9	19.7	3.2	BDL	BDL	3.2	BDL
		426	169.0	BDL	BDL	BDL	BDL	16.9	BDL	BDL	11.5	BDL	BDL
		427	249.0	BDL	BDL	BDL	BDL	8.5	BDL	BDL	43.9	BDL	BDL
		428	108.5	BDL	BDL	BDL	11.5	16.9	BDL	BDL	BDL	BDL	BDL
		429	278.4	BDL	BDL	BDL	BDL	11.3	5.8	BDL	29.2	BDL	BDL
		430	272.6	14.6	BDL	BDL	BDL	16.9	BDL	BDL	BDL	BDL	BDL

* = Result to left has an associated comment or marker
BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table G5

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Serum

Day: 91 relative to Start Date

Group	Sex	Animal	G-CSF pg/mL	GM-CSF pg/mL	IFN-γ pg/mL	IL-10 pg/mL	IL-12(p70) pg/mL	IL-13 pg/mL	IL-15 pg/mL	IL-17 pg/mL	IL-1α pg/mL	IL-1ß pg/mL	IL-2 pg/mL
7	f	496	94.1	BDL	BDL	BDL	9.7	14.1	BDL	BDL	10000.0	49.6	BDL
		497	101.2	27.8	BDL	BDL	BDL	14.1	64.1	BDL	94.8	BDL	BDL
		498	114.3	BDL	BDL	BDL	BDL	22.5	BDL	BDL	40.5	BDL	BDL
		499	95.9	22.0	BDL	22.0	198.7	19.7	BDL	23.7	531.1	67.4	BDL
		500	94.2	BDL	BDL	BDL	3.9	14.1	18.7	BDL	7.2	BDL	BDL
		506	160.0	27.8	BDL	39.5	214.2	22.5	BDL	41.3	47.9	75.5	BDL
		507	225.6	65.7	BDL	BDL	6.9	14.1	BDL	BDL	55.5	3.2	BDL
		508	108.8	37.1	BDL	BDL	BDL	11.3	BDL	BDL	14.5	6.4	BDL
		509	149.9	BDL	BDL	5.0	14.2	11.3	BDL	BDL	44.2	13.4	BDL
		510	306.6	14.6	20.6	5.0	1699.8	11420.6	527.9	275.3	70.5	6.4	10.9

* = Result to left has an associated comment or marker
BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G5

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Serum

Day: 91 relative to Start Date

Group	Sex	Animal	IL-4 pg/mL	IL-5 pg/mL	IL-6 pg/mL	IL-7 pg/mL	IL-9 pg/mL	IP-10 pg/mL	KC pg/mL	MCP-1 pg/mL	MIP-1α pg/mL	RANTES pg/mL	TNF-α pg/mL
1	f	16	BDL	8.5	3.2	BDL	BDL	84.3	31.6	13.0	19.3	18.9	BDL
		17	BDL	9.1	BDL	BDL	1241.6	68.1	55.9	10.8	8.1	32.0	BDL
		18	BDL	16.7	BDL	BDL	BDL	77.2	11.4	6.5	86.9	12.6	BDL
		19	BDL	15.1	BDL	BDL	BDL	81.0	37.7	10.0	19.3	14.1	BDL
		20	BDL	11.5	BDL	3.2	BDL	329.0	47.7	10.0	23.4	22.2	BDL
		26	BDL	8.5	BDL	BDL	134.2	274.9	43.7	8.3	14.4	28.9	BDL
		27	BDL	5.2	BDL	BDL	BDL	72.8	36.1	6.5	BDL	14.6	BDL
		28	BDL	5.2	BDL	19.0	BDL	69.1	9.7	10.0	BDL	9.2	BDL
		29	BDL	8.0	BDL	BDL	BDL	67.8	49.0	8.3	8.1	18.9	BDL
		30	BDL	7.1	BDL	BDL	BDL	84.0	27.5	3.2	8.1	15.4	BDL
2	f	96	BDL	9.1	BDL	12.0	BDL	62.5	20.3	6.5	14.4	4.8	BDL
		97	BDL	11.6	9.5	BDL	BDL	105.0	5.9	7.4	19.3	11.8	BDL
		98	BDL	9.1	BDL	BDL	BDL	81.3	54.7	14.4	14.4	25.9	BDL
		99	BDL	10.2	BDL	BDL	BDL	92.7	42.9	14.4	19.3	22.4	BDL
		100	BDL	8.1	BDL	BDL	1185.2	90.8	17.3	11.5	14.4	29.4	BDL
		106	BDL	6.1	BDL	BDL	BDL	63.7	43.2	33.9	239.5	11.6	7.1
		107	BDL	16.1	11.0	BDL	BDL	68.4	8.2	13.4	BDL	11.1	BDL
		108	BDL	5.2	BDL	BDL	BDL	105.8	25.3	10.0	8.1	14.6	BDL
		109	BDL	12.8	8.6	BDL	BDL	133.8	33.1	92.2	14.4	28.8	BDL
		110	BDL	10.8	BDL	BDL	BDL	67.7	17.1	10.0	14.4	12.6	BDL

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BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
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Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Serum

Day: 91 relative to Start Date

Group	Sex	Animal	IL-4 pg/mL	IL-5 pg/mL	IL-6 pg/mL	IL-7 pg/mL	IL-9 pg/mL	IP-10 pg/mL	KC pg/mL	MCP-1 pg/mL	MIP-1α pg/mL	RANTES pg/mL	TNF-α pg/mL
3	f	176	BDL	10.4	BDL	BDL	BDL	95.5	27.5	21.8	8.1	30.0	BDL
		177	BDL	24.2	BDL	BDL	BDL	91.6	45.9	6.5	23.4	23.7	BDL
		178	BDL	6.9	BDL	BDL	BDL	114.4	58.6	10.0	27.1	7.5	BDL
		179	BDL	10.2	3.6	14.0	BDL	77.0	14.9	6.5	8.1	6.5	BDL
		180	BDL	11.2	3.4	BDL	111.7	48.3	135.8	19.4	154.3	24.7	BDL
		186	BDL	3.6	BDL	BDL	BDL	80.3	10.4	10.0	23.4	29.8	BDL
		187	BDL	4.5	9.9	BDL	BDL	67.9	36.4	BDL	8.1	13.8	BDL
		188	BDL	10.1	BDL	98.1	BDL	67.4	17.8	4.4	8.1	12.9	BDL
		189	BDL	BDL	BDL	BDL	BDL	324.1	52.1	11.5	28.9	31.6	BDL
		190	BDL	10.4	8.4	BDL	BDL	57.4	40.5	BDL	8.1	4.8	BDL
4	f	256	BDL	9.6	BDL	BDL	BDL	102.9	38.0	20.6	8.1	14.3	BDL
		257	BDL	7.1	BDL	BDL	BDL	69.5	41.5	9.2	23.4	14.6	BDL
		258	BDL	5.9	14.3	BDL	BDL	87.6	63.6	BDL	8.1	18.4	BDL
		259	BDL	6.1	BDL	28.1	BDL	84.8	64.4	8.3	19.3	12.9	BDL
		260	BDL	7.1	BDL	BDL	BDL	89.6	90.7	8.3	BDL	17.3	BDL
		266	BDL	5.6	BDL	BDL	32.7	87.2	33.6	6.5	14.4	14.3	BDL
		267	BDL	3.2	BDL	BDL	BDL	56.5	28.0	6.5	8.1	13.5	BDL
		268	BDL	17.7	BDL	BDL	BDL	67.8	24.7	4.4	8.1	30.5	BDL
		269	BDL	10.2	BDL	BDL	BDL	76.7	40.3	8.3	23.4	9.5	BDL
		270	BDL	13.5	BDL	BDL	BDL	62.5	26.5	BDL	19.3	20.3	BDL

* = Result to left has an associated comment or marker
BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
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Table G5

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Serum

Day: 91 relative to Start Date

Group	Sex	Animal	IL-4 pg/mL	IL-5 pg/mL	IL-6 pg/mL	IL-7 pg/mL	IL-9 pg/mL	IP-10 pg/mL	KC pg/mL	MCP-1 pg/mL	MIP-1α pg/mL	RANTES pg/mL	TNF-α pg/mL
5	f	336	BDL	9.7	9.3	BDL	BDL	67.3	15.6	10.0	BDL	13.2	BDL
		337	BDL	12.1	3.6	BDL	182.8	73.1	21.5	BDL	30.5	12.4	BDL
		338	BDL	31.6	BDL	BDL	BDL	69.3	8.8	11.5	BDL	9.7	BDL
		339	BDL	16.8	BDL	5.1	BDL	305.6	28.3	8.3	14.4	14.9	BDL
		340	BDL	8.2	BDL	BDL	BDL	88.2	49.1	BDL	14.4	14.9	BDL
		346	BDL	5.2	BDL	BDL	BDL	162.0	26.3	290.6	19.3	331.7	56.3
		347	BDL	1.3	20.0	BDL	BDL	56.3	28.8	BDL	8.1	11.5	BDL
		348	BDL	11.0	BDL	BDL	BDL	77.5	43.8	6.5	8.1	8.6	BDL
		349	BDL	14.4	BDL	BDL	BDL	63.1	29.6	BDL	14.4	6.5	BDL
		350	BDL	6.3	BDL	BDL	102.9	64.8	8.3	8.3	14.4	15.2	BDL
6	f	416	BDL	4.3	BDL	BDL	BDL	75.6	40.6	BDL	8.1	9.4	BDL
		417	4.90	16.7	8.0	BDL	BDL	86.3	21.8	29.1	23.4	18.9	15.2
		418	BDL	7.7	BDL	5.3	BDL	71.4	4.2	8.3	BDL	12.8	BDL
		419	BDL	6.7	BDL	BDL	BDL	55.2	26.6	BDL	14.4	10.0	BDL
		420	BDL	1.9	9.5	BDL	BDL	90.6	52.1	10.0	19.3	7.5	BDL
		426	BDL	11.7	BDL	BDL	BDL	70.0	33.8	6.5	BDL	11.8	BDL
		427	BDL	4.3	BDL	BDL	23.6	58.7	18.3	8.3	8.1	8.1	BDL
		428	BDL	10.6	BDL	BDL	BDL	78.7	50.2	8.3	8.1	BDL	BDL
		429	BDL	6.1	BDL	BDL	BDL	58.1	25.8	6.5	BDL	10.6	BDL
		430	BDL	5.2	BDL	BDL	BDL	83.1	32.6	BDL	BDL	BDL	BDL

* = Result to left has an associated comment or marker
BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G5

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Serum

Day: 91 relative to Start Date

Group	Sex	Animal	IL-4 pg/mL	IL-5 pg/mL	IL-6 pg/mL	IL-7 pg/mL	IL-9 pg/mL	IP-10 pg/mL	KC pg/mL	MCP-1 pg/mL	MIP-1α pg/mL	RANTES pg/mL	TNF-α pg/mL
7	f	496	BDL	8.7	3.4	BDL	BDL	115.8	53.5	132.5	30.5	18.6	37.2
		497	BDL	10.1	BDL	3.6	BDL	87.9	47.3	4.4	8.1	8.9	BDL
		498	BDL	6.9	3.4	BDL	BDL	90.1	56.9	BDL	19.3	13.5	BDL
		499	8.20	16.8	13.5	BDL	BDL	92.1	32.5	19.4	23.4	18.8	10.1
		500	BDL	13.5	BDL	BDL	BDL	70.9	35.1	BDL	8.1	16.3	BDL
		506	14.70	27.3	13.1	BDL	BDL	65.4	13.1	18.2	8.1	9.1	7.1
		507	BDL	7.1	13.3	BDL	BDL	71.1	16.9	34.4	19.3	14.9	BDL
		508	BDL	6.3	BDL	BDL	BDL	70.4	23.6	BDL	11.5	22.2	BDL
		509	BDL	10.8	BDL	BDL	BDL	72.0	20.1	8.3	BDL	10.9	3.5
		510	BDL	8.5	BDL	27.6	BDL	126.4	29.2	18.2	14.4	1453.2	5.0

* = Result to left has an associated comment or marker
BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G6

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary Cytokine/Chemokine Analysis of Serum

Day: 91 relative to Start Date

Group	Sex		G-CSF pg/mL	GM-CSF pg/mL	IFN-gamm pg/mL	IL-10 pg/mL	IL-12(p70) pg/mL	IL-13 pg/mL	IL-15 pg/mL	IL-17 pg/mL
1	f	Mean	179.33	43.91	7.43	.	5.86	20.57	43.39	.
		S.D.	57.88	20.61	3.13	.	2.05	7.03	45.48	.
		N	10	7	3	0	5	10	8	0
2	f	Mean	177.06	93.70	31.70	14.90	14.90	20.75	15.63	8.10
		S.D.	51.63	80.49	.	.	14.55	8.48	3.23	.
		N	10	5	1	1	3	10	8	1
3	f	Mean	176.04	46.06	15.00	3.70	16.00	23.55	22.25	.
		S.D.	74.04	59.09	7.64	.	6.74	10.74	16.66	.
		N	10	5	2	1	4	10	6	0
4	f	Mean	137.63	38.97	.	11.70	4.57	16.06	18.60	.
		S.D.	42.88	30.92	.	.	1.15	3.97	16.84	.
		N	10	6	0	1	3	10	5	0
5	f	Mean	148.79	41.82	12.00	19.00	10.46	21.01	20.01	13.00
		S.D.	69.61	47.20	6.08	.	7.49	11.54	18.65	.
		N	10	5	2	1	5	9	9	1
6	f	Mean	159.98	14.60	.	23.00	31.36	14.11	6.25	15.70
		S.D.	78.81	.	.	.	55.00	4.55	2.90	.
		N	10	1	0	1	5	10	4	1
7	f	Mean	145.06	32.50	20.60	17.88	74.60	15.97	41.40	113.43
		S.D.	70.41	17.88	.	16.49	102.30	4.43	32.10	140.46
		N	10	6	1	4	6	9	2	3

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G6

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary Cytokine/Chemokine Analysis of Serum

Day: 91 relative to Start Date

Group	Sex		IL-1α Serum pg/mL	IL-1ß Serum pg/mL	IL-2 Serum pg/mL	IL-4 Serum pg/mL	IL-5 Serum pg/mL	IL-6 Serum pg/mL	IL-7 Serum pg/mL
1	f	Mean	44.49	4.80	6.10	.	9.49	3.20	11.10
		S.D.	30.18	.	.	.	3.86	.	11.17
		N	9	1	1	0	10	1	2
2	f	Mean	41.60	6.35	19.20	.	9.91	9.70	12.00
		S.D.	43.38	2.19	.	.	3.19	1.21	.
		N	9	2	1	0	10	3	1
3	f	Mean	50.40	9.58	10.20	.	10.17	6.33	56.05
		S.D.	36.13	12.50	.	.	5.96	3.32	59.47
		N	6	5	1	0	9	4	2
4	f	Mean	149.93	.	9.00	.	8.60	14.30	28.10
		S.D.	175.58	.	.	.	4.30	.	.
		N	9	0	1	0	10	1	1
5	f	Mean	25.97	37.80	6.90	.	11.66	10.97	5.10
		S.D.	21.96	48.93	.	.	8.34	8.33	.
		N	7	2	1	0	10	3	1
6	f	Mean	89.11	23.40	.	4.900	7.52	8.75	5.30
		S.D.	123.09	33.61	.	.	4.37	1.06	.
		N	7	3	0	1	10	2	1
7	f	Mean	46.89	31.70	10.90	11.450	11.60	9.34	15.60
		S.D.	28.29	31.47	.	4.596	6.40	5.42	16.97
		N	8	7	1	2	10	5	2

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G6

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary Cytokine/Chemokine Analysis of Serum

Day: 91 relative to Start Date

Group	Sex		IL-9 Serum pg/mL	IP-10 Serum pg/mL	KC Serum pg/mL	MCP-1 Serum pg/mL	MIP-1α Serum pg/mL	RANTES Serum pg/mL	TNF-α Serum pg/mL
1	f	Mean	.	120.82	35.03	8.66	23.45	18.68	.
		S.D.	.	96.51	15.43	2.75	26.32	7.22	.
		N	0	10	10	10	8	10	0
2	f	Mean	.	87.17	26.80	21.37	39.80	17.30	7.10
		S.D.	.	23.11	16.19	26.05	74.96	8.60	.
		N	0	10	10	10	9	10	1
3	f	Mean	.	102.39	43.99	11.26	29.76	18.53	.
		S.D.	.	80.25	36.08	6.24	44.65	10.56	.
		N	0	10	10	8	10	10	0
4	f	Mean	32.70	78.51	45.13	9.01	14.69	16.56	.
		S.D.	.	14.36	21.26	4.92	6.78	5.76	.
		N	1	10	10	8	9	10	0
5	f	Mean	.	102.72	26.01	8.92	15.45	11.88	56.30
		S.D.	.	77.41	13.39	1.90	7.11	3.08	.
		N	0	10	10	5	8	9	1
6	f	Mean	23.60	72.77	30.60	11.00	13.57	11.14	15.20
		S.D.	.	12.39	14.63	8.07	6.63	3.60	.
		N	1	10	10	7	6	8	1
7	f	Mean	.	86.21	32.82	33.63	15.86	14.80	12.58
		S.D.	.	20.79	15.36	44.63	7.88	4.63	13.98
		N	0	10	10	7	9	9	5

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G7

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Oral Cavity Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	G-CSF Oral pg/mL	GM-CSF Oral pg/mL	IFN-γ Oral pg/mL	IL-10 Oral pg/mL	IL-12(p70) Oral pg/mL	IL-13 Oral pg/mL	IL-15 Oral pg/mL	IL-17 Oral pg/mL	IL-1α Oral pg/mL	IL-1ß Oral pg/mL	IL-2 Oral pg/mL
1	f	16	142.8	8.7	BDL	BDL	BDL	BDL	29.7	BDL	204.9	4.2	BDL
		17	134.8	BDL	BDL	BDL	BDL	BDL	22.2	BDL	156.8	4.2	BDL
		18	135.6	16.2	BDL	BDL	3.3	BDL	29.1	BDL	228.5	4.2	BDL
		19	184.4	BDL	BDL	BDL	BDL	BDL	14.4	BDL	156.0	BDL	7.3
		20	52.1	8.7	BDL	BDL	BDL	BDL	34.0	BDL	237.7	BDL	BDL
		26	73.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	273.3	BDL	4.5
		27	65.2	8.7	BDL	BDL	BDL	BDL	24.7	BDL	155.6	BDL	BDL
		28	43.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	228.9	BDL	14.8
		29	10.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	104.5	BDL	8.5
		30	149.9	BDL	BDL	BDL	BDL	BDL	14.4	BDL	229.7	BDL	BDL
2	f	96	286.0	16.2	BDL	BDL	BDL	BDL	17.1	BDL	269.6	BDL	BDL
		97	69.7	8.7	BDL	BDL	BDL	BDL	18.4	BDL	257.1	BDL	BDL
		98	133.9	16.2	BDL	BDL	BDL	BDL	23.5	BDL	240.6	BDL	BDL
		99	111.5	8.7	BDL	BDL	BDL	BDL	16.4	BDL	119.0	BDL	BDL
		100	35.1	BDL	BDL	BDL	BDL	BDL	17.7	BDL	206.3	4.2	3.3
		106	52.7	BDL	BDL	BDL	BDL	BDL	13.1	BDL	205.1	BDL	BDL
		107	115.4	BDL	BDL	BDL	BDL	BDL	18.4	BDL	184.2	BDL	6.5
		108	127.5	8.7	BDL	BDL	BDL	BDL	11.7	BDL	226.9	BDL	BDL
		109	38.0	8.7	BDL	BDL	BDL	BDL	BDL	BDL	168.8	BDL	10.3
		110	38.1	BDL	BDL	BDL	BDL	BDL	26.0	BDL	217.5	BDL	BDL

BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G7

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Oral Cavity Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	G-CSF Oral pg/mL	GM-CSF Oral pg/mL	IFN-γ Oral pg/mL	IL-10 Oral pg/mL	IL-12(p70) Oral pg/mL	IL-13 Oral pg/mL	IL-15 Oral pg/mL	IL-17 Oral pg/mL	IL-1α Oral pg/mL	IL-1ß Oral pg/mL	IL-2 Oral pg/mL
3	f	176	50.6	8.7	BDL	BDL	BDL	BDL	10.4	BDL	264.2	BDL	BDL
		177	17.3	BDL	BDL	BDL	BDL	BDL	6.1	BDL	130.4	BDL	BDL
		178	53.6	BDL	BDL	BDL	BDL	BDL	17.1	BDL	228.9	BDL	BDL
		179	59.2	BDL	BDL	BDL	BDL	BDL	6.1	BDL	185.2	BDL	BDL
		180	79.1	BDL	BDL	BDL	BDL	BDL	10.4	BDL	355.5	BDL	BDL
		186	55.0	8.7	BDL	BDL	BDL	BDL	14.4	BDL	176.9	BDL	BDL
		187	68.4	8.7	BDL	BDL	BDL	BDL	20.9	BDL	333.6	BDL	BDL
		188	44.0	BDL	BDL	BDL	BDL	BDL	19.6	BDL	258.2	BDL	BDL
		189	79.7	16.2	BDL	BDL	BDL	BDL	19.6	BDL	342.5	BDL	BDL
		190	65.8	BDL	BDL	BDL	BDL	BDL	18.4	BDL	196.3	BDL	BDL
4	f	256	101.9	8.7	BDL	BDL	BDL	BDL	9.0	BDL	175.3	BDL	BDL
		257	29.2	BDL	BDL	BDL	BDL	BDL	10.4	BDL	194.5	BDL	BDL
		258	47.6	8.7	BDL	BDL	BDL	BDL	BDL	BDL	172.1	BDL	BDL
		259	55.4	BDL	BDL	BDL	BDL	BDL	7.6	BDL	173.5	BDL	7.2
		260	20.8	BDL	BDL	BDL	BDL	BDL	22.2	BDL	229.5	4.2	4.4
		266	50.2	8.7	BDL	BDL	BDL	BDL	14.4	BDL	140.2	BDL	BDL
		267	91.8	BDL	BDL	BDL	BDL	BDL	18.4	BDL	163.2	BDL	BDL
		268	334.6	BDL	BDL	BDL	BDL	BDL	7.6	BDL	270.6	BDL	3.8
		269	54.7	BDL	BDL	BDL	BDL	BDL	10.4	BDL	145.8	BDL	BDL
		270	96.2	8.7	BDL	BDL	BDL	BDL	11.7	BDL	164.8	BDL	BDL

BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G7

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Oral Cavity Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	G-CSF Oral pg/mL	GM-CSF Oral pg/mL	IFN-γ Oral pg/mL	IL-10 Oral pg/mL	IL-12(p70) Oral pg/mL	IL-13 Oral pg/mL	IL-15 Oral pg/mL	IL-17 Oral pg/mL	IL-1α Oral pg/mL	IL-1ß Oral pg/mL	IL-2 Oral pg/mL
5	f	336	95.6	8.7	BDL	BDL	BDL	BDL	32.1	BDL	171.7	BDL	BDL
		337	65.8	8.7	BDL	BDL	BDL	BDL	17.1	BDL	272.5	BDL	BDL
		338	77.0	BDL	BDL	BDL	BDL	BDL	26.0	BDL	250.9	BDL	BDL
		339	89.1	21.7	BDL	BDL	BDL	BDL	32.1	BDL	188.8	BDL	BDL
		340	109.9	8.7	BDL	BDL	BDL	BDL	33.4	BDL	322.6	BDL	BDL
		346	147.4	8.7	BDL	BDL	BDL	BDL	7.6	BDL	17.3	BDL	BDL
		347	154.7	BDL	BDL	BDL	BDL	BDL	27.2	BDL	268.1	BDL	BDL
		348	83.7	BDL	BDL	BDL	BDL	BDL	19.6	BDL	123.5	BDL	BDL
		349	106.9	BDL	BDL	BDL	BDL	BDL	16.4	BDL	205.3	BDL	BDL
		350	33.6	16.2	BDL	BDL	BDL	BDL	10.4	BDL	113.5	BDL	BDL
6	f	416	122.6	BDL	BDL	BDL	BDL	BDL	22.2	BDL	283.0	BDL	BDL
		417	168.0	BDL	BDL	BDL	BDL	BDL	15.7	BDL	329.8	4.2	BDL
		418	25.1	BDL	BDL	BDL	BDL	BDL	33.4	BDL	217.3	BDL	BDL
		419	69.6	16.2	BDL	BDL	BDL	BDL	18.4	BDL	280.4	BDL	4.6
		420	45.9	BDL	BDL	BDL	BDL	BDL	17.1	BDL	234.5	BDL	BDL
		426	47.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	196.3	BDL	11.3
		427	17.9	BDL	BDL	BDL	BDL	BDL	BDL	BDL	255.5	BDL	6.1
		428	114.6	BDL	BDL	BDL	BDL	BDL	9.0	BDL	268.8	BDL	BDL
		429	102.4	BDL	BDL	BDL	BDL	BDL	10.4	BDL	273.3	BDL	BDL
		430	265.6	BDL	BDL	BDL	BDL	BDL	13.8	BDL	252.0	BDL	BDL

BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table G7

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Oral Cavity Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	G-CSF Oral pg/mL	GM-CSF Oral pg/mL	IFN-γ Oral pg/mL	IL-10 Oral pg/mL	IL-12(p70) Oral pg/mL	IL-13 Oral pg/mL	IL-15 Oral pg/mL	IL-17 Oral pg/mL	IL-1α Oral pg/mL	IL-1ß Oral pg/mL	IL-2 Oral pg/mL
7	f	496	4.9	BDL	BDL	BDL	BDL	BDL	13.8	BDL	187.6	BDL	BDL
		497	157.0	BDL	BDL	BDL	BDL	BDL	10.4	BDL	181.1	BDL	BDL
		498	96.5	8.7	BDL	BDL	BDL	BDL	39.4	BDL	402.6	BDL	BDL
		499	98.9	BDL	BDL	BDL	BDL	BDL	28.5	BDL	524.0	BDL	BDL
		500	105.1	8.7	BDL	BDL	BDL	BDL	13.1	BDL	355.3	BDL	BDL
		506	170.5	BDL	BDL	BDL	BDL	BDL	18.4	BDL	189.8	BDL	BDL
		507	41.5	BDL	BDL	BDL	BDL	BDL	29.7	BDL	248.7	BDL	BDL
		508	99.4	BDL	BDL	BDL	BDL	BDL	13.8	BDL	210.0	BDL	BDL
		509	8.5	8.7	BDL	BDL	BDL	BDL	15.1	BDL	92.3	BDL	BDL
		510	82.1	16.2	BDL	BDL	BDL	BDL	9.7	BDL	193.9	BDL	BDL

BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G7

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Oral Cavity Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	IL-4 Oral pg/mL	IL-5 Oral pg/mL	IL-6 Oral pg/mL	IL-7 Oral pg/mL	IL-9 Oral pg/mL	IP-10 Oral pg/mL	KC Oral pg/mL	MCP-1 Oral pg/mL	MIP-1α Oral pg/mL	RANTES Oral pg/mL	TNF-α Oral pg/mL
1	f	16	BDL	BDL	BDL	BDL	BDL	114.8	118.0	16.2	BDL	5.1	BDL
		17	BDL	BDL	BDL	BDL	BDL	BDL	167.0	BDL	BDL	BDL	BDL
		18	BDL	BDL	BDL	BDL	BDL	BDL	125.0	BDL	BDL	5.6	BDL
		19	BDL	BDL	20.6	BDL	BDL	BDL	165.0	BDL	BDL	BDL	BDL
		20	BDL	BDL	BDL	BDL	BDL	8.4	102.0	12.0	BDL	6.5	BDL
		26	BDL	BDL	6.8	BDL	BDL	BDL	187.0	BDL	BDL	BDL	BDL
		27	BDL	BDL	BDL	BDL	BDL	3.2	245.0	14.1	BDL	BDL	BDL
		28	BDL	BDL	34.8	BDL	BDL	BDL	185.0	BDL	BDL	6.2	BDL
		29	BDL	BDL	21.2	BDL	BDL	BDL	47.0	BDL	BDL	4.4	BDL
		30	BDL	BDL	BDL	BDL	BDL	3.9	234.0	9.5	BDL	6.2	BDL
2	f	96	BDL	BDL	BDL	BDL	BDL	BDL	191.0	6.7	BDL	BDL	BDL
		97	BDL	BDL	BDL	BDL	BDL	125.0	160.0	18.1	BDL	BDL	BDL
		98	BDL	BDL	BDL	BDL	BDL	BDL	218.0	12.0	BDL	BDL	BDL
		99	BDL	BDL	BDL	BDL	BDL	BDL	194.0	9.5	BDL	BDL	BDL
		100	BDL	BDL	BDL	BDL	BDL	BDL	94.0	6.7	BDL	9.6	BDL
		106	BDL	BDL	BDL	BDL	BDL	BDL	123.0	6.7	BDL	BDL	BDL
		107	BDL	BDL	19.3	BDL	BDL	BDL	143.0	6.7	BDL	BDL	BDL
		108	BDL	BDL	BDL	BDL	BDL	4.2	238.0	6.7	BDL	BDL	BDL
		109	BDL	BDL	30.1	BDL	BDL	BDL	180.0	21.6	BDL	8.7	BDL
		110	BDL	BDL	BDL	BDL	BDL	BDL	117.0	BDL	BDL	BDL	BDL

BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G7

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Oral Cavity Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	IL-4 Oral pg/mL	IL-5 Oral pg/mL	IL-6 Oral pg/mL	IL-7 Oral pg/mL	IL-9 Oral pg/mL	IP-10 Oral pg/mL	KC Oral pg/mL	MCP-1 Oral pg/mL	MIP-1α Oral pg/mL	RANTES Oral pg/mL	TNF-α Oral pg/mL
3	f	176	BDL	BDL	BDL	BDL	BDL	BDL	99.0	BDL	BDL	BDL	BDL
		177	BDL	BDL	BDL	BDL	BDL	BDL	30.0	BDL	BDL	BDL	BDL
		178	BDL	BDL	BDL	BDL	BDL	BDL	154.0	BDL	BDL	BDL	BDL
		179	BDL	BDL	BDL	BDL	BDL	BDL	117.0	6.7	BDL	BDL	BDL
		180	BDL	BDL	BDL	BDL	BDL	3.2	156.0	6.7	BDL	BDL	BDL
		186	BDL	BDL	BDL	BDL	BDL	BDL	186.0	BDL	BDL	BDL	BDL
		187	BDL	BDL	8.4	BDL	BDL	BDL	299.0	6.7	BDL	BDL	BDL
		188	BDL	BDL	6.8	BDL	BDL	4.3	157.0	BDL	BDL	BDL	BDL
		189	BDL	BDL	BDL	BDL	BDL	16.0	215.0	12.0	BDL	3.5	BDL
		190	BDL	BDL	BDL	BDL	BDL	45.9	150.0	9.5	BDL	BDL	BDL
4	f	256	BDL	BDL	BDL	BDL	BDL	BDL	133.0	BDL	BDL	BDL	BDL
		257	BDL	BDL	BDL	BDL	BDL	BDL	36.0	6.7	BDL	8.6	BDL
		258	BDL	BDL	BDL	BDL	BDL	BDL	94.0	6.7	BDL	BDL	BDL
		259	BDL	BDL	16.3	BDL	BDL	BDL	132.0	6.7	BDL	BDL	BDL
		260	BDL	BDL	BDL	BDL	BDL	BDL	35.0	2.9	BDL	BDL	BDL
		266	BDL	BDL	10.0	BDL	BDL	BDL	155.0	9.5	BDL	BDL	BDL
		267	BDL	BDL	10.0	BDL	BDL	BDL	172.0	BDL	BDL	BDL	BDL
		268	BDL	BDL	16.4	BDL	BDL	BDL	451.0	14.1	BDL	BDL	BDL
		269	BDL	BDL	7.2	BDL	BDL	4.1	127.0	BDL	BDL	BDL	BDL
		270	BDL	BDL	5.5	BDL	BDL	BDL	270.0	9.5	BDL	BDL	BDL

BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G7

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Oral Cavity Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	IL-4 Oral pg/mL	IL-5 Oral pg/mL	IL-6 Oral pg/mL	IL-7 Oral pg/mL	IL-9 Oral pg/mL	IP-10 Oral pg/mL	KC Oral pg/mL	MCP-1 Oral pg/mL	MIP-1α Oral pg/mL	RANTES Oral pg/mL	TNF-α Oral pg/mL
5	f	336	BDL	BDL	BDL	BDL	BDL	3.9	122.0	BDL	BDL	BDL	BDL
		337	BDL	BDL	BDL	BDL	BDL	BDL	176.0	BDL	BDL	BDL	BDL
		338	BDL	BDL	BDL	BDL	BDL	23.9	127.0	9.5	BDL	BDL	BDL
		339	BDL	BDL	BDL	BDL	BDL	6.0	149.0	9.5	BDL	BDL	BDL
		340	BDL	BDL	BDL	BDL	BDL	3.2	128.0	6.7	BDL	BDL	BDL
		346	BDL	BDL	BDL	BDL	BDL	BDL	266.0	6.7	BDL	BDL	BDL
		347	BDL	BDL	BDL	BDL	BDL	5.3	132.0	BDL	BDL	BDL	BDL
		348	BDL	BDL	BDL	BDL	BDL	BDL	166.0	6.7	BDL	BDL	BDL
		349	BDL	BDL	3.4	BDL	BDL	BDL	291.0	6.7	BDL	BDL	BDL
		350	BDL	BDL	BDL	BDL	BDL	BDL	52.0	BDL	BDL	BDL	BDL
6	f	416	BDL	BDL	BDL	BDL	BDL	8.5	148.0	9.5	BDL	BDL	BDL
		417	BDL	11.7	BDL	BDL	BDL	BDL	165.0	24.8	BDL	BDL	BDL
		418	BDL	BDL	6.3	BDL	BDL	4.3	46.0	BDL	BDL	BDL	BDL
		419	BDL	BDL	BDL	BDL	BDL	33.4	164.0	10.8	BDL	BDL	BDL
		420	BDL	BDL	BDL	BDL	BDL	BDL	137.0	2.9	BDL	BDL	BDL
		426	BDL	BDL	30.2	BDL	BDL	BDL	171.0	BDL	BDL	BDL	BDL
		427	BDL	BDL	14.3	BDL	BDL	BDL	95.0	BDL	BDL	BDL	BDL
		428	BDL	BDL	BDL	BDL	BDL	BDL	194.0	BDL	BDL	BDL	BDL
		429	BDL	BDL	8.1	BDL	BDL	BDL	211.0	9.5	BDL	BDL	BDL
		430	BDL	BDL	BDL	BDL	BDL	BDL	184.0	6.7	BDL	BDL	BDL

BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table G7

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Oral Cavity Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	IL-4 Oral pg/mL	IL-5 Oral pg/mL	IL-6 Oral pg/mL	IL-7 Oral pg/mL	IL-9 Oral pg/mL	IP-10 Oral pg/mL	KC Oral pg/mL	MCP-1 Oral pg/mL	MIP-1α Oral pg/mL	RANTES Oral pg/mL	TNF-α Oral pg/mL
7	f	496	BDL	BDL	BDL	BDL	BDL	9.3	37.0	BDL	BDL	BDL	BDL
		497	BDL	BDL	5.5	BDL	BDL	BDL	205.0	BDL	BDL	BDL	BDL
		498	BDL	BDL	BDL	BDL	BDL	9.6	225.0	9.5	BDL	BDL	BDL
		499	BDL	BDL	BDL	BDL	BDL	BDL	265.0	6.7	BDL	BDL	BDL
		500	BDL	BDL	BDL	BDL	BDL	BDL	152.0	6.7	BDL	BDL	BDL
		506	BDL	BDL	5.5	BDL	BDL	BDL	271.0	6.7	BDL	BDL	BDL
		507	BDL	BDL	5.9	BDL	BDL	BDL	204.0	BDL	BDL	BDL	BDL
		508	BDL	BDL	BDL	BDL	BDL	BDL	57.0	6.7	BDL	BDL	BDL
		509	BDL	BDL	BDL	BDL	BDL	BDL	16.0	BDL	BDL	BDL	BDL
		510	BDL	BDL	BDL	BDL	BDL	4.1	209.0	6.7	BDL	BDL	BDL

BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table G8

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary Cytokine/Chemokine Analysis of Oral Cavity Homogenates

Day: 91 relative to Start Date

Group	Sex		G-CSF Oral pg/mL	GM-CSF Oral pg/mL	IFN-γ Oral pg/mL	IL-10 Oral pg/mL	IL-12(p70) Oral pg/mL	IL-13 Oral pg/mL	IL-15 Oral pg/mL	IL-17 Oral pg/mL
1	f	Mean	99.29	10.58	.	.	3.30	.	24.07	.
		S.D.	57.01	3.75	.	.	.	.	7.60	.
		N	10	4	0	0	1	0	7	0
2	f	Mean	100.79	11.20	.	.	.	.	18.03	.
		S.D.	75.94	3.87	.	.	.	.	4.50	.
		N	10	6	0	0	0	0	9	0
3	f	Mean	57.27	10.58	.	.	.	.	14.30	.
		S.D.	18.31	3.75	.	.	.	.	5.67	.
		N	10	4	0	0	0	0	10	0
4	f	Mean	88.24	8.70	.	.	.	.	12.41	.
		S.D.	90.86	0.00	.	.	.	.	5.03	.
		N	10	4	0	0	0	0	9	0
5	f	Mean	96.37	12.12	.	.	.	.	22.19	.
		S.D.	36.15	5.57	.	.	.	.	9.31	.
		N	10	6	0	0	0	0	10	0
6	f	Mean	97.93	16.20	.	.	.	.	17.50	.
		S.D.	75.78	.	.	.	.	.	7.70	.
		N	10	1	0	0	0	0	8	0
7	f	Mean	86.44	10.58	.	.	.	.	19.19	.
		S.D.	55.36	3.75	.	.	.	.	9.92	.
		N	10	4	0	0	0	0	10	0

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G8

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary Cytokine/Chemokine Analysis of Oral Cavity Homogenates

Day: 91 relative to Start Date

Group	Sex		IL-1α Oral pg/mL	IL-1ß Oral pg/mL	IL-2 Oral pg/mL	IL-4 Oral pg/mL	IL-5 Oral pg/mL	IL-6 Oral pg/mL	IL-7 Oral pg/mL
1	f	Mean	197.59	4.20	8.78	.	.	20.85	.
		S.D.	51.84	0.00	4.35	.	.	11.43	.
		N	10	3	4	0	0	4	0
2	f	Mean	209.51	4.20	6.70	.	.	24.70	.
		S.D.	44.38	.	3.50	.	.	7.64	.
		N	10	1	3	0	0	2	0
3	f	Mean	247.17	.	.	.	.	7.60	.
		S.D.	77.49	.	.	.	.	1.13	.
		N	10	0	0	0	0	2	0
4	f	Mean	182.95	4.20	5.13	.	.	10.90	.
		S.D.	39.69	.	1.81	.	.	4.56	.
		N	10	1	3	0	0	6	0
5	f	Mean	193.42	.	.	.	.	3.40	.
		S.D.	91.14	.	.	.	.	.	.
		N	10	0	0	0	0	1	0
6	f	Mean	259.09	4.20	7.33	.	11.70	14.73	.
		S.D.	37.53	.	3.52	.	.	10.87	.
		N	10	1	3	0	1	4	0
7	f	Mean	258.53	.	.	.	.	5.63	.
		S.D.	129.36	.	.	.	.	0.23	.
		N	10	0	0	0	0	3	0

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G8

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary Cytokine/Chemokine Analysis of Oral Cavity Homogenates

Day: 91 relative to Start Date

Group	Sex		IL-9 Oral pg/mL	IP-10 Oral pg/mL	KC Oral pg/mL	MCP-1 Oral pg/mL	MIP-1α Oral pg/mL	RANTES Oral pg/mL	TNF-α Oral pg/mL
1	f	Mean	.	32.58	157.50	12.95	.	5.67	.
		S.D.	.	54.87	60.73	2.87	.	0.80	.
		N	0	4	10	4	0	6	0
2	f	Mean	.	64.60	165.80	10.52	.	9.15	.
		S.D.	.	85.42	46.54	5.66	.	0.64	.
		N	0	2	10	9	0	2	0
3	f	Mean	.	17.35	156.30	8.32	.	3.50	.
		S.D.	.	19.90	71.12	2.39	.	.	.
		N	0	4	10	5	0	1	0
4	f	Mean	.	4.10	160.50	8.01	.	8.60	.
		S.D.	.	.	122.43	3.48	.	.	.
		N	0	1	10	7	0	1	0
5	f	Mean	.	8.46	160.90	7.63	.	.	.
		S.D.	.	8.70	70.56	1.45	.	.	.
		N	0	5	10	6	0	0	0
6	f	Mean	.	15.40	151.50	10.70	.	.	.
		S.D.	.	15.73	49.07	7.46	.	.	.
		N	0	3	10	6	0	0	0
7	f	Mean	.	7.67	164.10	7.17	.	.	.
		S.D.	.	3.09	94.46	1.14	.	.	.
		N	0	3	10	6	0	0	0

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G9

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Duodenum Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	G-CSF Duodenum pg/mL	GM-CSF Duodenum pg/mL	IFN-γ Duodenum pg/mL	IL-10 Duodenum pg/mL	IL-12(p70) Duodenum pg/mL	IL-13 Duodenum pg/mL	IL-15 Duodenum pg/mL	IL-17 Duodenum pg/mL	IL-1α Duodenum pg/mL	IL-1ß Duodenum pg/mL	IL-2 Duodenum pg/mL
1	f	16	BDL	44.1	11.0	1845.3	1150.4	1739.7	923.6	1121.6	1442.1	132.9	818.0
		17	6.6	28.3	1100.5	1905.6	BDL	2188.8	488.5	559.4	1583.2	151.2	BDL
		18	3.4	BDL	5.6	6.3	BDL	BDL	BDL	BDL	116.4	69.6	BDL
		19	4.2	18.6	6.6	8.6	BDL	BDL	BDL	BDL	255.8	109.7	BDL
		20	5.2	18.6	BDL	9.3	BDL	6.6	10.9	10.2	95.9	109.7	5.5
		26	4.0	18.6	3.3	5.9	BDL	BDL	BDL	BDL	171.3	217.7	BDL
		27	BDL	18.6	4.6	11.2	BDL	BDL	BDL	BDL	283.8	222.0	BDL
		28	4.4	28.3	6.6	9.6	BDL	BDL	BDL	BDL	728.8	503.2	BDL
		29	BDL	BDL	4.6	3.9	BDL	BDL	BDL	BDL	257.9	86.7	BDL
		30	BDL	BDL	5.3	22.6	BDL	BDL	BDL	BDL	455.7	156.5	BDL
2	f	96	5.0	28.3	3.8	7.9	BDL	BDL	BDL	BDL	173.2	101.5	BDL
		97	BDL	BDL	BDL	6.6	BDL	BDL	BDL	BDL	BDL	58.5	BDL
		98	136.6	41.4	364.5	68.6	10.6	868.7	292.0	333.0	661.0	87.7	200.5
		99	BDL	BDL	BDL	4.6	BDL	BDL	BDL	BDL	81.0	83.3	BDL
		100	3.7	18.6	BDL	BDL	BDL	BDL	3.7	BDL	87.9	127.7	BDL
		106	BDL	32.1	3.3	5.6	BDL	BDL	BDL	BDL	1759.0	48.0	BDL
		107	BDL	BDL	4.4	9.3	BDL	BDL	BDL	BDL	301.3	41.0	BDL
		108	3.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	159.6	11.2	BDL
		109	BDL	28.3	4.6	7.9	BDL	BDL	BDL	BDL	862.0	53.4	BDL
		110	BDL	18.6	5.6	7.9	BDL	BDL	BDL	BDL	382.7	119.5	BDL

* = Result to left has an associated comment or marker
BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G9

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Duodenum Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	G-CSF Duodenum pg/mL	GM-CSF Duodenum pg/mL	IFN-γ Duodenum pg/mL	IL-10 Duodenum pg/mL	IL-12(p70) Duodenum pg/mL	IL-13 Duodenum pg/mL	IL-15 Duodenum pg/mL	IL-17 Duodenum pg/mL	IL-1α Duodenum pg/mL	IL-1ß Duodenum pg/mL	IL-2 Duodenum pg/mL
3	f	176	BDL	28.3	BDL	BDL	BDL	BDL	BDL	BDL	230.6	33.4	BDL
		177	BDL	28.3	7.2	7.3	BDL	BDL	BDL	BDL	149.3	108.7	BDL
		178	BDL	18.6	5.5	9.3	BDL	BDL	BDL	BDL	147.4	135.7	BDL
		179	3.4	35.5	BDL	5.6	BDL	BDL	BDL	BDL	108.4	131.5	BDL
		180	BDL	BDL	4.6	11.2	BDL	736.4	BDL	BDL	182.5	92.1	BDL
		186	3.7	28.3	5.8	7.9	BDL	BDL	BDL	BDL	444.8	87.2	BDL
		187	3.4	18.6	BDL	5.3	BDL	BDL	4.9	BDL	44.4	55.3	BDL
		188	BDL	28.3	BDL	8.9	BDL	BDL	BDL	BDL	774.0	64.8	BDL
		189	BDL	18.6	3.8	11.2	9.2	BDL	BDL	BDL	BDL	88.8	BDL
		190	3.6	18.6	BDL	7.3	BDL	BDL	BDL	BDL	209.0	56.0	BDL
4	f	256	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	29.8	57.9	BDL
		257	BDL	11.1	6.0	5.9	BDL	BDL	BDL	BDL	163.3	175.1	BDL
		258	BDL	18.6	4.1	7.9	BDL	BDL	BDL	BDL	127.1	83.9	BDL
		259	BDL	38.6	8.0	10.2	BDL	BDL	BDL	BDL	51.7	64.8	BDL
		260	BDL	18.6	BDL	9.6	BDL	BDL	BDL	BDL	84.2	70.8	BDL
		266	BDL	18.6	BDL	BDL	BDL	BDL	BDL	BDL	107.5	75.4	BDL
		267	BDL	18.6	BDL	9.3	BDL	BDL	BDL	BDL	1021.9	58.5	BDL
		268	BDL	28.3	6.9	69.1	3.7	BDL	167.6	8.3	1671.8	94.2	BDL
		269	BDL	BDL	4.9	15.3	BDL	BDL	BDL	BDL	1361.2	97.4	BDL
		270	BDL	18.6	3.5	5.9	BDL	BDL	BDL	BDL	447.1	70.8	BDL

* = Result to left has an associated comment or marker
BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G9

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Duodenum Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	G-CSF Duodenum pg/mL	GM-CSF Duodenum pg/mL	IFN-γ Duodenum pg/mL	IL-10 Duodenum pg/mL	IL-12(p70) Duodenum pg/mL	IL-13 Duodenum pg/mL	IL-15 Duodenum pg/mL	IL-17 Duodenum pg/mL	IL-1α Duodenum pg/mL	IL-1ß Duodenum pg/mL	IL-2 Duodenum pg/mL
5	f	336	BDL	18.6	BDL	17.7	9.2	BDL	BDL	BDL	85.6	57.9	BDL
		337	BDL	28.3	11.4	31.2	BDL	BDL	BDL	BDL	BDL	61.7	BDL
		338	4.9	28.3	BDL	20.5	BDL	BDL	3.7	BDL	79.6	108.7	BDL
		339	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	35.0	BDL
		340	3.5	18.6	3.6	10.5	BDL	BDL	BDL	BDL	150.9	50.1	BDL
		346	3.8	BDL	4.9	6.6	BDL	BDL	BDL	BDL	262.1	28.6	BDL
		347	3.8	28.3	5.8	12.1	BDL	BDL	BDL	BDL	541.2	53.4	BDL
		348	BDL	18.6	4.0	9.3	BDL	BDL	BDL	BDL	455.9	61.1	BDL
		349	5.6	18.6	307.7	820.2	BDL	106.9	60.0	134.5	539.8	35.0	6.2
		350	BDL	35.5	6.9	19.3	BDL	BDL	BDL	BDL	538.0	71.9	BDL
6	f	416	BDL	41.4	5.2	46.0	BDL	BDL	BDL	BDL	184.4	54.7	BDL
		417	6.4	23.9	4.9	11.5	BDL	BDL	BDL	BDL	435.5	295.5	BDL
		418	6.5	41.4	BDL	7.9	BDL	BDL	7.3	BDL	184.8	23.4	5.5
		419	5.0	35.5	4.4	12.8	BDL	BDL	BDL	BDL	203.9	50.7	BDL
		420	BDL	18.6	5.6	18.7	BDL	BDL	BDL	BDL	992.9	95.8	BDL
		426	5.8	28.3	5.2	21.1	BDL	BDL	BDL	BDL	229.5	51.4	BDL
		427	BDL	35.5	4.7	16.2	BDL	BDL	BDL	BDL	468.1	51.4	BDL
		428	4.6	18.6	10.2	19.9	7.4	BDL	BDL	BDL	455.9	16.7	BDL
		429	4.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	5232.8	BDL	5.5
		430	5.0	BDL	3.6	BDL	BDL	BDL	BDL	BDL	343.0	80.0	BDL

* = Result to left has an associated comment or marker
BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G9

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Duodenum Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	G-CSF Duodenum pg/mL	GM-CSF Duodenum pg/mL	IFN-γ Duodenum pg/mL	IL-10 Duodenum pg/mL	IL-12(p70) Duodenum pg/mL	IL-13 Duodenum pg/mL	IL-15 Duodenum pg/mL	IL-17 Duodenum pg/mL	IL-1α Duodenum pg/mL	IL-1ß Duodenum pg/mL	IL-2 Duodenum pg/mL
7	f	496	7.5	28.3	4.9	11.8	BDL	BDL	4.9	BDL	188.5	53.4	BDL
		497	BDL	35.5	7.9	11.2	BDL	BDL	3.7	BDL	11.0	80.0	BDL
		498	5.0	18.6	1.5	3.9	BDL	BDL	4.9	BDL	32.1	113.2	7.5
		499	3.9	28.3	BDL	1203.3	5.1	BDL	BDL	BDL	BDL	11.2	11.3
		500	7.3	28.3	5.2	142.7	10.6	14.1	13.4	BDL	2022.8	23.4	10.9
		506	7.6	28.3	3.6	26.5	BDL	BDL	BDL	BDL	368.3	41.0	BDL
		507	6.5	28.3	30.7	BDL	31.8	BDL	3040.6	4.8	436.9	30.2	8.0
		508	83.3	BDL	BDL	0.9	BDL	BDL	5.5	BDL	102.0	BDL	BDL
		509	6.0	28.3	5.9	18.7	BDL	BDL	7.3	BDL	268.8	69.6	BDL
		510	3.9	41.4	6.6	27.1	BDL	BDL	BDL	BDL	132.0	49.4	BDL

* = Result to left has an associated comment or marker
BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G9

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Duodenum Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	IL-4 Duodenum pg/mL	IL-5 Duodenum pg/mL	IL-6 Duodenum pg/mL	IL-7 Duodenum pg/mL	IL-9 Duodenum pg/mL	IP-10 Duodenum pg/mL	KC Duodenum pg/mL	MCP-1 Duodenum pg/mL	MIP-1α Duodenum pg/mL	RANTES Duodenum pg/mL	TNF-α Duodenum pg/mL
1	f	16	BDL	BDL	870.2	BDL	1149.6	1430.1	815.1	314.6	74.6	255.1	23.5
		17	579.7	5.0	16.4	9.1	1982.1	327.9	1006.0	19.5	46.2	268.2	4.8
		18	BDL	BDL	3.0	BDL	131.4	BDL	BDL	7.5	18.6	10.0	BDL
		19	BDL	BDL	BDL	BDL	195.3	BDL	BDL	16.3	BDL	BDL	BDL
		20	BDL	BDL	BDL	7.4	61.0	216.4	54.5	60.6	47.1	429.2	3.5
		26	BDL	BDL	BDL	BDL	BDL	87.5	17.2	46.4	37.4	252.7	BDL
		27	BDL	BDL	4.2	BDL	BDL	6.3	BDL	27.1	BDL	40.1	BDL
		28	BDL	BDL	4.5	BDL	208.7	BDL	BDL	19.5	BDL	9.4	BDL
		29	BDL	BDL	BDL	BDL	174.8	6.9	BDL	22.2	BDL	50.6	BDL
		30	BDL	BDL	BDL	BDL	70.2	BDL	BDL	22.2	BDL	18.0	BDL
2	f	96	BDL	BDL	BDL	BDL	142.6	12.9	3.4	24.8	24.1	355.6	BDL
		97	BDL	BDL	BDL	BDL	91.9	115.9	BDL	16.3	BDL	881.3	BDL
		98	BDL	BDL	11.7	464.9	1129.9	628.7	172.1	65.2	43.2	2918.3	6.9
		99	BDL	BDL	BDL	BDL	BDL	BDL	BDL	12.6	BDL	BDL	BDL
		100	BDL	BDL	BDL	BDL	22.8	171.4	41.3	44.9	39.9	315.1	BDL
		106	BDL	BDL	BDL	BDL	BDL	12.1	BDL	20.9	BDL	33.4	BDL
		107	BDL	BDL	BDL	BDL	84.5	13.0	7.1	33.2	BDL	843.2	BDL
		108	BDL	BDL	BDL	BDL	BDL	61.4	18.4	36.9	28.3	68.0	BDL
		109	BDL	BDL	BDL	BDL	130.5	17.2	4.8	77.1	BDL	451.1	BDL
		110	BDL	BDL	5.0	BDL	116.1	BDL	BDL	19.5	BDL	133.2	BDL

* = Result to left has an associated comment or marker
BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table G9

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Duodenum Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	IL-4 Duodenum pg/mL	IL-5 Duodenum pg/mL	IL-6 Duodenum pg/mL	IL-7 Duodenum pg/mL	IL-9 Duodenum pg/mL	IP-10 Duodenum pg/mL	KC Duodenum pg/mL	MCP-1 Duodenum pg/mL	MIP-1α Duodenum pg/mL	RANTES Duodenum pg/mL	TNF-α Duodenum pg/mL
3	f	176	BDL	BDL	BDL	BDL	BDL	BDL	BDL	24.8	BDL	24.5	BDL
		177	BDL	BDL	4.5	BDL	163.4	BDL	BDL	12.6	7.1	3.8	BDL
		178	BDL	BDL	4.8	BDL	185.2	4.0	BDL	19.5	18.6	30.2	BDL
		179	BDL	BDL	BDL	BDL	171.3	BDL	BDL	31.3	18.6	85.0	BDL
		180	BDL	BDL	5.6	BDL	BDL	BDL	BDL	16.3	BDL	92.2	BDL
		186	BDL	BDL	BDL	BDL	188.6	BDL	BDL	31.3	BDL	84.5	BDL
		187	BDL	BDL	4.8	BDL	216.9	4.7	BDL	20.9	BDL	170.9	BDL
		188	BDL	BDL	BDL	BDL	BDL	BDL	BDL	16.3	BDL	11.6	BDL
		189	BDL	BDL	6.8	BDL	70.2	10000.0	BDL	24.8	7.1	BDL	BDL
		190	BDL	BDL	BDL	BDL	181.7	97.3	44.2	44.9	51.5	367.7	BDL
4	f	256	BDL	BDL	BDL	BDL	27.3	BDL	BDL	BDL	BDL	BDL	BDL
		257	BDL	BDL	5.3	BDL	111.2	BDL	BDL	12.6	24.1	BDL	BDL
		258	BDL	BDL	BDL	BDL	114.1	BDL	BDL	22.2	7.1	44.6	BDL
		259	BDL	BDL	BDL	BDL	183.4	BDL	BDL	20.9	BDL	BDL	BDL
		260	BDL	BDL	BDL	BDL	65.6	3.7	BDL	19.5	7.1	46.0	BDL
		266	BDL	BDL	4.9	BDL	131.4	102.8	BDL	22.2	BDL	34.7	BDL
		267	BDL	BDL	4.2	BDL	BDL	BDL	BDL	12.6	BDL	6.4	BDL
		268	BDL	BDL	3.9	BDL	BDL	19.8	75.4	31.3	34.7	BDL	BDL
		269	BDL	BDL	6.0	BDL	89.8	BDL	BDL	16.3	BDL	BDL	BDL
		270	BDL	BDL	4.8	BDL	53.8	BDL	BDL	7.5	BDL	BDL	BDL

* = Result to left has an associated comment or marker
BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table G9

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Duodenum Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	IL-4 Duodenum pg/mL	IL-5 Duodenum pg/mL	IL-6 Duodenum pg/mL	IL-7 Duodenum pg/mL	IL-9 Duodenum pg/mL	IP-10 Duodenum pg/mL	KC Duodenum pg/mL	MCP-1 Duodenum pg/mL	MIP-1α Duodenum pg/mL	RANTES Duodenum pg/mL	TNF-α Duodenum pg/mL
5	f	336	BDL	BDL	BDL	BDL	BDL	49.5	35.1	36.0	7.1	31.6	BDL
		337	BDL	BDL	44.0	BDL	176.5	BDL	5.8	22.2	18.6	6.5	BDL
		338	BDL	BDL	7.0	BDL	BDL	8.6	5.2	44.9	BDL	BDL	BDL
		339	BDL	BDL	BDL	BDL	BDL	BDL	BDL	12.6	BDL	BDL	BDL
		340	BDL	BDL	3.6	BDL	BDL	19.8	9.9	34.2	24.1	BDL	BDL
		346	BDL	BDL	BDL	BDL	182.6	17.9	4.6	16.3	7.1	6.2	BDL
		347	BDL	BDL	7.0	BDL	207.9	10.3	2.9	30.3	BDL	37.6	BDL
		348	BDL	BDL	3.5	BDL	72.4	BDL	BDL	12.6	BDL	26.7	BDL
		349	40.7	BDL	BDL	BDL	BDL	91.8	184.5	35.1	34.7	10000.0	BDL
		350	BDL	BDL	7.3	BDL	30.2	BDL	BDL	19.5	BDL	BDL	BDL
6	f	416	BDL	BDL	7.6	BDL	169.6	30.6	4.5	19.5	7.1	5.3	BDL
		417	BDL	BDL	5.3	BDL	109.2	BDL	BDL	19.5	18.6	BDL	BDL
		418	BDL	BDL	BDL	BDL	BDL	61.9	22.6	33.2	31.8	11.5	BDL
		419	BDL	BDL	4.6	BDL	BDL	6.0	BDL	22.2	24.1	4.8	BDL
		420	BDL	BDL	3.9	BDL	18.0	BDL	BDL	16.3	BDL	BDL	BDL
		426	BDL	BDL	5.3	BDL	42.5	19.3	BDL	24.8	BDL	BDL	BDL
		427	BDL	BDL	3.3	BDL	BDL	BDL	BDL	7.5	BDL	BDL	BDL
		428	BDL	BDL	4.2	BDL	BDL	47.9	14.1	53.2	39.9	20.1	BDL
		429	BDL	BDL	BDL	BDL	BDL	BDL	12.9	30.3	7.1	12.2	BDL
		430	BDL	BDL	5.3	BDL	BDL	5.3	BDL	35.1	BDL	5.1	BDL

* = Result to left has an associated comment or marker
BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G9

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Cytokine/Chemokine Analysis of Duodenum Homogenates

Day: 91 relative to Start Date

Group	Sex	Animal	IL-4 Duodenum pg/mL	IL-5 Duodenum pg/mL	IL-6 Duodenum pg/mL	IL-7 Duodenum pg/mL	IL-9 Duodenum pg/mL	IP-10 Duodenum pg/mL	KC Duodenum pg/mL	MCP-1 Duodenum pg/mL	MIP-1α Duodenum pg/mL	RANTES Duodenum pg/mL	TNF-α Duodenum pg/mL
7	f	496	BDL	BDL	4.5	BDL	172.2	BDL	BDL	24.8	24.1	BDL	BDL
		497	BDL	BDL	9.9	BDL	BDL	BDL	3.4	29.3	BDL	BDL	3.9
		498	BDL	BDL	BDL	BDL	BDL	51.1	43.4	27.1	BDL	11.7	BDL
		499	BDL	BDL	BDL	BDL	BDL	47.4	44.3	19.5	BDL	10000.0	BDL
		500	BDL	BDL	6.2	BDL	358.4	54.3	22.2	30.3	33.3	10000.0	BDL
		506	BDL	BDL	4.5	BDL	104.2	54.9	22.6	41.9	26.3	BDL	BDL
		507	BDL	BDL	30.3	BDL	BDL	BDL	BDL	34.2	39.9	30.5	BDL
		508	BDL	BDL	BDL	BDL	BDL	BDL	15.0	BDL	BDL	BDL	BDL
		509	BDL	BDL	BDL	BDL	62.2	27.4	40.0	35.1	24.1	BDL	BDL
		510	BDL	BDL	7.2	BDL	BDL	7.8	3.6	29.3	BDL	BDL	BDL

* = Result to left has an associated comment or marker
BDL = Below detectable level (i.e., less than the lowest standard in the Milliplex kit, which was 3.2 pg/mL).

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G10

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary Cytokine/Chemokine Analysis of Duodenum Homogenates

Day: 91 relative to Start Date

Group	Sex		G-CSF Duodenum pg/mL	GM-CSF Duodenum pg/mL	IFN-γ Duodenum pg/mL	IL-10 Duodenum pg/mL	IL-12(p70) Duodenum pg/mL	IL-13 Duodenum pg/mL	IL-15 Duodenum pg/mL	IL-17 Duodenum pg/mL
1	f	Mean	4.63	25.01	5.95	9.68	.	6.60	10.90	10.20
		S.D.	1.13	9.58	2.32	5.73	.	.	.	.
		N	6	7	8	8	0	1	1	1
2	f	Mean	37.25	27.88	4.34	14.80	10.60	.	3.70	.
		S.D.	66.24	8.64	0.87	21.79	.	.	.	.
		N	4	6	5	8	1	0	1	0
3	f	Mean	3.53	24.79	5.38	8.22	9.20	.	4.90	.
		S.D.	0.15	6.30	1.29	2.14	.	.	.	.
		N	4	9	5	9	1	0	1	0
4	f	Mean	.	21.38	5.57	16.65	3.70	.	.	8.30
		S.D.	.	8.36	1.72	21.40	.	.	.	.
		N	0	8	6	8	1	0	0	1
5	f	Mean	4.32	24.35	6.10	15.90	9.20	.	31.85	.
		S.D.	0.89	6.58	2.86	7.96	.	.	39.81	.
		N	5	8	6	8	1	0	2	0
6	f	Mean	5.39	30.40	5.48	19.26	7.40	.	7.30	.
		S.D.	0.85	9.40	2.00	11.71	.	.	.	.
		N	7	8	8	8	1	0	1	0
7	f	Mean	14.56	29.48	8.29	30.35	15.83	14.10	6.62	4.80
		S.D.	25.82	6.18	9.26	46.39	14.10	.	3.53	.
		N	9	9	8	8	3	1	6	1

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G10

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary Cytokine/Chemokine Analysis of Duodenum Homogenates

Day: 91 relative to Start Date

Group	Sex		IL-1α Duodenum pg/mL	IL-1ß Duodenum pg/mL	IL-2 Duodenum pg/mL	IL-4 Duodenum pg/mL	IL-5 Duodenum pg/mL	IL-6 Duodenum pg/mL	IL-7 Duodenum pg/mL
1	f	Mean	539.09	175.92	5.50	.	5.00	7.03	8.25
		S.D.	546.03	125.55	.	.	.	6.28	1.20
		N	10	10	1	0	1	4	2
2	f	Mean	338.59	73.18	.	.	.	8.35	.
		S.D.	285.31	37.05	.	.	.	4.74	.
		N	8	10	0	0	0	2	0
3	f	Mean	254.49	85.35	.	.	.	5.30	.
		S.D.	224.15	33.59	.	.	.	0.93	.
		N	9	10	0	0	0	5	0
4	f	Mean	506.56	84.88	.	.	.	4.85	.
		S.D.	613.82	34.48	.	.	.	0.76	.
		N	10	10	0	0	0	6	0
5	f	Mean	331.64	56.34	6.20	40.70	.	12.07	.
		S.D.	209.36	23.01	.	.	.	15.74	.
		N	8	10	1	1	0	6	0
6	f	Mean	388.67	79.96	5.50	.	.	4.94	.
		S.D.	255.68	84.44	0.00	.	.	1.30	.
		N	9	9	2	0	0	8	0
7	f	Mean	395.82	52.38	9.43	.	.	10.43	.
		S.D.	626.99	31.48	1.95	.	.	9.94	.
		N	9	9	4	0	0	6	0

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table G10

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary Cytokine/Chemokine Analysis of Duodenum Homogenates

Day: 91 relative to Start Date

Group	Sex		IL-9 Duodenum pg/mL	IP-10 Duodenum pg/mL	KC Duodenum pg/mL	MCP-1 Duodenum pg/mL	MIP-1α Duodenum pg/mL	RANTES Duodenum pg/mL	TNF-α Duodenum pg/mL
1	f	Mean	496.64	345.85	473.20	55.59	44.78	148.14	10.60
		S.D.	698.50	545.82	511.21	92.31	20.23	155.01	11.19
		N	8	6	4	10	5	9	3
2	f	Mean	245.47	129.08	41.18	35.14	33.88	666.58	6.90
		S.D.	391.97	210.22	65.68	21.56	9.13	898.47	.
		N	7	8	6	10	4	9	1
3	f	Mean	168.19	35.33	44.20	24.27	20.58	96.71	.
		S.D.	46.36	53.67	.	9.56	18.22	114.43	.
		N	7	3	1	10	5	9	0
4	f	Mean	97.08	42.10	75.40	18.34	18.25	32.93	.
		S.D.	49.14	53.18	.	7.01	13.58	18.38	.
		N	8	3	1	9	4	4	0
5	f	Mean	133.92	32.98	35.43	26.37	18.32	21.72	.
		S.D.	77.78	32.38	66.68	11.23	11.76	14.55	.
		N	5	6	7	10	5	5	0
6	f	Mean	84.83	28.50	13.53	26.16	21.43	9.83	.
		S.D.	68.41	22.91	7.41	12.60	13.23	6.03	.
		N	4	6	4	10	6	6	0
7	f	Mean	174.25	40.48	24.31	30.17	29.54	21.10	3.90
		S.D.	130.87	18.97	16.78	6.44	6.91	13.29	.
		N	4	6	8	9	5	2	1

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table G11

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Protein Concentration of Tissue Homogenates Used for Assay
of 8-Isoprostane and Cytokine Levels:

Protein (µg/mL Homogenate)

Animal ID	Duodenum	Oral Cavity
1F16	7139	6220
1F17	7452	5938
1F18	11617	5634
1F19	6783	5710
1F20	5887	5916
1F26	9503	4605
1F27	9503	4441
1F28	11808	4899
1F29	11808	4104
1F30	10394	4624
Mean	**9189**	**5209**
S.D.	**2241**	**753**

Animal ID	Duodenum	Oral Cavity
2F96	5887	6077
2F97	6372	6569
2F98	5292	6377
2F99	3445	6769
2F100	6783	6560
2F106	9563	4292
2F107	11869	4564
2F108	11869	4427
2F109	10455	4719
2F110	10455	4229
Mean	**8199**	**5458**
S.D.	**2995**	**1089**

Animal ID	Duodenum	Oral Cavity
3F176	6372	6569
3F177	6783	5355
3F178	7452	5670
3F179	6783	7138
3F180	6372	6462
3F186	9563	3957
3F187	10455	4644
3F188	10455	4053
3F189	9563	4499
3F190	10455	4283
Mean	**8425**	**5263**
S.D.	**1817**	**1151**

Animal ID	Duodenum	Oral Cavity
4F256	13464	6005
4F257	9580	23574
4F258	7139	18992
4F259	12126	23574
4F260	5887	18992
4F266	10105	5282
4F267	10455	4313
4F268	11869	5177
4F269	8472	4114
4F270	8109	4307
Mean	**9721**	**11433**
S.D.	**2372**	**8632**

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table G11

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Protein Concentration of Tissue Homogenates Used for Assay
of 8-Isoprostane and Cytokine Levels:

Protein (µg/mL Homogenate)

Animal ID	Duodenum	Oral Cavity
5F336	14479	15036
5F337	10394	16565
5F338	14479	23574
5F339	10394	23574
5F340	14479	6282
5F346	10455	4475
5F347	14539	4098
5F348	7813	4189
5F349	11869	4832
5F350	11869	3998
Mean	**12077**	**10662**
S.D.	**2356**	**8221**

Animal ID	Duodenum	Oral Cavity
6F416	11808	5163
6F417	11808	4421
6F418	21999	4254
6F419	21999	4487
6F420	11808	4137
6F426	14539	5408
6F427	14539	4924
6F428	14539	3857
6F429	10455	4313
6F430	11869	4713
Mean	**14536**	**4568**
S.D.	**4183**	**482**

Animal ID	Duodenum	Oral Cavity
7F496	14479	3936
7F497	14479	4936
7F498	21999	4319
7F499	21999	4437
7F500	21999	4745
7F506	11869	4602
7F507	14539	4415
7F508	3783	4037
7F509	11869	3886
7F510	14539	4176
Mean	**15155**	**4349**
S.D.	**5707**	**348**

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Attachment G1

Manufacturer's Instructions for the Ferritin, Transferrin, 8-Isoprostane, and 8-OHdG ELISAs

IMMUNOASSAYS

Ferritin (Mouse) ELISA

For the quantitative determination of ferritin in mouse serum and plasma

For Research Use Only. Not For Use In Diagnostic Procedures.

Catalog Number:	41-FERMS-E01
Size:	96 wells
Version:	2 1.3 - ALPCO 8/21/2009

ALPCO Diagnostics

26G Keewaydin Drive • Salem, NH 03079
Phone: (800) 592-5726 • Fax: (603) 898-6854
www.alpco.com • Email: web@alpco.com

INTENDED USE

The Ferritin (Mouse) ELISA kits are highly sensitive two-site enzyme linked immunoassays (ELISA) for measuring ferritin in serum and plasma of mice.

INTRODUCTION

Ferritin is a water-soluble, iron storage protein. Serum ferritin levels are said to be useful for the study of iron deficiency anemia, metabolism disorders, and malignant tumors. Ferritin may also be an acute-phase protein and is often elevated in the course of disease.

PRINCIPLE OF THE ASSAY

The principle of the double antibody sandwich ELISA is represented in Figure 1. In this assay the Ferritin present in the samples reacts with the anti-ferritin antibodies which have been adsorbed to the surface of polystyrene microplate wells. After the removal of unbound serum proteins by washing, anti-ferritin antibodies conjugated with horseradish peroxidase (HRP) are added. These enzyme-labeled antibodies form complexes with the previously bound ferritin. Following another washing step, the enzyme bound to the immunosorbent is assayed by the addition of a chromogenic substrate, 3,3',5,5'-tetramethylbenzidine (TMB). The quantity of bound enzyme varies directly with the concentration of ferritin in the sample tested; the absorbance at 450 nm is a measure of the concentration of ferritin in the sample. The quantity of ferritin in the sample can be interpolated from the standard curve constructed from the standards, and corrected for sample dilution.

Anti-Ferritin Antibodies Bound To Solid Phase
|
Standards and Samples Added
|
Ferritin * Anti-Ferritin Complexes Formed
|
Unbound Sample Proteins Removed
|
Anti-Ferritin-HRP Conjugate Added
|
Anti-Ferritin-HRP * Ferritin * Anti-Ferritin Complexes Formed
|
Unbound Anti-Ferritin-HRP Removed
|
Chromogenic Substrate Added
|
Determine Bound Enzyme Activity

Figure 1.

REAGENTS (Quantities sufficient for 96 determinations)

1. DILUENT CONCENTRATE (assay buffer)
One bottle containing 50 ml of a 5X concentrated Diluent (assay buffer).

2. WASH SOLUTION CONCENTRATE
One bottle containing 50 ml of a 20X concentrated Wash solution.

3. ENZYME ANTIBODY CONJUGATE 100X
One vial containing 150 µl of affinity purified anti-mouse ferritin antibody conjugated with horseradish peroxidase in a stabilizing buffer.

4. CHROMOGEN SUBSTRATE SOLUTION
One vial containing 12 ml of 3,3′,5,5′-tetramethylbenzidine (TMB) and hydrogen peroxide in citric acid buffer at pH 3.3.

5. STOP SOLUTION
One vial containing 12 ml of 0.3 M sulfuric acid.
WARNING: Avoid contact with skin.

6. ANTI-MOUSE FERRITIN MICROPLATE
Twelve removable eight (8) well microplate strips in well holder frame. Each well is coated with affinity purified anti-mouse ferritin.

7. MOUSE FERRITIN CALIBRATOR
One vial containing a mouse ferritin Calibrator.

REAGENT PREPARATION

1. DILUENT CONCENTRATE
The Diluent solution supplied is a 5X concentrate and must be diluted 1/5 with deionized water (1 part Diluent concentrate, 4 parts deionized water).

2. WASH SOLUTION CONCENTRATE
The Wash solution supplied is a 20X concentrate and must be diluted 1/20 with deionized water (1 part Wash concentrate, 19 parts deionized water). Crystal formation in the concentrate is not uncommon when storage temperatures are low. Warming of the concentrate to 30-35°C before dilution can dissolve crystals.

3. ENZYME ANTIBODY CONJUGATE
Prepare the required amount of working Conjugate solution for each microplate strip by adding 10 µl of Enzyme Antibody Conjugate to 990 µl of 1X Diluent for each strip to be used. Mix uniformly, but gently. Avoid foaming.

4. CHROMOGEN SUBSTRATE SOLUTION
Ready to use as supplied.

5. STOP SOLUTION
Ready to use as supplied.

6. ANTI-MOUSE FERRITIN MICROPLATE
Ready to use as supplied. Unseal Microplate pouch and remove plate from pouch. Remove all strips and wells that **will not** be used from the well holder frame, place back in pouch along with desiccant pack, and reseal.

7. MOUSE FERRITIN CALIBRATOR
The mouse ferritin Calibrator should be stored frozen in aliquots. The Calibrator is at a concentration of 840 ng/ml. **Mouse ferritin Standards need to be prepared immediately prior to use (see chart below).** Mix well between each step. Avoid foaming.

Standards	ng/ml	Volume Added to 1X Diluent	Volume of 1X Diluent
6	400	250 µl of ferritin Calibrator	275 µl
5	200	300 µl of Standard 6	300 µl
4	100	300 µl of Standard 5	300 µl
3	50	300 µl of Standard 4	300 µl
2	25	300 µl of Standard 3	300 µl
1	12.5	300 µl of Standard 2	300 µl
0	0		500 µl

STORAGE AND STABILITY

The expiry date for the package is stated on the box label.

1. DILUENT
The 5X Diluent concentrate is stable until the expiry date. The 1X working solution is stable for at least one week from the date of preparation. Both solutions should be stored at 4-8°C.

2. WASH SOLUTION
The 20X Wash solution concentrate is stable until the expiry date. The 1X working solution is stable for at least least one week from the date of preparation. Both solutions can be stored at room temperature (16-25°C) or at 4-8°C.

3. ENZYME ANTIBODY CONJUGATE
Undiluted horseradish peroxidase anti-ferritin conjugate should be stored at 4-8°C and **diluted immediately prior to use**. The working conjugate solution is stable for up to 8 hours.

4. CHROMOGEN SUBSTRATE SOLUTION
The Chromogen Substrate solution should be stored at 4-8°C and is stable until the expiry date.

5. STOP SOLUTION
The Stop solution should be stored at 4-8°C and is stable until the expiry date.

6. ANTI-MOUSE FERRITIN MICROPLATE
Anti-mouse ferritin coated wells are stable until the expiry date and should be stored at 4-8°C in the sealed foil pouch with desiccant pack.

7. MOUSE FERRITIN CALIBRATOR
Long Term Storage: Upon receipt, stored Calibrator in frozen aliquots. They will be stable until the expiry date. Short Term Storage: The Calibrator is stable for up to 14 days at 4°C. The working Standard solutions should be prepared immediately prior to use and are stable for up to 8 hours.

INDICATIONS OF INSTABILITY
If the test is performing correctly, the results observed with the Standard solutions should be within 20% of the expected values.

SAMPLE COLLECTION AND HANDLING

Blood should be collected by venipuncture. The serum should be separated from the cells after clot formation by centrifugation. For plasma samples, blood should be collected into a container with an anticoagulant and then centrifuged. Care should be taken to minimize hemolysis; excessive hemolysis can impact the results. Assay immediately or store samples in aliquots at -20°C. Avoid repeated freeze-thaw cycles.

1. Precautions

For any sample that might contain pathogens, care must be taken to prevent contact with open wounds.

2. Additives and Preservatives

No additives or preservatives are necessary to maintain the integrity of the sample. Avoid azide contamination.

3. Known Interfering Substances

Azide and thimerosal at concentrations higher than 0.1% inhibit the enzyme reaction.

MATERIALS PROVIDED - See "REAGENTS"

MATERIALS REQUIRED BUT NOT PROVIDED

- Precision pipettes (10 µl - 1 ml) for making and dispensing dilutions
- Test tubes
- Microplate washer/aspirator
- Deionized or distilled water
- Microplate reader
- Assorted glassware for the preparation of reagents and buffer solutions
- Timer
- Vortex mixer
- Centrifuge
- Anticoagulant – for collection of plasma samples

ASSAY PROTOCOL

DILUTION OF SAMPLES

The assay for quantification of ferritin in plasma or serum requires that samples be diluted before use. For a single step determination, a dilution of 1/40 is appropriate for most plasma or serum samples. A lesser or greater dilution might be required for absolute quantification of samples yielding results outside the range of the standard curve. **It is highly recommended to serially dilute one or two representative samples if unsure of sample level, before running the entire plate.**

1. To prepare a 1/40 dilution of sample, transfer 10 µl of sample to 390 µl of 1X Diluent. This yields a 1/40 dilution. Mix thoroughly.

PROCEDURE

1. **Bring all reagents to room temperature before use.**

2. Pipette 100 µl of

   Standard 0 (0 ng/ml) in duplicate
   Standard 1 (12.5 ng/ml) in duplicate
   Standard 2 (25 ng/ml) in duplicate
   Standard 3 (50 ng/ml) in duplicate
   Standard 4 (100 ng/ml) in duplicate
   Standard 5 (200 ng/ml) in duplicate
   Standard 6 (400 ng/ml) in duplicate

3. Pipette 100 µl of the prediluted samples (in duplicate) into the predesignated wells.

4. Incubate the microplate at room temperature for sixty (60+/-2) minutes. Keep plate covered and level during incubation.

5. Following incubation, aspirate the contents of the wells.

6. Completely fill each well with appropriately diluted Wash solution and aspirate. Repeat three times, for a total of four washes. If washing manually - completely fill wells with 1X Wash solution, invert the plate, and then pour/shake out the contents in a waste container. Follow this by sharply striking the wells on absorbent paper to remove residual solution. Repeat three times for a total of four washes.

7. Pipette 100 µl of appropriately diluted Enzyme Antibody Conjugate to each well. Incubate at room temperature for ten (10+/-2) minutes. Keep plate covered, level, and in the dark during the incubation.

8. Wash and blot the wells as described in Steps 5 and 6.

9. Pipette 100 µl of Chromogen Substrate solution into each well.

10. Incubate in the dark at room temperature for precisely ten (10) minutes.

11. After ten minutes, add 100 µl of Stop solution to each well.

12. Determine the absorbance (450 nm) of the contents of each well. Calibrate the plate reader to air.

STABILITY OF THE FINAL REACTION MIXTURE

The absorbance of the final reaction mixture can be measured up to two hours after the addition of the Stop solution. However, good laboratory practice dictates that the measurement be made as soon as possible.

RESULTS

1. Substract the average background value from the test values for each sample.

2. Using the results observed for the Standards construct a standard curve. The appropriate curve fit is that of a four parameter logistics curve. A second order polynomial (quadratic) or other curve fit may also be used.

3. Interpolate test sample values from the standard curve. Correct for sera dilution factor to arrive at the ferritin concentration in the original sample.

LIMITATIONS OF THE PROCEDURE

1. Reliable and reproducible results will be obtained when the assay procedure is carried out with a complete understanding of the information contained in the package insert instructions and with adherence to good laboratory practice.

2. Factors that might affect the performance of the assay include proper instrument function; cleanliness of glassware; quality of deionized water; and accuracy of reagent and sample pipettings, washing technique, and incubation times/temperatures.

3. Do not mix or substitute reagents with those from other lots or sources.

IMMUNOASSAYS

Transferrin (Mouse) ELISA

For the quantitative determination of transferrin in mouse serum or plasma

Please read carefully due to Critical Changes, e.g., Standard preparation and recommended sample dilution.

For Research Use Only. Not For Use In Diagnostic Procedures.

Catalog Number:	41-TRAMS-E01
Size:	96 wells
Version:	2 L12.0 – ALPCO 5/24/2010

ALPCO Diagnostics

26G Keewaydin Drive • Salem, NH 03079
Phone: (800) 592-5726 • Fax: (603) 898-6854
www.alpco.com • Email: web@alpco.com

INTENDED USE

The Transferrin (Mouse) ELISA test kit is a highly sensitive two-site enzyme linked immunoassay (ELISA) for measuring transferrin in serum and plasma of mice.

INTRODUCTION

Transferrin is a metal-combining protein that binds reversibly to acid-soluble iron in plasma. Its function is to transport iron to the bone marrow, and to tissue storage organs such as the liver. Transferrin also participates in the regulation and control of iron absorption and protects against iron intoxication. Like haptoglobin, the carrier of hemoglobin, transferrin is synthesized in the liver, but unlike haptoglobin, transferrin is returned to the circulation after unloading its iron in the reticuloendothelial system. This ELISA kit can be used to measure transferrin in serum and plasma.

PRINCIPLE OF THE ASSAY

The principle of the double antibody sandwich ELISA is represented in Figure 1. In this assay the transferrin present in the sample reacts with the anti-transferrin antibodies which have been adsorbed to the surface of polystyrene microplate wells. After the removal of unbound sample proteins by washing, anti-transferrin antibodies conjugated with horseradish peroxidase (HRP) are added. These enzyme-labeled antibodies form complexes with the previously bound sample transferrin. Following another washing step, the enzyme bound to the immunosorbent is assayed by the addition of a chromogenic substrate, 3,3',5,5'-tetramethylbenzidine (TMB). The quantity of bound enzyme correlates directly with the concentration of transferrin in the sample tested; the absorbance at 450 nm is a measure of the concentration of transferrin in the sample. The quantity of transferrin in the sample can be interpolated from the standard curve constructed from the standards, and corrected for sample dilution.

Anti-Transferrin Antibodies Bound To Solid Phase
|
Standards and Samples Added
|
Transferrin * Anti-Transferrin Complexes Formed
|
Unbound Sample Proteins Removed
|
Anti-Transferrin-HRP Conjugate Added
|
Anti-Transferrin-HRP * Transferrin * Anti-Transferrin Complexes Formed
|
Unbound Anti-Transferrin-HRP Removed
|
Chromogenic Substrate Added
|
Determine Bound Enzyme Activity

Figure 1.

REAGENTS (Quantities sufficient for 96 determinations)

1. DILUENT CONCENTRATE (assay buffer)
One bottle containing 50 ml of a 5X concentrated Diluent (assay buffer).

2. WASH SOLUTION CONCENTRATE
One bottle containing 50 ml of a 20X concentrated Wash solution.

3. ENZYME ANTIBODY CONJUGATE 100X
One vial containing 150 µl of affinity purified anti-mouse transferrin antibody conjugated with horseradish peroxidase in a stabilizing buffer.

4. CHROMOGEN SUBSTRATE SOLUTION
One vial containing 12 ml of 3,3',5,5'-tetramethylbenzidine (TMB) and hydrogen peroxide in citric acid buffer at pH 3.3.

5. STOP SOLUTION
One vial containing 12 ml of 0.3 M sulfuric acid. **WARNING: Avoid contact with skin.**

6. ANTI-MOUSE TRANSFERRIN ELISA MICROPLATE
Twelve removable eight (8) well microplate strips in well holder frame. Each well is coated with affinity purified anti-mouse transferrin.

7. MOUSE TRANSFERRIN CALIBRATOR
One vial containing a lyophilized mouse transferrin Calibrator.

FOR RESEARCH USE ONLY

REAGENT PREPARATION

1. DILUENT CONCENTRATE
The Diluent supplied is a 5X concentrate and must be diluted 1:5 with distilled or deionized water (1 part buffer concentrate, 4 parts deionized water).

2. WASH SOLUTION CONCENTRATE
The Wash solution supplied is a 20X concentrate and must be diluted 1:20 with distilled or deionized water. Crystal formation in the concentrate is not uncommon when storage temperatures are low. Warming of the concentrate to 30-35°C before dilution can dissolve crystals (1 part buffer concentrate, 19 parts deionized water).

3. ENZYME ANTIBODY CONJUGATE
The required amount of working conjugate solution for each microplate is prepared by adding 10 µl Enzyme Antibody Conjugate to 990 µl of 1X Diluent for each test strip to be used. Mix uniformly, but gently. Avoid foaming.

4. CHROMOGEN SUBSTRATE SOLUTION
Ready to use as supplied.

5. STOP SOLUTION
Ready to use as supplied.

6. ANTI-MOUSE TRANSFERRIN ELISA MICROPLATE
Ready to use as supplied. Unseal microplate pouch and remove plate. Remove all strips and wells that WILL NOT be used from the well holder frame, place back in pouch along with desiccant pack, and reseal.

7. MOUSE TRANSFERRIN CALIBRATOR
Add 1.0 ml of distilled or deionized water to the mouse transferrin Calibrator and mix gently until dissolved. The Calibrator is now at a concentration of 8.86 µg/ml **(the reconstituted Calibrator should be frozen in aliquots if future use is intended). Mouse transferrin Standards need to be prepared immediately prior to use (see chart below).** Mix well between each step. Avoid foaming. For samples containing lower levels of transferrin, it is possible to extend the utility of the lower detection limit of this assay by making a 2-fold dilution of standard 1.

Standard	ng/ml	Volume added to 1X Diluent ⟶	Volume of 1X Diluent
6	100	10 µl Mouse Transferrin Calibrator	876 µl
5	50	250 µl Standard 6	250 µl
4	25	250 µl Standard 5	250 µl
3	12.5	250 µl Standard 4	250 µl
2	6.25	250 µl Standard 3	250 µl
1	3.125	250 µl Standard 2	250 µl
0	0		500 µl

STORAGE AND STABILITY

The expiration date for the package is stated on the box label.

1. DILUENT
The 5X Diluent concentrate is stable until the expiration date. The 1X working solution is stable for at least one week from the date of preparation. Both solutions should be stored at 4-8°C.

2. WASH SOLUTION
The 20X Wash solution concentrate is stable until the expiration date. The 1X working solution is stable for at least one week from the date of preparation. Both solutions can be stored at room temperature (16-25°C) or at 4-8°C.

3. ENZYME ANTIBODY CONJUGATE
Undiluted horseradish peroxidase anti-transferrin Conjugate should be stored at 4-8°C and **diluted immediately prior to use**. The working Conjugate solution is stable for up to 8 hours.

4. CHROMOGEN SUBSTRATE SOLUTION
The Chromogen Substrate solution should be stored at 4-8°C and is stable until the expiration date.

5. STOP SOLUTION
The Stop solution should be stored at 4-8°C and is stable until the expiration date.

6. ANTI-MOUSE TRANSFERRIN ELISA MICROPLATE
Anti-mouse transferrin coated wells are stable until the expiration date, and should be stored at 4-8°C in the sealed foil pouch with desiccant pack.

7. MOUSE TRANSFERRIN CALIBRATOR
The lyophilized mouse transferrin Calibrator should be stored at 4°C or frozen until reconstituted. The reconstituted Calibrator should be stored frozen in aliquots (multiple freeze/thaw cycles should be avoided). The working Standard solutions should be prepared immediately prior to use and are stable for up to 8 hours.

INDICATIONS OF INSTABILITY
If the test is performing correctly, the results observed with the Standard solutions should be within 20% of the expected values.

SAMPLE COLLECTION AND HANDLING

Blood should be collected by venipuncture. The serum should be separated from the cells after clot formation by centrifugation. For plasma samples, blood should be collected into a container with an anticoagulant and then centrifuged. Care should be taken to minimize hemolysis; excessive hemolysis can impact test results. Assay immediately or store samples in aliquots at -20°C. Avoid repeated freeze/thaw cycles.

1. Precautions

For any sample that might contain pathogens, care must be taken to prevent contact with open wounds.

2. Additives and Preservatives

No additives or preservatives are necessary to maintain the integrity of the specimen. Avoid azide contamination.

3. Known interfering substances

Azide and thimerosal at concentrations higher than 0.1% inhibit the enzyme reaction.

MATERIALS PROVIDED - See "REAGENTS"

MATERIALS REQUIRED BUT NOT PROVIDED

- Precision pipette (1 µl to 1 ml) for making and dispensing dilutions
- Test tubes
- Microplate washer/aspirator
- Distilled or deionized water
- Microplate reader
- Assorted glassware for the preparation of reagents and buffer solutions
- Timer
- Anticoagulant (for collection of plasma)
- Vortex mixer

ASSAY PROTOCOL

DILUTION OF SERUM SAMPLES

The assay for quantification of transferrin requires that each sample be diluted before use. For a single step determination, a 1:100,000 dilution is appropriate for most serum or plasma samples. A lesser or greater dilution might be required for absolute quantification of samples that yield results outside the range of the standard curve. **If unsure of sample concentration, test a serial dilution with one or two representative samples before running the entire plate.**

1. To prepare a 1:100,000 dilution of sample, transfer 5 µl of sample to 495 µl of 1X Diluent. This gives yields a 1:100 dilution. Next, dilute the 1:100 samples by transferring 1 µl to 999 µl of 1X Diluent. This yields a 1:100,000 dilution of the sample. Mix thoroughly at each stage.

PROCEDURE

1. **Bring all reagents to room temperature before use.**

2. Pipette 100 µl of
   Standard 0 (0 ng/ml) in duplicate
   Standard 1 (3.125 ng/ml) in duplicate
   Standard 2 (6.25 ng/ml) in duplicate
   Standard 3 (12.5 ng/ml) in duplicate
   Standard 4 (25 ng/ml) in duplicate
   Standard 5 (50 ng/ml) in duplicate
   Standard 6 (100 ng/ml) in duplicate

3. Pipette 100 µl of the diluted samples (in duplicate) into the pre-designated wells.

4. Incubate the microplate at room temperature for thirty (30 ± 2) minutes. Keep plate covered and level during incubation.

5. Following incubation, aspirate the contents of the wells.

6. Completely fill each well with appropriately diluted Wash solution and aspirate. Repeat three times, for a total of four washes. If washing manually, completely fill wells with Wash solution, invert the plate, and pour/shake out the contents into a waste container. Follow this by sharply striking the wells on absorbent paper to remove residual solution. Repeat three times for a total of four washes.

7. Pipette 100 µl of appropriately diluted Enzyme Antibody Conjugate to each well. Incubate at room temperature for for thirty (30 ± 2) minutes. Keep plate covered, in the dark, and level during incubation.

8. Wash and blot the wells as described in Steps 5 and 6.

9. Pipette 100 µl of Chromogen Substrate solution into each well.

10. Incubate in the dark at room temperature for precisely ten (10) minutes.

11. After ten (10) minutes, add 100 µl of Stop solution to each well.

12. Determine the absorbance (450 nm) of the contents of each well. Calibrate the plate reader to air.

STABILITY OF THE FINAL REACTION MIXTURE

The absorbance of the final reaction mixture can be measured up to 2 hours after the addition of the Stop solution. However, good laboratory practice dictates that the measurement be made as soon as possible.

RESULTS

1. Subtract the average background (0 ng/ml standard) value from the test values for each sample.

2. Using the results observed for the standards construct a standard curve. The appropriate curve fit is that of a four-parameter logistics curve. A second order polynomial (quadratic) or other curve fit may also be used.

3. Interpolate test sample values from standard curve. Correct for sera dilution factor to arrive at the transferrin concentration in the original sample.

LIMITATIONS OF THE PROCEDURE

1. Reliable and reproducible results will be obtained when the assay procedure is carried out with a complete understanding of the information contained in the package insert instructions and with adherence to good laboratory practice.

2. Factors that might affect the performance of the assay include proper instrument function, cleanliness of glassware, quality of distilled or deionized water, thoroughness of washing, and accuracy of reagent and sample pipettings.

3. Do not mix or substitute reagents with those from other lots or sources.

Product Manual

OxiSelect™ 8-iso-Prostaglandin F2α ELISA Kit

Catalog Numbers

STA-337 96 assays

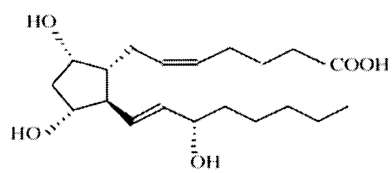
FOR RESEARCH USE ONLY
Not for use in diagnostic procedures

CELL BIOLABS, INC.
Creating Solutions for Life Science Research

Introduction

Lipid peroxidation is a well-defined mechanism of cellular damage in animals and plants. Lipid peroxides are unstable indicators of oxidative stress in cells that decompose to form more complex and reactive compounds such as isoprostanes. The isoprostanes are a type of eicosanoids produced non-enzymatically through the oxygen radical induced peroxidation of tissue phospholipids and lipoproteins. Isoprostanes are prostaglandin-like compounds that appear in normal plasma and urine samples, but are elevated by oxidative stress in tissue, plasma, and urine.

8-iso-Prostaglandin F2α (also known as 8-epi-PGF2α, 8-isoprostane, or 15-isoprostane F2t), is an isoprostane that has been shown to be useful for the assessment of oxidative stress *in vivo*. It is produced in membrane phospholipids from non-cyclooxygenase and cyclooxygenase peroxidation pathways derived from arachidonic acid. 8-iso-Prostaglandin F2α (8-iso-PGF2α) is a potent vasoconstrictor, a mutagen in 3T3 cells as well as vascular smooth muscle cells, and also a possible pathophysiological mediator that can alter membrane integrity. It has been implicated in atherogenesis and elevated levels are associated with hepatorenal syndrome, rheumatoid arthritis, carcinogenesis, as well as atherosclerosis. 8-iso-PGF2α circulates in the plasma and is excreted in the urine. 8-iso PGF2α circulates as an esterified LDL Phospholipid and as a free acid. The total normal plasma 8-iso PGF2α is about 40-100 pg/mL and about 190 pg/mg of creatine. Methods for determining total 8-iso PGF2α usually require alkaline hydrolysis of 8-iso PGF2α esters from tissues followed by extractions, phase separations and thin layer chromatography.



8-iso-Prostaglandin F2α (8-iso-PGF2α)

Cell Biolabs' OxiSelect™ 8-iso-Prostaglandin F2α ELISA Kit is an enzyme immunoassay developed for rapid detection and quantification of 8-iso-Prostaglandin F2α. The quantity of 8-iso-PGF2α in samples is determined by comparing its absorbance with that of a known 8-iso-PGF2α standard curve. Each kit provides sufficient reagents to perform up to 96 assays, including the standard curve and unknown phospholipids samples.

Assay Principle

Cell Biolabs' 8-iso-PGF2α kit is a competitive enzyme-linked immunoassay (ELISA) for determining levels of 8-iso-PGF2α in a variety of biological samples such as plasma, urine, serum, or tissue extracts. An antibody to 8-iso-PGF2α is incubated in pre-coated microtiter plate wells. Upon washing, 8-iso-PGF2α standards or treated samples are mixed with an 8-iso-PGF2α-HRP conjugate and added simultaneously to the wells. The unconjugated, or free 8-iso-PGF2α and 8-iso-PGF2α-HRP conjugate compete for binding to the antibody bound to the plate. After this brief incubation and wash, a substrate to the HRP is added. The HRP activity results in color development that is directly proportional to the amount of 8-iso-PGF2α conjugate bound to the plate and inversely proportional to the amount of free 8-iso-PGF2α in the samples or standards. The 8-iso-PGF2α content in an unknown sample is determined by comparing with the known predetermined standard curve. Please read the complete kit insert prior to performing the assay.

Related Products

1. STA-330: OxiSelect™ TBARS Assay Kit (MDA Quantitation)
2. STA-334: OxiSelect™ HNE-His Adduct ELISA Kit
3. STA-340: OxiSelect™ Superoxide Dismutase Activity Assay
4. STA-341- OxiSelect™ Catalase Activity Assay Kit
5. STA-310: OxiSelect™ Protein Carbonyl ELISA Kit
6. STA-320: OxiSelect™ Oxidative DNA Damage ELISA Kit (8-OHdG Quantitation)
7. STA-325: OxiSelect™ Oxidative RNA Damage ELISA Kit (8-OHG Quantitation)
8. STA-350: OxiSelect™ Comet Assay (3-Well Slides)
9. STA-345: OxiSelect™ ORAC Activity Assay
10. STA-346: OxiSelect™ HORAC Activity Assay

Kit Components

1. Goat Anti-Rabbit Antibody Coated Plate (Part No. 250001): One 96-well strip plate.
2. Anti-8-iso-PGF2α Antibody (Part No. 233701): One 20 µL tube of anti-8-iso-PGF2α rabbit IgG.
3. Sample Diluent (Part No. 233702): One 50 mL bottle.
4. 10X Wash Buffer (Part No. 310806): One 100 mL bottle.
5. Substrate Solution (Part No. 310807): One 12 mL amber bottle.
6. Stop Solution (Part. No. 310808): One 12 mL bottle.
7. 8-iso-PGF2α Standard (Part No. 233703): One 25 µL tube of 200 µg/mL 8-iso-PGF2α in DMSO.
8. 8-iso-PGF2α-HRP Conjugate (Part No. 233704): One 70 µL tube of 8-iso-PGF2α-HRP conjugate.

Materials Not Supplied

1. Protein samples such as purified protein, plasma, serum, cell lysate
2. Deionized water
3. 5 µL to 1000 µL adjustable single channel precision micropipettes with disposable tips
4. 50 µL to 300 µL adjustable multichannel micropipette with disposable tips
5. Bottles, flasks, and conical or microtubes necessary for reagent preparation
6. Reagents and materials necessary for sample extraction and purification
7. Multichannel micropipette reservoir
8. Plate orbital shaker or rotator
9. Microplate reader capable of reading at 450 nm (620 nm as optional reference wave length)

Storage

Upon receipt, store the Anti-8-iso-PGF2α Antibody, 8-iso-PGF2α-HRP Conjugate, and 8-iso-PGF2α Standard at -20ºC. Make aliquots as necessary to avoid freeze/thaw cycles. Store all other kit components at 4ºC until their expiration dates. Any partial or unused components should return to their proper storage temperatures.

Safety Considerations

1. Some kit components contain azide, which can react with copper or lead piping. Flush with large volumes of water when disposing of reagents.
2. Some kit reagents are caustic or hazardous and should be handled accordingly.

Preparation of Reagents

- 1X Wash Buffer: Dilute the 10X Wash Buffer Concentrate to 1X with deionized water. Stir to homogeneity.
- Anti-8-iso-PGF2α Antibody: Immediately before use, dilute the Anti-8-iso-PGF2α Antibody 1:1000 with Sample Diluent.
- 8-iso-PGF2α-HRP Conjugate: Immediately before use, dilute the conjugate 1:80 with Sample Diluent. Only prepare enough of the diluted conjugate for the number of wells immediately used.
- Substrate Solution: Prior to use, warm the Substrate Solution to room temperature.

Note: Do not store diluted Anti-8-iso-PGF2α Antibody, 8-iso-PGF2α-HRP Conjugate, or 8-iso-PGF2α Standard solutions.

Preparation of Samples

Hydrolysis of lipoprotein or phospholipid coupled 8-iso-Prostaglandin F2α (8-iso-PGF2α) is required to measure both free and esterified isoprostane. To hydrolyze this ester bond, the sample is usually treated with 2N NaOH at 45 °C for 2 hours.

Serum, plasma, tissue lysate samples:

Use 1 part of 10N NaOH for every 4 parts of liquid sample. After incubation at 45 °C for 2 hours, add 100 µL of concentrated (12.1N) HCl per 500 µL of hydrolyzed sample. The sample could turn milky after this addition. Centrifuge the samples for 5 minutes at 12,000 rpm in a microcentrifuge. The clear supernatant can be used in the assay or stored at ≤ -20 °C for future use. If necessary check the pH of the neutralized samples. The pH should be in the range of 6-8. If it is not, adjust the pH to this range by adding 1 M Tris stock, pH 7.0, to a final 50 mM Tris.

Urine Sample:

Urine sample is acidified to pH 3.0 by adding 1/10 volume of 1N HCl (Example: Add 100 µL of 1N HCl to 1 mL of urine sample). Acidified urine sample should be further diluted in PBS or Sample Diluent 1:4 to 1:8 before ELISA.

Preparation of 8-iso-PGF2α Standards

1. Prepare fresh standards by diluting the 8-iso-PGF2α Standard from 200µg/mL to 0.2 µg/mL in Sample Diluent for a 1:1000 final dilution. (Example: Add 5 µL of 8-iso-PGF2α Standard stock tube to 4.995 mL of Sample Diluent)
2. Prepare a series of the remaining 8-iso-PGF2α standards according to Table 1.

Standard Tubes	8-iso-PGF2α Standard (µL)	Sample Diluent (µL)	8-iso-PGF2α Standard (pg/mL)
1	5 µL of Standard Stock	4995 µL	200,000
2	250 µL of Tube #1	750 µL	50,000
3	250 µL of Tube #2	750 µL	12,500
4	250 µL of Tube #3	750 µL	3,125
5	250 µL of Tube #4	750 µL	781
6	250 µL of Tube #5	750 µL	195
7	250 µL of Tube #6	750 µL	49
8	0 µL	200 µL	0

Table 1. Preparation of 8-iso-PGF2α Standard Curve.

Note: Do not store diluted 8-iso-PGF2α Standard solutions.

Assay Protocol

Note: Each 8-iso-PGF2α Standard and unknown samples should be assayed in duplicate or triplicate. A freshly prepared standard curve should be used each time the assay is performed.

1. Add 100 µL of the diluted Anti-8-iso-PGF2α Antibody to the Goat Anti-Rabbit Antibody Coated Plate. Incubate 1 hour at 25°C on an orbital shaker.
2. Remove the antibody solution from the wells. Wash wells 5 times with 300 µL 1X Wash Buffer per well. After the last wash, empty the wells and tap microwell plate on absorbent pad or paper towel to remove excess wash solution.

   Note: Thorough washing is necessary to remove all of the azide present in the antibody solution.
3. Combine 55 µL of the 8-iso-PGF2α standard or sample and 55 µL of 8-iso-PGF2α-HRP conjugate in a microtube and mix thoroughly. Transfer 100 µL of the combined solution per well. A well containing Sample Diluent can be used as a control. Incubate 1 hour at 25°C on an orbital shaker.
4. Remove the combined solution from the wells. Wash 5 times with 300 µL of 1X Wash Buffer per well. After the last wash, empty wells and tap microwell plate on absorbent pad or paper towel to remove excess wash solution.

5. Add 100 µL of Substrate Solution to each well. Incubate at room temperature for 10-30 minutes on an orbital shaker.
6. Stop the enzyme reaction by adding 100 µL of Stop Solution to each well. Results should be read immediately (color will fade over time).
7. Read absorbance of each well on a microplate reader using 450 nm as the primary wave length.

Example of Results

The following figures demonstrate typical 8-iso-PGF2α results. One should use the data below for reference only. This data should not be used to interpret actual results.

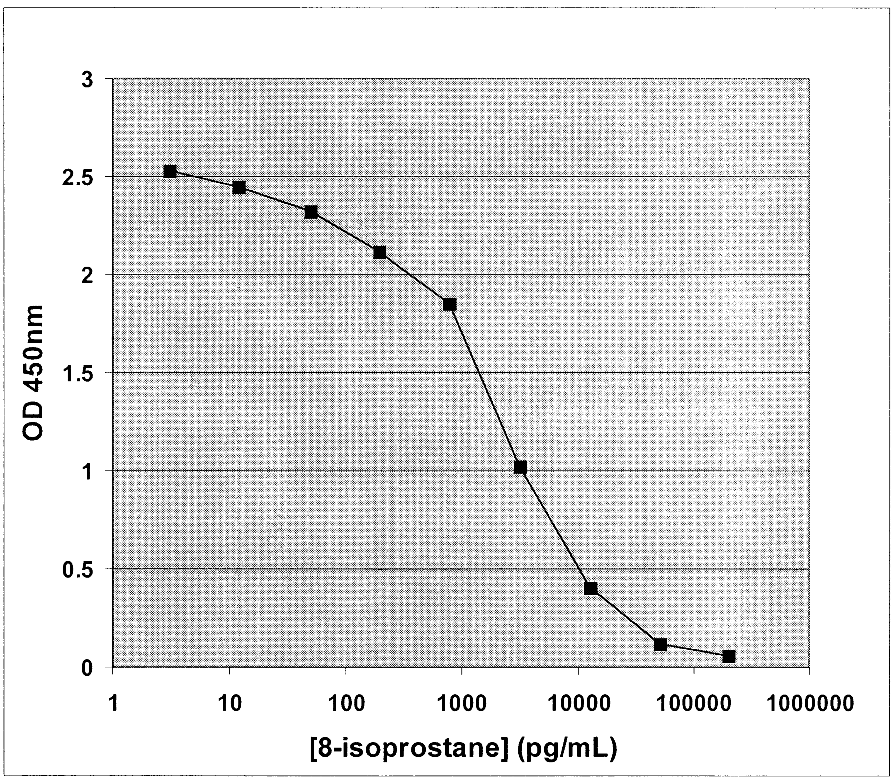


Figure 1: 8-iso-PGF2α ELISA Standard Curve.

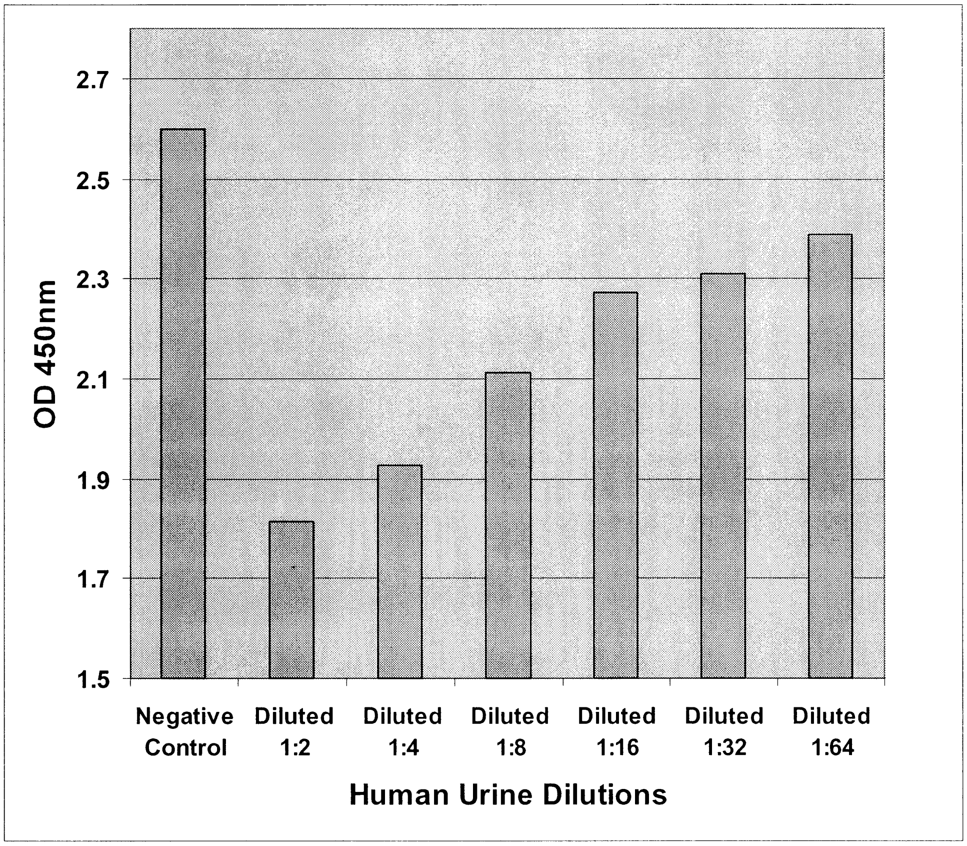


Figure 2: Dilutions of Human Urine tested with 8-iso-PGF2α ELISA.

Cross reactivity of 8-iso-Prostaglandin F2α ELISA Kit

Compounds	Cross Reactivity
8-iso-PGF2α	100%
PGF1α	4.6%
PGF2α	1.85%
PGE1	0.19%
TXB2	0.023%
PGB1	0.02%
PGE3	0.012%
6-keto-PGF1α	0.008%
13,14-dihydro-15-keto-PGF2α	0.008%
6,15-keto-13,14-dihydro-PGF1α	0.005%
8-iso-PGE1	<0.001%
PGA2	<0.001%
PGJ2	<0.001%

References

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5. Wang, Z., Ciabattoni, G., Cre'minon, C., et al. (1995) *Pharmacol. Exp. Ther.* 275: 94-100.

Warranty

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Contact Information

Cell Biolabs, Inc.
7758 Arjons Drive
San Diego, CA 92126
Worldwide: +1 858-271-6500
USA Toll-Free: 1-888-CBL-0505
E-mail: tech@cellbiolabs.com
www.cellbiolabs.com

Revised Protocol

Product Manual

OxiSelect™ Oxidative DNA Damage ELISA Kit (8-OHdG Quantitation)

Catalog Number

STA-320	96 assays
STA-320-5	5 x 96 assays

FOR RESEARCH USE ONLY
Not for use in diagnostic procedures

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Introduction

Free radicals and other reactive species are constantly generated *in vivo* and cause oxidative damage to biomolecules, a process held in check only by the existence of multiple antioxidant and repair systems as well as the replacement of damaged nucleic acids, proteins and lipids. DNA is probably the most biologically significant target of oxidative attack, and it is widely thought that continuous oxidative damage to DNA is a significant contributor to the age-related development of the major cancers, such as those of the colon, breast, rectum, and prostate. Among numerous types of oxidative DNA damage, the formation of 8-hydroxydeoxyguanosine (8-OHdG) is a ubiquitous marker of oxidative stress. 8-OHdG, one of the oxidative DNA damage byproducts, is physiologically formed and enhanced by chemical carcinogens. During the repair of damaged DNA *in vivo* by exonucleases, the resulting 8-OH-dG is excreted without further metabolism into urine.

Cell Biolabs' Oxidative DNA Damage ELISA Kit is a competitive enzyme immunoassay developed for rapid detection and quantitation of 8-OHdG in urine, serum, or other cell or tissue DNA samples. The quantity of 8-OHdG in unknown sample is determined by comparing its absorbance with that of a known 8-OHdG standard curve. The kit has an 8-OHdG detection sensitivity range of 100 pg/mL to 20 ng/mL. Each kit provides sufficient reagents to perform up to 96 assays, including standard curve and unknown samples.

Assay Principle

The Oxidative DNA Damage ELISA kit is a competitive ELISA for the quantitative measurement of 8-OHdG. The unknown 8-OHdG samples or 8-OHdG standards are first added to an 8-OHdG/BSA conjugate preabsorbed EIA plate. After a brief incubation, an anti-8-OHdG monoclonal antibody is added, followed by an HRP conjugated secondary antibody. The 8-OHdG content in unknown samples is determined by comparison with predetermined 8-OHdG standard curve.

Related Products

1. STA-303: OxiSelect™ Nitrotyrosine Immunoblot Kit
2. STA-305: OxiSelect™ Nitrotyrosine ELISA Kit
3. STA-308: OxiSelect™ Protein Carbonyl Immunoblot Kit
4. STA-310: OxiSelect™ Protein Carbonyl ELISA Kit
5. STA-315: OxiSelect™ Protein Carbonyl Spectrophotometric Assay
6. STA-330: OxiSelect™ TBARS Assay Kit (MDA Quantitation)
7. STA-332: OxiSelect™ MDA ELISA Kit
8. STA-334: OxiSelect™ HNE Adduct ELISA Kit
9. STA-324: OxiSelect™ Oxidative DNA Damage Quantitation Kit (AP Sites)
10. STA-325: OxiSelect™ Oxidative RNA Damage ELISA Kit (8-OHG)

Kit Components

Box 1 (shipped at room temperature)

1. 96-well Protein Binding Plate (Part No. 231001): One strip well 96-well plate.
2. Anti-8-OHdG Antibody (Part No. 232002): One 15 µL vial of anti-8-OHdG.
3. Secondary Antibody, HRP Conjugate (Part No. 10902): One 50 µL vial.
4. Assay Diluent (Part No. 310804): One 50 mL bottle.
5. 10X Wash Buffer (Part No. 310806): One 100 mL bottle.
6. Substrate Solution (Part No. 310807): One 12 mL amber bottle.
7. Stop Solution (Part. No. 310808): One 12 mL bottle.
8. 8-OHdG Standard (Part No. 232003): One 100 µL vial of 2 µg/mL 8-OHdG in 1X PBS, 0.1% BSA.

Box 2 (shipped on blue ice packs)

1. 8-OHdG Conjugate (Part No. 232001): One 20 µL vial of 8-OHdG-BSA conjugate at 1.0 mg/mL in PBS.

Materials Not Supplied

1. 8-OHdG samples such as serum, urine, cell or tissue DNA
2. DNA Extraction Kit
3. Sodium Acetate, pH 5.2
4. Tris Buffer, pH7.5
5. Nuclease P1, Alkaline Phosphatase
6. 10 µL to 1000 µL adjustable single channel micropipettes with disposable tips
7. 50 µL to 300 µL adjustable multichannel micropipette with disposable tips
8. Multichannel micropipette reservoir
9. Microplate reader capable of reading at 450 nm (620 nm as optional reference wave length)

Storage

Upon receipt, aliquot and store the **8-OHdG Standard at -20°C** and the **8-OHdG Conjugate at -80°C** to avoid multiple freeze/thaw cycles. Store all other components at 4°C until their expiration dates.

Preparation of Reagents

- 8-OHdG Coated Plate: Dilute the proper amount of 8-OHdG Conjugate (1 mg/mL) to **1 µg/mL** in 1X PBS. Add 100 µL of the **1 µg/mL** 8-OHdG Conjugate to each well and incubate overnight at 4°C. Remove the 8-OHdG coating solution and wash once with dH_2O. Blot plate on paper towels to remove excess fluid. Add 200 µL of Assay Diluent to each well and block for 1 hr at room temperature. Transfer the plate to 4°C and remove the Assay Diluent immediately before use.
  Note: 8-OHdG coated plate is not stable. We recommend using it within 24 hrs after coating.
- 1X Wash Buffer: Dilute the 10X Wash Buffer Concentrate to 1X with deionized water. Stir to homogeneity.
- Anti-8-OHdG Antibody and Secondary Antibody: Immediately before use dilute the Anti-8-OHdG Antibody 1:500 and Secondary Antibody 1:1000 with Assay Diluent. Do not store diluted solutions.

Preparation of Standard Curve

Prepare a dilution series of 8-OHdG standards in the concentration range of 0 ng/mL – 20 ng/mL by diluting the 8-OHdG Standard in Assay Diluent (Table 1).

Standard Tubes	8-OHdG Standard (µL)	Assay Diluent (µL)	8-OHdG (ng/mL)
1	10	990	20
2	500 of Tube #1	500	10
3	500 of Tube #2	500	5
4	500 of Tube #3	500	2.5
5	500 of Tube #4	500	1.25
6	500 of Tube #5	500	0.625
7	500 of Tube #6	500	0.313
8	500 of Tube #7	500	0.156
9	500 of Tube #8	500	0.078
10	0	500	0

Table 1. Preparation of 8-OHdG Standards

Preparation of Samples

I. Urine or Serum Samples

Clear urine or serum samples can be diluted in Assay Diluent and used directly in the assay. Samples containing precipitates should be centrifuged at 3000 g for 10 minutes, or filtered through 0.45 µm filter, prior to use in the assay.

II. Cell or Tissue DNA Samples:

1. Extract DNA from cell or tissue samples by a desired method or commercial DNA Extraction kit.
2. Dissolve extracted DNA in water at 1-5 mg/mL.
3. Convert DNA sample to single-stranded DNA by incubating the sample at 95°C for 5 minutes and rapidly chilling on ice.
4. Digest DNA sample to nucleosides by incubating the denatured DNA with 5-20 units of nuclease P1 for 2 hrs at 37°C in 20 mM Sodium Acetate, pH 5.2, and following with treatment of 5-10 units of alkaline phosphatase for 1 hr at 37 ^{0}C in 100 mM Tris, pH 7.5.
5. The reaction mixture is centrifuged for 5 minutes at 6000 g and the supernatant is used for the 8-OHdG ELISA assay.

Assay Protocol

1. Prepare and mix all reagents thoroughly before use. Each 8-OHdG sample including unknown and standard should be assayed in duplicate. High content 8-OHdG urine or serum samples should be diluted at least 10-20 fold in Assay Diluent.
2. Add 50 µL of unknown sample or 8-OHdG standard to the wells of the 8-OHdG Conjugate coated plate. Incubate at room temperature for 10 minutes on an orbital shaker.
3. Add 50 µL of the diluted anti-8-OHdG antibody to each well, incubate at room temperature for 1 hour on an orbital shaker.
4. Wash microwell strips 3 times with 250 µL 1X Wash Buffer per well with thorough aspiration between each wash. After the last wash, empty wells and tap microwell strips on absorbent pad or paper towel to remove excess 1X Wash Buffer.
5. Add 100 µL of the diluted Secondary Antibody-Enzyme Conjugate to all wells.
6. Incubate at room temperature for 1 hour on an orbital shaker.
7. Wash microwell strips 3 times according to step 4 above. Proceed immediately to the next step.
8. Warm Substrate Solution to room temperature. Add 100 µL of Substrate Solution to each well, including the blank wells. Incubate at room temperature on an orbital shaker. Actual incubation time may vary from 2-30 minutes.

   Note: Watch plate carefully; if color changes rapidly, the reaction may need to be stopped sooner to prevent saturation.
9. Stop the enzyme reaction by adding 100 µL of Stop Solution into each well, including the blank wells. Results should be read immediately (color will fade over time).

10. Read absorbance of each microwell on a spectrophotometer using 450 nm as the primary wave length.

Example of Results

The following figures demonstrate typical Oxidative DNA Damage ELISA results. One should use the data below for reference only. This data should not be used to interpret actual results.

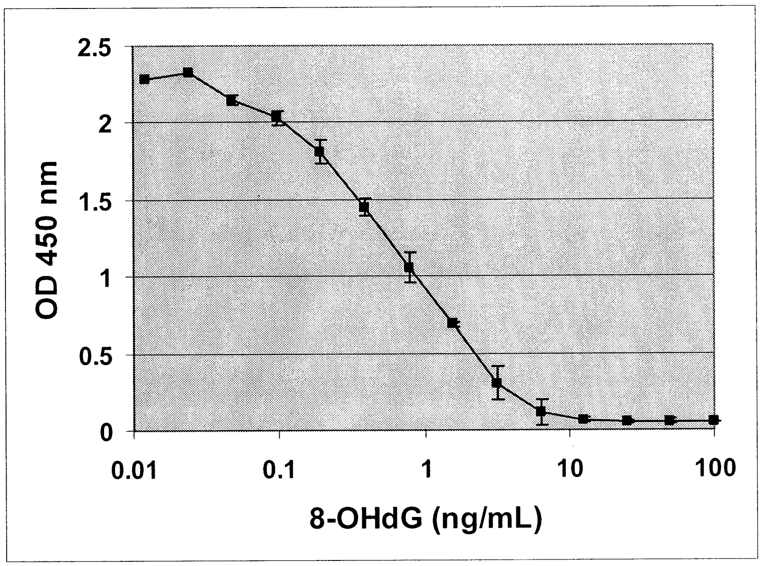

Figure 1: 8-OHdG ELISA Standard Curve.

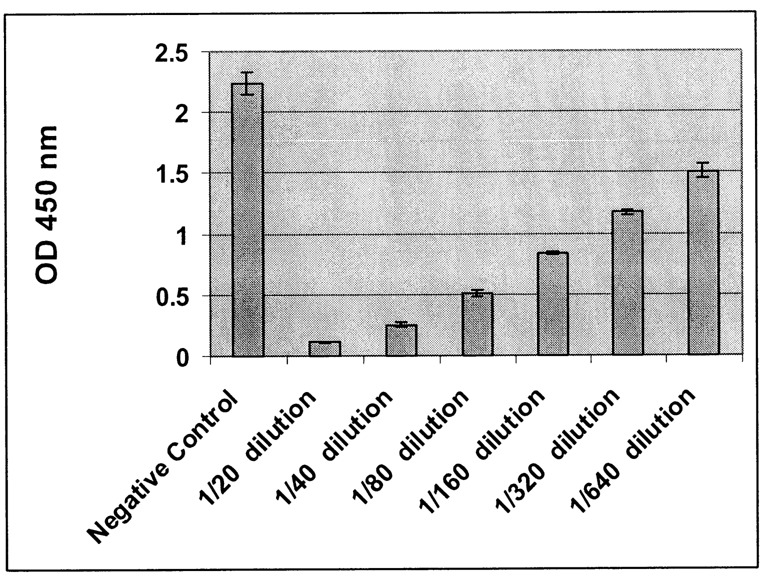

Figure 2: 8-OHdG level in human urine sample.

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Recent Product Citations

1. Ksiazek, K. et al. (2008). Impaired response to oxidative stress in senescent cells may lead to acccumulation of DNA damage in mesothelial cells from aged donors. *Biochem. and Biophys. Res. Comm.* **373**:335-339.
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Contact Information

Cell Biolabs, Inc.
7758 Arjons Drive
San Diego, CA 92126
Worldwide: +1 858-271-6500
USA Toll-Free: 1-888-CBL-0505
E-mail: tech@cellbiolabs.com
www.cellbiolabs.com

Attachment G2

Manufacturer's Instructions for the Cytokine/Chemokine Multiplexing


MILLIPORE
MILLIPLEX MAP
Kit
Mouse Cytokine / Chemokine
96-Well Plate Assay
Cat. # MPXMCYTO-70K or MPXMCYTO70KPMX

MILLIPLEX® MAP

MOUSE CYTOKINE / CHEMOKINE KIT
96 Well Plate Assay

#MPXMCYTO-70K or
#MPXMCYTO70KPMX13 (premixed) or
#MPXMCYTO70KPMX22 (premixed) or
#MPXMCYTO70KPMX32 (premixed)

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INTRODUCTION

"Cytokine" is a general term used for a diverse group of soluble proteins and peptides which act as regulators under both normal and pathological conditions to modulate the functional activities of individual cells and tissues. These proteins also mediate interactions between cells directly and regulate processes taking place in the extracellular environment. Cytokines differ from hormones in that they act on a wider spectrum of target cells and they are not produced by specialized cells which are organized in specialized glands. This group of proteins includes lymphokines, interferons, colony stimulating factors and chemokines.

Cytokine and chemokine research plays a significant role in achieving a deeper understanding of disease states such as allergic reactions, IBD, sepsis, and cancer. Therefore, the MILLIPLEX® MAP Mouse Cytokine / Chemokine panel enables you to focus on the therapeutic potential of cytokines as well as the modulation of cytokine expression. Coupled with the Luminex® xMAP® platform, you receive the advantage of ideal speed and sensitivity, allowing quantitative multiplex detection of dozens of analytes simultaneously which can dramatically improve productivity.

Millipore's MILLIPLEX® MAP Mouse Cytokine / Chemokine panel is the most versatile system available for cytokine and chemokine research.

- MILLIPLEX® MAP offers you the ability to:
  - Select a premixed kit (13-, 22- or 32-plex).
  - Choose any combination of analytes from our panel of 32 analytes to design a custom kit that better meets your needs.
- A convenient "all-in-one" box format gives you the assurance that you will have all the necessary reagents you need to run your assay.

Millipore's MILLIPLEX® MAP Mouse Cytokine / Chemokine kit is to be used for the simultaneous quantification of the following 32 mouse cytokines and chemokines: Eotaxin, G-CSF, GM-CSF, IFNγ, IL-1α, IL-1β, IL-2, IL-3, IL-4, IL-5, IL-6, IL-7, IL-9, IL-10, IL-12(p40), IL-12(p70), IL-13, IL-15, IL-17, IP-10, KC, LIF, LIX, MCP-1, M-CSF, MIG, MIP-1α, MIP-1β, MIP-2, RANTES, TNFα, and VEGF.

This kit may be used for the analysis of all or any combination of the above cytokines and chemokines in tissue/cell lysate and culture supernatant samples. This kit can also be used in serum or plasma samples for the analysis of all or any combination of the above cytokines and chemokines.

This kit is for research purposes only.

Please read entire protocol before use.

It is important to use same assay incubation conditions throughout your study.

PRINCIPLE

MILLIPLEX® MAP is based on the Luminex® xMAP® technology — one of the fastest growing and most respected multiplex technologies offering applications throughout the life sciences and capable of performing a variety of bioassays including immunoassays on the surface of fluorescent-coded beads known as microspheres.

- Luminex® uses proprietary techniques to internally color-code microspheres with two fluorescent dyes. Through precise concentrations of these dyes, 100 distinctly colored bead sets can be created, each of which is coated with a specific capture antibody.
- After an analyte from a test sample is captured by the bead, a biotinylated detection antibody is introduced.
- The reaction mixture is then incubated with Streptavidin-PE conjugate, the reporter molecule, to complete the reaction on the surface of each microsphere.
- The microspheres are allowed to pass rapidly through a laser which excites the internal dyes marking the microsphere set. A second laser excites PE, the fluorescent dye on the reporter molecule.
- Finally, high-speed digital-signal processors identify each individual microsphere and quantify the result of its bioassay based on fluorescent reporter signals.

The capability of adding multiple conjugated beads to each sample results in the ability to obtain multiple results from each sample. Open-architecture xMAP® technology enables multiplexing of many types of bioassays reducing time, labor and costs over traditional methods.

STORAGE CONDITIONS UPON RECEIPT

- Recommended storage for kit components is 2 - 8°C.
- Once the standards and controls have been reconstituted, immediately transfer contents into polypropylene vials. **DO NOT STORE RECONSTITUTED STANDARDS OR CONTROLS IN GLASS VIALS**. For long-term storage, freeze reconstituted standards and controls at ≤ -20°C. Avoid multiple (>2) freeze/thaw cycles.
- **DO NOT FREEZE Antibody-Immobilized Beads, Detection Antibodies, and Streptavidin-Phycoerythrin.**

REAGENTS SUPPLIED

Note: Store all reagents at 2 – 8°C

REAGENTS SUPPLIED	CATALOG NUMBER	VOLUME	QUANTITY
Mouse Cytokine / Chemokine Standard	MXM8070 or MXM8070-2	lyophilized	1 vial
Mouse Cytokine Quality Controls 1 and 2	MXM6070 or MXM6070-2	lyophilized	2 vials
Serum Matrix Note: Contains 0.08% Sodium Azide	MXMSM	lyophilized	1 vial
Set of one 96-Well Filter Plate with 2 Sealers	MX-PLATE		1 plate 2 sealers
Assay Buffer	L-AB	30 mL	1 bottle
10X Wash Buffer Note: Contains 0.05% Proclin	L-WB	30 mL	1 bottle
Mouse Cytokine Detection Antibodies	MXM1070-1 or MXM1070-2 or MXM1070-3	3.2 mL	1 bottle
Streptavidin-Phycoerythrin	L-SAPE3 *(Use with Cat. # MXM1070-1)* or L-SAPE4 *(Use with Cat. # MXM1070-2)* or L-SAPE10 *(Use with Cat. # MXM1070-3)*	3.2 mL	1 bottle
Mixing Bottle (not provided with premixed panel)	--------------	--------------	1 bottle

Mouse Cytokine / Chemokine Antibody-Immobilized Premixed Beads:

Premixed 13-plex Beads	MXMPMX13	3.5 mL	1 bottle
Premixed 22-plex Beads	MXMPMX22	3.5 mL	1 bottle
Premixed 32-plex Beads	MXMPMX32	3.5 mL	1 bottle

Included Mouse Cytokine / Chemokine Antibody-Immobilized Beads are dependent on customizable selection of analytes within the panel (see following table page 5).

Mouse Cytokine / Chemokine Antibody-Immobilized Beads:

Bead/Analyte Name	Luminex Bead Region	Customizable 32 Analytes (60X concentration, 90µL) Available	Cat. #	13-Plex Premixed Beads	22-Plex Premixed Beads	32-Plex Premixed Beads
Anti-Mouse Eotaxin Bead	1	✓	MXMETXN			✓
Anti-Mouse G-CSF Bead	3	✓	MXMGCSF		✓	✓
Anti-Mouse GM-CSF Bead	5	✓	MXMGMCSF	✓	✓	✓
Anti-Mouse IFNγ Bead	7	✓	MXMIFNG	✓	✓	✓
Anti-Mouse IL-1α Bead	9	✓	MXMIL-1A		✓	✓
Anti-Mouse IL-1β Bead	11	✓	MXMIL-1B	✓	✓	✓
Anti-Mouse IL-2 Bead	13	✓	MXMIL-2	✓	✓	✓
Anti-Mouse IL-3 Bead	15	✓	MXMIL-3			✓
Anti-Mouse IL-4 Bead	17	✓	MXMIL-4	✓	✓	✓
Anti-Mouse IL-5 Bead	19	✓	MXMIL-5	✓	✓	✓
Anti-Mouse IL-6 Bead	21	✓	MXMIL-6	✓	✓	✓
Anti-Mouse IL-7 Bead	23	✓	MXMIL-7	✓	✓	✓
Anti-Mouse IL-9 Bead	66	✓	MXMIL-9		✓	✓
Anti-Mouse IL-10 Bead	27	✓	MXMIL-10	✓	✓	✓
Anti-Mouse IL-12 (p40) Bead	29	✓	MXM12P40			✓
Anti-Mouse IL-12 (p70) Bead	62	✓	MXM12P70	✓	✓	✓
Anti-Mouse IL-13 Bead	33	✓	MXMIL-13	✓	✓	✓
Anti-Mouse IL-15 Bead	35	✓	MXMIL-15		✓	✓
Anti-Mouse IL-17 Bead	37	✓	MXMIL-17		✓	✓
Anti-Mouse IP-10 Bead	39	✓	MXMIP10		✓	✓
Anti-Mouse KC Bead	42	✓	MXMKC		✓	✓
Anti-Mouse LIF Bead	44	✓	MXMLIF			✓
Anti-Mouse LIX Bead	45	✓	MXMLIX			✓
Anti-Mouse MCP-1 Bead	49	✓	MXMMCP-1	✓	✓	✓
Anti-Mouse M-CSF Bead	10	✓	MXMMCSF			✓
Anti-Mouse MIG Bead	57	✓	MXMMIG			✓
Anti-Mouse MIP-1α Bead	53	✓	MXMMIP-1A		✓	✓
Anti-Mouse MIP-1β Bead	55	✓	MXMMIP-1B			✓
Anti-Mouse MIP-2 Bead	40	✓	MXMMIP-2			✓
Anti-Mouse RANTES Bead	59	✓	MXMRNTS		✓	✓
Anti-Mouse TNFα Bead	61	✓	MXMTNF-A	✓	✓	✓
Anti-Mouse VEGF Bead	63	✓	MXMVEGF			✓

MATERIALS REQUIRED BUT NOT PROVIDED

Reagents

1. Luminex Sheath Fluid (Luminex Catalogue #40-50000)

Instrumentation / Materials

1. Adjustable Pipettes with Tips capable of delivering 25 µL to 1000 µL
2. Multichannel Pipettes capable of delivering 5 µL to 50 µL or 25 µL to 200 µL
3. Reagent Reservoirs
4. Polypropylene Microfuge Tubes
5. Aluminum Foil
6. Rubber Bands
7. Absorbent Pads
8. Laboratory Vortex Mixer
9. Sonicator (Branson Ultrasonic Cleaner Model #B200 or equivalent)
10. Titer Plate Shaker (Lab-Line Instruments Model #4625 or equivalent)
11. Vacuum Filtration Unit (Millipore Vacuum Manifold Catalog #MSVMHTS00 or equivalent with Millipore Vacuum Pump Catalog #WP6111560 or equivalent)
12. Luminex 100™ IS, 200™, or HTS by Luminex Corporation
13. Plate Stand (Millipore Catalog #MX-STAND)

SAFETY PRECAUTIONS

- All blood components and biological materials should be handled as potentially hazardous. Follow universal precautions as established by the Centers for Disease Control and Prevention and by the Occupational Safety and Health Administration when handling and disposing of infectious agents.
- Sodium azide or Proclin has been added to some reagents as a preservative. Although the concentrations are low, sodium azide and Proclin may react with lead and copper plumbing to form highly explosive metal azides. On disposal, flush with a large volume of water to prevent azide build up.

TECHNICAL GUIDELINES

To obtain reliable and reproducible results, the operator should carefully read this entire manual and fully understand all aspects of each assay step before running the assay. The following notes should be reviewed and understood before the assay is set up.

- FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.
- Do not use beyond the expiration date on the label.
- Do not mix or substitute reagents with those from other lots or sources.
- The Antibody-Immobilized Beads are light sensitive and must be protected from light at all times. Cover the assay plate containing beads with opaque plate lid or aluminum foil during all incubation steps.
- It is important to allow all reagents to warm to room temperature (20-25°C) before use in the assay.
- The bottom of the Microtiter Filter Plate should not be in direct contact with any surface during assay set-up or incubation times. The plate can be set on a plate

stand or on the non-flat side of the plate cover or any other plate holder to raise the plate from the surface. A plate stand can be purchased separately from Millipore (Millipore Catalog #MX-STAND).

- Incomplete washing can adversely affect the assay outcome. All washing must be performed with the Wash Buffer provided.
- After the wash steps, keep the bottom of the Microtiter Filter Plate clean by blotting on paper towels or absorbent pads to prevent any leakage due to capillary action.
- Keep the vacuum suction on the plate as low as possible. It is recommended to have a vacuum setting that will remove 200 µL of buffer in $\geq$ 5 seconds (equivalent to < 100 mmHg).
- After hydration, all Standards and Controls must be transferred to polypropylene tubes.
- The Standards prepared by serial dilution must be used within 1 hour of preparation. Discard any unused standards except the standard stock which may be stored at ≤ -20°C for 1 month and at ≤ -80°C for greater than one month.
- If samples fall outside the dynamic range of the assay, further dilute the samples with the appropriate diluent and repeat the assay.
- Any unused mixed Antibody-Immobilized Beads may be stored in the Mixing Bottle at 2-8°C for up to one month.
- During the preparation of the standard curve, make certain to mix the higher concentration well before making the next dilution. Use a new tip with each dilution.
- The plate should be read immediately after the assay is finished. If, however, the plate cannot be read immediately, seal the plate, cover with aluminum foil or an opaque lid, and store the plate at 2-8°C for up to 24 hours. Prior to reading, agitate the plate on the plate shaker at room temperature for 10 minutes. Delay in reading a plate may result in decreased sensitivity for some cytokines and chemokines.
- The titer plate shaker should be set at a speed to provide maximum orbital mixing without splashing of liquid outside the wells. For the recommended plate shaker, this would be a setting of 5-7 which is approximately 500-800 rpm.
- Ensure that the needle probe is clean. This may be achieved by sonication and/or alcohol flushes. Adjust probe height according to the protocols recommended by Luminex to the kit filter plate using 3 alignment discs prior to reading an assay.
- For cell culture supernatants or tissue extraction, use the culture or extraction medium as the matrix solution in background, standard and control wells. If samples are diluted in Assay Buffer, use the Assay Buffer as matrix.
- For serum/plasma samples that require further dilution beyond 1:1, use the Serum Matrix provided in the kit as the diluent.
- For cell/tissue homogenate, the final cell or tissue homogenate should be prepared in a buffer that has a neutral pH, contains minimal detergents and no strong denaturing detergents, and has an ionic strength close to physiological concentration. Avoid debris, lipids, and cell/tissue aggregates. Centrifuge samples before use.
- Vortex all reagents well before adding to plate.

SAMPLE COLLECTION AND STORAGE

A. Preparation of Serum Samples:

- Allow the blood to clot for at least 30 minutes before centrifugation for 10 minutes at 1000xg. Remove serum and assay immediately or aliquot and store samples at ≤ -20°C.
- Avoid multiple (>2) freeze/thaw cycles.
- When using frozen samples, it is recommended to thaw the samples completely, mix well by vortexing and centrifuge prior to use in the assay to remove particulates.
- Serum samples should be diluted 1:1 in the Assay Buffer provided in the kit (i.e. one part serum sample into one part Assay Buffer). When further dilution beyond 1:1 is required, use Serum Matrix as the diluent.

B. Preparation of Plasma Samples:

- Plasma collection using EDTA as an anti-coagulant is recommended. Centrifuge for 10 minutes at 1000xg within 30 minutes of blood collection. Remove plasma and assay immediately or aliquot and store samples at ≤ -20°C.
- Avoid multiple (>2) freeze/thaw cycles.
- When using frozen samples, it is recommended to thaw the samples completely, mix well by vortexing and centrifuge prior to use in the assay to remove particulates.
- Plasma samples should be diluted 1:1 in the Assay Buffer provided in the kit (i.e. one part plasma sample into one part Assay Buffer). When further dilution beyond 1:1 is required, use Serum Matrix as the diluent.

C. Preparation of Tissue Culture Supernatant:

- Centrifuge the sample to remove debris and assay immediately or aliquot and store samples at ≤ -20°C.
- Avoid multiple (>2) freeze/thaw cycles.
- Tissue culture supernatant may require a dilution with an appropriate control medium prior to assay.

NOTE:

- A maximum of 25 µL per well of neat or diluted serum or plasma can be used. Tissue culture or other media may also be used.
- All samples must be stored in polypropylene tubes. **DO NOT STORE SAMPLES IN GLASS.**
- Avoid debris, lipids and cells when using samples with gross hemolysis or lipemia.
- Care must be taken when using heparin as an anticoagulant since an excess of heparin will provide falsely high values. Use no more than 10 IU heparin per mL of blood collected.

PREPARATION OF REAGENTS FOR IMMUNOASSAY

A. Preparation of Antibody-Immobilized Beads

If premixed beads are used, sonicate the premixed bead bottle 30 seconds and then vortex for 1 minute before use.

For individual vials of beads, sonicate each antibody-bead vial for 30 seconds; vortex for 1 minute. Add 60 µL from each antibody bead vial to the Mixing Bottle and bring final volume to 3.0 mL with Assay Buffer. Vortex the mixed beads well. Unused portion may be stored at 2-8°C for up to one month.

Example 1: When using 30 cytokine antibody-immobilized beads, add 60 µL from each of the 30 bead sets to the Mixing Bottle. Then add 1.2 mL Assay Buffer.

Example 2: When using 9 cytokine antibody-immobilized beads, add 60 µL from each of the 9 bead sets to the Mixing Bottle. Then add 2.46 mL Assay Buffer.

B. Preparation of Quality Controls

Before use, reconstitute Quality Control 1 and Quality Control 2 with 250 µL deionized water. Invert the vial several times to mix and vortex. Allow the vial to sit for 5-10 minutes and then transfer the controls to appropriately labeled polypropylene microfuge tubes. Unused portion may be stored at ≤ -20°C for up to one month.

C. Preparation of Wash Buffer

Bring the 10X Wash Buffer to room temperature and mix to bring all salts into solution. Dilute 30 mL of 10X Wash Buffer with 270 mL deionized water. Store unused portion at 2-8°C for up to one month.

D. Preparation of Serum Matrix

This step is required for serum or plasma samples only.

Add 2.0 mL Assay Buffer to the bottle containing lyophilized Serum Matrix. Mix well. Allow at least 10 minutes for complete reconstitution. Leftover reconstituted Serum Matrix should be stored at ≤ -20°C for up to one month.

E. Preparation of Mouse Cytokine Standard

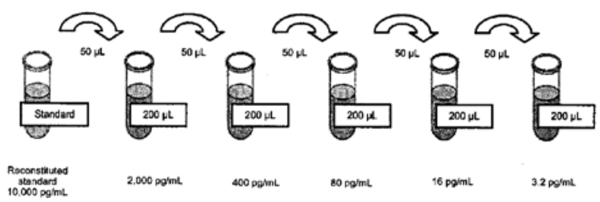
1.) Prior to use, reconstitute the Mouse Cytokine Standard with 250 µL deionized water to give a 10,000 pg/mL concentration of standard for all analytes. Invert the vial several times to mix. Vortex the vial for 10 seconds. Allow the vial to sit for 5-10 minutes and then transfer the standard to an appropriately labeled polypropylene microfuge tube. This will be used as the 10,000 pg/mL standard; the unused portion may be stored at ≤ -20°C for up to one month.

2). Preparation of Working Standards

Label five polypropylene microfuge tubes 2,000, 400, 80, 16, and 3.2 pg/mL. Add 200 µL of Assay Buffer to each of the five tubes. Prepare serial dilutions by adding 50 µL of the 10,000 pg/mL reconstituted standard to the 2,000 pg/mL tube, mix well and transfer 50 µL of the 2,000 pg/mL standard to the 400 pg/mL tube, mix well and transfer 50 µL of the 400 pg/mL standard to the 80 pg/mL tube, mix well and transfer 50 µL of the 80 pg/mL standard to 16 pg/mL tube, mix well and transfer 50 µL of the 16 pg/mL standard to the 3.2 pg/mL tube and mix well. The 0 pg/mL standard (Background) will be Assay Buffer.

Standard Concentration (pg/mL)	Volume of Deionized Water to Add	Volume of Standard to Add
10,000	250 µL	0

Standard Concentration (pg/mL)	Volume of Assay Buffer to Add	Volume of Standard to Add
2,000	200 µL	50 µL of 10,000 pg/mL
400	200 µL	50 µL of 2000 pg/mL
80	200 µL	50 µL of 400 pg/mL
16	200 µL	50 µL of 80 pg/mL
3.2	200 µL	50 µL of 16 pg/mL



IMMUNOASSAY PROCEDURE

- Prior to beginning this assay, it is imperative to read this protocol completely and to thoroughly understand the Technical Guidelines.
- Allow all reagents to warm to room temperature (20-25°C) before use in the assay.
- Diagram the placement of Standards [0 (Background), 3.2, 16, 80, 400, 2,000, and 10,000 pg/mL], Controls 1 and 2, and Samples on Well Map Worksheet in a vertical configuration. (Note: Most instruments will only read the 96-well plate vertically by default.) It is recommended to run the assay in duplicate.
- Set the filter plate on a plate holder at all times during reagent dispensing and incubation steps so that the bottom of the plate does not touch any surface.

1. Prewet the filter plate by pipetting 200 µL of Wash Buffer into each well of the Microtiter Filter Plate. Seal and shake on a plate shaker for 10 minutes at room temperature (20-25°C).
2. Remove Wash Buffer by vacuum. **(NOTE: DO NOT INVERT PLATE.)** Blot excess Wash Buffer from the bottom of the plate with an absorbent pad or paper towels.
3. Add 25 µL of each Standard or Control into the appropriate wells. Assay Buffer should be used for 0 pg/mL standard (Background).
4. Add 25 µL of Assay Buffer to the sample wells.
5. Add 25 µL of appropriate matrix solution to the background, standards, and control wells. When assaying serum or plasma, use the Serum Matrix provided in the kit. When assaying tissue culture or other supernatant, use proper control culture medium as the matrix solution.
6. Add 25 µL of Sample (diluted one part serum or plasma to one part Assay Buffer) into the appropriate wells.
7. Vortex Mixing Bottle and add 25 µL of the Mixed or Premixed Beads to each well. (Note: During addition of Beads, shake bead bottle intermittently to avoid settling.)
8. Seal the plate with a plate sealer, cover it with the lid. Wrap a rubber band around the plate holder, plate and lid and incubate with agitation on a plate shaker overnight at 4°C or 2 hours at room temperature (20-25°C). *An overnight incubation (16-18 hr) may improve assay sensitivity for some analytes.*

Add 200 µL Wash Buffer per well

Shake 10 min, RT

Vacuum

- Add 25 µL Standard or Control to appropriate wells
- Add 25 µL Assay Buffer to background and sample wells
- Add 25 µL Samples to sample wells
- Add 25 µL Matrix to background, standards, and control wells
- Add 25 µL Beads to each well

Incubate overnight at 4°C or 2 hours at RT with shaking

9. Gently remove fluid by vacuum. **(NOTE: DO NOT INVERT PLATE.)**
10. Wash plate 2 times with 200 µL/well of Wash Buffer, removing Wash Buffer by vacuum filtration between each wash. Blot excess Wash Buffer from the bottom the plate with an absorbent pad or paper towels.
11. Add 25 µL of Detection Antibodies into each well. (Note: Allow the Detection Antibodies to warm to room temperature prior to addition.)
12. Seal, cover with lid and incubate with agitation on a plate shaker for 1 hour at room temperature (20-25°C). **DO NOT VACUUM AFTER INCUBATION.**
13. Add 25 µL Streptavidin-Phycoerythrin to each well containing the 25 µL of Detection Antibodies.
14. Seal, cover with lid and incubate with agitation on a plate shaker for 30 minutes at room temperature (20-25°C).
15. Gently remove all contents by vacuum. **(NOTE: DO NOT INVERT PLATE.)**
16. Wash plate 2 times with 200 µL/well Wash Buffer, removing Wash Buffer by vacuum filtration between each wash. Wipe any excess buffer on the bottom of the plate with a tissue.
17. Add 150 µL of Sheath Fluid to all wells. Resuspend the beads on a plate shaker for 5 minutes.
18. Run plate on Luminex 100™ IS, 200™, HTS.
19. Save and analyze the Median Fluorescent Intensity (MFI) data using a 5-parameter logistic or spline curve-fitting method for calculating cytokine/chemokines concentrations in samples. (Note: For diluted samples, multiply the calculated concentration by the dilution factor.)

↓ Vacuum and wash 2X with 200 µL Wash Buffer

Add 25 µL Detection Antibody per well

↓ Incubate 1 hour at RT

Do Not Vacuum

Add 25 µL Streptavidin-Phycoerythrin per well

↓ Incubate for 30 minutes at RT

Vacuum and wash 2X with 200 µL Wash Buffer

Add 150 µL Sheath Fluid per well

Read on Luminex (100 µL, 50 beads per bead set)

EQUIPMENT SETTINGS

These specifications are for the Luminex 100™ IS v.1.7 or Luminex 100™ IS v2.1/2.2, Luminex 200™ v2.3, xPONENT, and Luminex HTS. Luminex instruments with other software (e.g. MasterPlex, StarStation, LiquiChip, Bio-Plex, LABScan100) would need to follow instrument instructions for gate settings and additional specifications from the vendors.

Events:	50, per bead		50, per bead		50, per bead		50, per bead	
Sample Size:	100 µL		100 µL		100 µL		100 µL	
Gate Settings	8,000 to 15,000							
Time Out	60 seconds							
Bead Set:	13-Plex Premix Beads		22-Plex Premix Beads		32-Plex Premix Beads		Customizable 32-Plex Beads	
	GM-CSF	5	G-CSF	3	Eotaxin	1	Eotaxin	1
	IFNγ	7	GM-CSF	5	G-CSF	3	G-CSF	3
	IL-1β	11	IFNγ	7	GM-CSF	5	GM-CSF	5
	IL-2	13	IL-1α	9	IFNγ	7	IFNγ	7
	IL-4	17	IL-1β	11	IL-1α	9	IL-1α	9
	IL-5	19	IL-2	13	IL-1β	11	IL-1β	11
	IL-6	21	IL-4	17	IL-2	13	IL-2	13
	IL-7	23	IL-5	19	IL-3	15	IL-3	15
	IL-10	27	IL-6	21	IL-4	17	IL-4	17
	IL-12 (p70)	62	IL-7	23	IL-5	19	IL-5	19
	IL-13	33	IL-9	66	IL-6	21	IL-6	21
	MCP-1	49	IL-10	27	IL-7	23	IL-7	23
	TNFα	61	IL-12 (p70)	62	IL-9	66	IL-9	66
			IL-13	33	IL-10	27	IL-10	27
			IL-15	35	IL-12 (p40)	29	IL-12 (p40)	29
			IL-17	37	IL-12 (p70)	62	IL-12 (p70)	62
			IP-10	39	IL-13	33	IL-13	33
			KC	42	IL-15	35	IL-15	35
			MCP-1	49	IL-17	37	IL-17	37
			MIP-1α	53	IP-10	39	IP-10	39
			RANTES	59	KC	42	KC	42
			TNFα	61	LIF	44	LIF	44
					LIX	45	LIX	45
					MCP-1	49	MCP-1	49
					M-CSF	10	M-CSF	10
					MIG	57	MIG	57
					MIP-1α	53	MIP-1α	53
					MIP-1β	55	MIP-1β	55
					MIP-2	40	MIP-2	40
					RANTES	59	RANTES	59
					TNFα	61	TNFα	61
					VEGF	63	VEGF	63

QUALITY CONTROLS

The ranges for each analyte in Quality Control 1 and 2 are provided on the card insert or can be located at the Millipore website www.millipore.com/techlibrary/index.do using the catalog number as the keyword.

ASSAY CHARACTERISTICS

Cross-Reactivity

There was no or negligible cross-reactivity between the antibodies and any of the other analytes in this panel.

Assay Sensitivities (minimum detectable concentrations, pg/mL)

MinDC: Minimum Detectable Concentration is calculated by the StatLIA® Immunoassay Analysis Software from Brendan Technologies. It measures the true limits of detection for an assay by mathematically determining what the empirical MinDC would be if an infinite number of standard concentrations were run for the assay under the same conditions.

Cytokine	Overnight Protocol (N = 6 Assays)			2 Hour Protocol
	MinDC	MinDC+2SD	LLOQ (est.)*	MinDC
Eotaxin	4.4	5.8	6.0	5.5
G-CSF	0.9	1.6	1.0	2.8
GM-CSF	5.6	6.8	10.0	9.5
IFNγ	0.9	1.5	1.0	2.3
IL-1α	5.1	11.8	8.0	5.7
IL-1β	2.0	3.5	2.0	2.7
IL-2	0.8	1.1	1.0	0.8
IL-3	0.7	1.1	1.0	1.8
IL-4	0.4	0.5	1.0	0.5
IL-5	0.7	1.1	1.0	1.2
IL-6	1.8	4.0	4.0	3.4
IL-7	0.9	1.3	1.3	2.9
IL-9	6.0	8.0	10.0	11.5
IL-10	3.3	5.8	1.5	8.0
IL-12 (p40)	4.9	7.9	8.0	10.2
IL-12 (p70)	4.1	6.2	6.0	5.7
IL-13	6.3	9.8	25.0	10.8
IL-15	6.5	11.7	8.0	9.8
IL-17	0.5	0.6	1.0	0.8
IP-10	0.6	0.8	1.0	1.1
KC	1.4	2.2	1.0	1.8
LIF	0.8	1.1	1.0	1.9
LIX	7.6	13.9	8.0	11.2
MCP-1	5.3	7.5	5.0	9.1
M-CSF	1.1	1.9	2.0	1.8
MIG	1.0	2.3	1.0	1.9
MIP-1α	8.7	10.4	12.0	29.5
MIP-1β	10.1	13.5	12.0	14.8
MIP-2	63.6	105.5	125.0	54.9
RANTES	2.5	3.5	5.0	1.9
TNFα	1.0	1.5	1.2	1.4
VEGF	0.3	0.4	1.0	0.4

*LLOQ=Lowest Level of Quantification

Precision

Intra-assay precision is generated from the mean of the %CV's from 8 reportable results across two different concentration of cytokines in one experiment. Inter-assay precision is generated from the mean of the %CV's from 4 - 8 reportable results across two different concentrations of cytokine in 4 different experiments.

Cytokine	Overnight Protocol		2 Hour Protocol
	Intra-assay %CV	Inter-assay %CV	Intra-assay %CV
Eotaxin	7.4	6.8	5.2
G-CSF	8.4	8.0	6.6
GM-CSF	8.0	5.4	4.7
IFNγ	5.9	7.1	5.2
IL-1α	7.3	6.2	5.7
IL-1β	8.1	7.0	6.5
IL-2	5.6	4.2	4.2
IL-3	9.1	5.4	5.0
IL-4	8.1	8.5	5.3
IL-5	9.7	4.7	7.0
IL-6	10.4	7.9	7.8
IL-7	8.8	6.9	7.7
IL-9	8.0	7.1	5.6
IL-10	7.0	10.1	3.8
IL-12 (p40)	8.7	9.0	5.2
IL-12 (p70)	7.6	5.5	4.8
IL-13	11.9	10.9	10.5
IL-15	9.4	11.9	9.1
IL-17	7.5	6.3	4.0
IP-10	10.0	10.3	6.9
KC	9.9	10.9	7.5
LIF	9.2	7.6	6.0
LIX	5.2	5.9	6.4
MCP-1	5.8	4.4	3.0
M-CSF	11.3	11.5	6.0
MIG	10.3	20.4	17.5
MIP-1α	7.0	8.4	6.8
MIP-1β	5.0	6.3	4.7
MIP-2	21.3	21.2	22.6
RANTES	10.3	13.0	6.8
TNFα	16.3	11.8	11.5
VEGF	7.9	12.1	5.6

Accuracy

Spike Recovery: The data represent mean percent recovery of six levels of spiked standards in serum matrices.

Cytokine	Overnight Protocol	2 Hour Protocol
	% Recovery in Serum Matrix	% Recovery in Serum Matrix
Eotaxin	101.1	100.7
G-CSF	100.1	100.9
GM-CSF	99.2	105.6
IFNγ	99.1	101.1
IL-1α	98.4	103.6
IL-1β	101.4	101.1
IL-2	100.3	100.1
IL-3	100.3	100.3
IL-4	100.6	100.2
IL-5	100.3	100.2
IL-6	100.4	103.5
IL-7	100.1	100.6
IL-9	101.5	98.6
IL-10	100.4	102.6
IL-12 (p40)	102.5	108.6
IL-12 (p70)	100.4	101.0
IL-13	100.1	107.2
IL-15	103.8	105.0
IL-17	99.6	100.4
IP-10	103.2	100.1
KC	100.5	101.4
LIF	100.2	100.2
LIX	100.5	139.8
MCP-1	101.7	100.0
M-CSF	100.4	100.8
MIG	100.8	99.2
MIP-1α	100.4	85.3
MIP-1β	103.0	142.1
MIP-2	123.2	79.6
RANTES	100.5	109.4
TNFα	105.1	100.6
VEGF	100.1	100.3

TROUBLESHOOTING GUIDE

Problem	Probable Cause	Solution
Filter plate will not vacuum	Vacuum pressure is insufficient	Increase vacuum pressure such that 0.2mL buffer can be suctioned in 3-5 seconds.
	Samples have insoluble particles	Centrifuge samples just prior to assay set-up and use supernatant. If high lipid concentration, after centrifugation, remove lipid layer and use supernatant.
	Sample too viscous	May need to dilute sample.
Insufficient bead count	Vacuum pressure too high	Adjust vacuum pressure such that 0.2mL buffer can be suctioned in 3-5 seconds.
	Bead mix prepared incorrectly	Sonicate bead vials and vortex just prior to adding to bead mix bottle according to protocol. Agitate bead mix intermittently in reservoir while pipetting into the plate.
	Samples cause interference due to particulate matter or viscosity	See above. Also sample probe may need to be cleaned with alcohol flush, backflush and washes; or, if needed, probe should be removed and sonicated.
	Probe height not adjusted correctly	Adjust probe to 3 alignment discs in well H6.
Plate leaked	Vacuum pressure too high	Adjust vacuum pressure such that 0.2mL buffer can be suctioned in 3-5 seconds. May need to transfer contents to a new (prewetted) plate and continue.
	Plate set directly on table or absorbent towels during incubations or reagent additions	Set plate on plate stand or raised edge so bottom of filter is not touching any surface.
	Insufficient blotting of filter plate bottom causing wicking	Blot the bottom of the filter plate well with absorbent towels after each wash step.
	Pipette touching plate filter during additions	Pipette to the side of well.
	Probe height not adjusted correctly	Adjust probe to 3 alignment discs in well H6.
Background is too high	Background wells were contaminated	Avoid cross-well contamination by using sealer appropriately and by pipeting with multichannel pipets without touching reagent in plate.
	Matrix used has endogenous analyte or interference	Check matrix ingredients for crossreacting components (e.g. interleukin modified tissue culture medium).
	Insufficient washes	Increase number of washes.

Beads not in region or gate	Luminex not calibrated correctly or recently	Calibrate Luminex based on instrument manufacturer's instructions at least once a week or if temperature has changed by >3°C.
	Gate settings not adjusted correctly	Some Luminex instruments (e.g. Bio-Plex) require different gate settings than those described in the kit protocol. Use instrument default settings.
	Wrong bead regions in protocol template	Check kit protocol for correct bead regions or analyte selection.
	Incorrect sample type used	Samples containing organic solvents or if highly viscous should be diluted or dialyzed as required.
	Instrument not washed or primed	Prime the Luminex 4 times to eliminate air bubbles. Wash 4 times with sheath fluid or water if there is any remnant alcohol or sanitizing liquid.
	Beads were exposed to light	Keep plate and bead mix covered with dark lid or aluminum foil during all incubation steps.
Signal for whole plate is same as background	Incorrect or no Detection Antibody was added	Add appropriate Detection Antibody and continue.
	Streptavidin-Phycoerythrin was not added	Add Streptavidin-Phycoerythrin according to protocol. If Detection Antibody has already been vacuumed out, sensitivity may be low.
Low signal for standard curve	Detection Antibody may have been vacuumed out prior to adding Streptavidin Phycoerythrin	May need to repeat assay if desired sensitivity not achieved.
	Incubations done at incorrect temperatures, timings or agitation	Assay conditions need to be checked.
Signals too high, standard curves are saturated	Calibration target value set too high	With some Luminex instruments (e.g. Bio-Plex) default target setting for RP1 calibrator is set at High PMT. Use low target value for calibration and reanalyze plate.
	Plate incubation was too long with standard curve and samples	Use shorter incubation time.
Sample readings are out of range	Samples contain no or below detectable levels of analyte	If below detectable levels, it may be possible to use higher sample volume. Check with tech support for appropriate protocol modifications.
	Samples contain analyte concentrations higher than highest standard point	Samples may require dilution and reanalysis for that particular analyte.
	Standard curve was saturated at higher end of curve	See above.

High variation in samples and/or standards	Multichannel pipet may not be calibrated	Calibrate pipets.
	Plate washing was not uniform	Confirm all reagents are vacuumed out completely in all wash steps.
	Samples may have high particulate matter or other interfering substances	See above.
	Plate agitation was insufficient	Plate should be agitated during all incubation steps using a vertical plate shaker at a speed where beads are in constant motion without splashing.
	Cross-well contamination	Check when reusing plate sealer that no reagent has touched sealer.
		Care should be taken when using same pipet tips that are used for reagent additions and that pipet tip does not touch reagent in plate.

REPLACEMENT REAGENTS | **Catalog #**

REPLACEMENT REAGENTS	Catalog #
Mouse Cytokine Standard	MXM8070 MXM8070-2
Mouse Cytokine Quality Controls	MXM6070 MXM6070-2
Serum Matrix	MXMSM
Mouse Cytokine Detection Antibodies	MXM1070-1 MXM1070-2 MXM1070-3
Streptavidin-Phycoerythrin	
Use with Cat. # MXM1070-1	L-SAPE3
Use with Cat. # MXM1070-2	L-SAPE4
Use with Cat. # MXM1070-3	L-SAPE10
Assay Buffer	L-AB
Set of two 96-Well Filter Plates with Sealers	MX-PLATE
10X Wash Buffer	L-WB

Antibody-Immobilized Beads

Cytokine	*Bead #*	*Cat. #*	*Cytokine*	*Bead #*	*Cat. #*
Eotaxin	*1*	*MXMETXN*	*IL-17*	*37*	*MXMIL-17*
G-CSF	*3*	*MXMGCSF*	*IP-10*	*39*	*MXMIP10*
GM-CSF	*5*	*MXMGMCSF*	*KC*	*42*	*MXMKC*
IFNγ	*7*	*MXMIFNG*	*LIF*	*44*	*MXMLIF*
IL-1α	*9*	*MXMIL-1A*	*LIX*	*45*	*MXMLIX*
IL-1β	*11*	*MXMIL-1B*	*MCP-1*	*49*	*MXMMCP-1*
IL-2	*13*	*MXMIL-2*	*M-CSF*	*10*	*MXMMCSF*
IL-3	*15*	*MXMIL-3*	*MIG*	*57*	*MXMMIG*
IL-4	*17*	*MXMIL-4*	*MIP-1α*	*53*	*MXMMIP-1A*
IL-5	*19*	*MXMIL-5*	*MIP-1β*	*55*	*MXMMIP-1B*
IL-6	*21*	*MXMIL-6*	*MIP-2*	*40*	*MXMMIP-2*
IL-7	*23*	*MXMIL-7*	*RANTES*	*59*	*MXMRNTS*
IL-9	*66*	*MXMIL-9*	*TNFα*	*61*	*MXMTNF-A*
IL-10	*27*	*MXMIL-10*	*VEGF*	*63*	*MXMVEGF*
IL-12 (p40)	*29*	*MXM12P40*	*Premixed 13-plex Beads*		*MXMPMX13*
IL-12 (p70)	*62*	*MXM12P70*	*Premixed 22-plex Beads*		*MXMPMX22*
IL-13	*33*	*MXMIL-13*	*Premixed 32-plex Beads*		*MXMPMX32*
IL-15	*35*	*MXMIL-15*			

ORDERING INFORMATION

To place an order:

To assure the clarity of your custom cytokine kit order, please FAX the following information to our customer service department:

- Your name, telephone and/or fax number
- Customer account number
- Shipping and billing address
- Purchase order number
- Catalog number and description of product
- Quantity of kits
- Selection of MILLIPLEX® MAP Cytokine Analytes/Serum Matrix Requirements

FAX: (636) 441-8050
Toll-Free US: (800) MILLIPORE
Mail Orders: Millipore Corp.
6 Research Park Drive
St. Charles, Missouri 63304 U.S.A.

For International Customers:

To best serve our international customers in placing an order or obtaining additional information about MILLIPLEX™ MAP products, please contact your multiplex specialist or sales representative or email our European Customer Service at customerserviceEU@Millipore.com.

Conditions of Sale

All products are for research use only. They are not intended for use in clinical diagnosis or for administration to humans or animals. All products are intended for *in vitro* use only.

Material Safety Data Sheets (MSDS)

Material Safety Data Sheets for Millipore products may be ordered by fax or phone or through our website at www.millipore.com/techlibrary/index.do

WELL MAP

	1	2	3	4	5	6	7	8	9	10	11	12
A	0 pg/mL Standard (Background)	400 pg/mL Standard	QC-2 Control									
B	0 pg/mL Standard (Background)	400 pg/mL Standard	QC-2 Control									
C	3.2 pg/mL Standard	2,000 pg/mL Standard										
D	3.2 pg/mL Standard	2,000 pg/mL Standard										
E	16 pg/mL Standard	10,000 pg/mL Standard										
F	16 pg/mL Standard	10,000 pg/mL Standard										
G	80 pg/mL Standard	QC-1 Control										
H	80 pg/mL Standard	QC-1 Control										

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QUALITY CONTROL RANGES

Milliplex Mouse Cytokine/Chemokine Magnetic Panel
Catalog # MCYTOMAG-70K
and
Milliplex Mouse Cytokine/Chemokine Panel
Catalog # MPXMCYTO-70K

Kit lot
1731067

Control Catalog # MXM6070-2 LOT# MCY2-101 and MCY2- 201

Exp
31 AUG 2011

PMx22
22 Plex

Cytokine	QC Level	Expected Range	Units	Cytokine	QC Level	Expected Range	Units
G-CSF	Control 1	107 - 222	pg/mL	IL-12 (p70)	Control 1	91 - 190	pg/mL
	Control 2	554 - 1150	pg/mL		Control 2	483 - 1004	pg/mL
GM-CSF	Control 1	98 - 203	pg/mL	IL-13	Control 1	147 - 306	pg/mL
	Control 2	523 - 1086	pg/mL		Control 2	704 - 1462	pg/mL
IFNγ	Control 1	108 - 225	pg/mL	IL-15	Control 1	87 - 181	pg/mL
	Control 2	580 - 1204	pg/mL		Control 2	442 - 918	pg/mL
IL-1α	Control 1	95 - 197	pg/mL	IL-17	Control 1	98 - 204	pg/mL
	Control 2	525 - 1090	pg/mL		Control 2	495 - 1028	pg/mL
IL-1β	Control 1	92 - 192	pg/mL	IP-10	Control 1	90 - 187	pg/mL
	Control 2	510 - 1059	pg/mL		Control 2	562 - 1166	pg/mL
IL-2	Control 1	105 - 219	pg/mL	MKC	Control 1	136 - 283	pg/mL
	Control 2	558 - 1159	pg/mL		Control 2	675 - 1402	pg/mL
IL-4	Control 1	100 - 207	pg/mL	MCP-1	Control 1	103 - 214	pg/mL
	Control 2	482 - 1001	pg/mL		Control 2	583 - 1212	pg/mL
IL-5	Control 1	99 - 205	pg/mL	MIP-1α	Control 1	102 - 212	pg/mL
	Control 2	522 - 1085	pg/mL		Control 2	515 - 1070	pg/mL
IL-6	Control 1	101 - 210	pg/mL	MIP-1β	Control 1	105 - 219	pg/mL
	Control 2	536 - 1112	pg/mL		Control 2	523 - 1085	pg/mL
IL-7	Control 1	97 - 201	pg/mL	MIP-2	Control 1	106 - 219	pg/mL
	Control 2	491 - 1019	pg/mL		Control 2	539 - 1119	pg/mL
IL-9	Control 1	107 - 223	pg/mL	RANTES	Control 1	100 - 207	pg/mL
	Control 2	536 - 1113	pg/mL		Control 2	478 - 993	pg/mL
IL-10	Control 1	96 - 200	pg/mL	TNFα	Control 1	97 - 202	pg/mL
	Control 2	513 - 1065	pg/mL		Control 2	500 - 1039	pg/mL
IL-12 (p40)	Control 1	105 - 217	pg/mL				
	Control 2	554 - 1150	pg/mL				

Note: The Quality Control Ranges are generated with overnight assay format using serum matrix provided in the kit. Quality Control values in culture media are not tested.

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Cytokine/Chemokine Analysis of Serum: Quality Control Data

Sample	Cytokine/Chemokine (pg/mL)										
	G-CSF	**GM-CSF**	**IFNg**	**IL-10**	**IL-12 (p70)**	**IL-13**	**IL-15**	**IL-17**	**IL-1α**	**IL-1β**	**IL-2**
Control 1	138	135	143	136	131	173	122	134	124	122	139
Expect. Range	**107-222**	**98-203**	**108-225**	**96-200**	**91-190**	**147-306**	**87-181**	**98-204**	**95-197**	**92-192**	**105-219**
Control 2	935	804	856	848	820	1026	720	805	819	861	857
Expect. Range	**554-1150**	**523-1086**	**580-1204**	**513-1065**	**483-1004**	**704-1462**	**442-918**	**495-1028**	**525-1090**	**510-1059**	**558-1159**

Sample	Cytokine/Chemokine (pg/mL)										
	IL-4	**IL-5**	**IL-6**	**IL-7**	**IL-9**	**IP-10**	**KC**	**MCP-1**	**MIP-1a**	**RANTES**	**TNFa**
Control 1	130	120	121	127	164	117	153	137	127	173	119
Expect. Range	**100-207**	**99-205**	**101-210**	**97-201**	**107-223**	**90-187**	**136-283**	**103-214**	**102-212**	**100-207**	**97-202**
Control 2	662	800	804	734	879	762	998	885	875	783	684
Expect. Range	**482-1001**	**522-1085**	**536-1112**	**491-1019**	**536-1113**	**513-1065**	**675-1402**	**583-1212**	**515-1070**	**478-993**	**500-1039**

Attachment G3

Manufacturer's Instructions for the BCA Protein Assay Kit

INSTRUCTIONS

Micro BCA™ Protein Assay Kit

23235

0412.4

Number	Description
23235	**Micro BCA Protein Assay Kit**, sufficient reagents for 480 tube assays or 3,200 microplate assays

Kit Contents:

Micro BCA Reagent A (MA), 240 ml

Micro BCA Reagent B (MB), 240 ml

Micro BCA Reagent C (MC), 12 ml

Albumin Standard Ampules, 2 mg/ml, 10 × 1 ml ampules containing bovine serum albumin (BSA) at 2.0 mg/ml in a solution of 0.9% saline and 0.05% sodium azide

Storage: Upon receipt store product at room temperature. Product shipped at ambient temperature.

Note: If either Reagent MA or Reagent MB precipitates upon shipping in cold weather or during long-term storage, dissolve precipitates by gently warming and stirring solutions. Discard any reagent that shows discoloration or evidence of microbial contamination.

Table of Contents

Introduction

The Thermo Scientific Micro BCA Protein Assay Kit is a detergent-compatible bicinchoninic acid formulation for the colorimetric detection and quantitation of total protein. An adaptation of the Thermo Scientific Pierce BCA Protein Assay Kit (Product No. 23225), the Micro BCA Kit has been optimized for use with dilute protein samples (0.5-20 µg/ml). The unique, patented method utilizes bicinchoninic acid (BCA) as the detection reagent for Cu^{+1}, which is formed when Cu^{+2} is reduced by protein in an alkaline environment.[1] A purple-colored reaction product is formed by the chelation of two molecules of BCA with one cuprous ion (Cu^{+1}). This water-soluble complex exhibits a strong absorbance at 562 nm that is linear with increasing protein concentrations.

The macromolecular structure of protein, the number of peptide bonds and the presence of four amino acids (cysteine, cystine, tryptophan and tyrosine) are reported to be responsible for color formation with BCA.[2] Studies with di-, tri- and tetrapeptides suggest that the extent of color formation is caused by more than the mere sum of individual color-producing functional groups.[2]

The Micro BCA Protein Assay Kit uses concentrated reagents and a protocol that utilizes an extended incubation time at an elevated temperature (60°C, Test Tube Procedure only). The result is an extremely sensitive colorimetric protein assay in a test tube or microplate assay format.

Pierce Biotechnology 3747 N. Meridian Road | PO Box 117 Rockford, IL 61105 USA | (815) 968-0747 (815) 968-7316 fax | www.thermo.com/pierce

Preparation of Standards and Working Reagent

A. Preparation of Diluted Albumin (BSA) Standards

Use Table 1 as a guide to prepare a set of protein standards. Dilute the contents of one Albumin (BSA) Standard ampule into several clean vials, preferably using a diluent that is similar to the sample buffer. Each 1 ml ampule of 2.0 mg/ml Albumin Standard is sufficient to prepare a set of diluted standards such that three replicates of each dilution may be included in the Test Tube Procedure.

Table 1. Preparation of Diluted Albumin (BSA) Standards

Vial	Volume of Diluent	Volume and Source of BSA	Final BSA Concentration
A	4.5 ml	0.5 ml of Stock	200 µg/ml
B	8.0 ml	2.0 ml of vial A dilution	40 µg/ml
C	4.0 ml	4.0 ml of vial B dilution	20 µg/ml
D	4.0 ml	4.0 ml of vial C dilution	10 µg/ml
E	4.0 ml	4.0 ml of vial D dilution	5 µg/ml
F	4.0 ml	4.0 ml of vial E dilution	2.5 µg/ml
G	4.8 ml	3.2 ml of vial F dilution	1 µg/ml
H	4.0 ml	4.0 ml of vial G dilution	0.5 µg/ml
I	8.0 ml	0	0 µg/ml = Blank

B. Preparation of the Micro BCA Working Reagent (WR)

1. Use the following formula to determine the total volume of WR required:

   (# standards + # unknowns) × (# replicates) × (volume of WR per sample) = total volume WR required

   Example: for the standard Test Tube Procedure with 3 unknowns and 2 replicates of each sample:

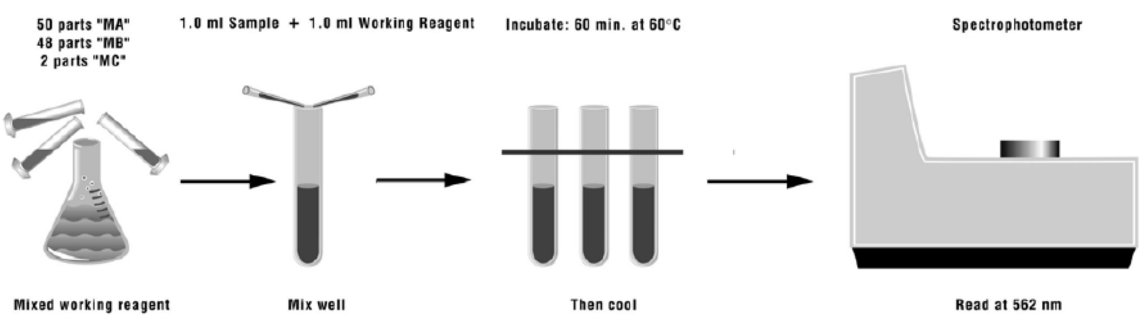
   (9 standards + 3 unknowns) × (2 replicates) × (1 ml) = 24 ml WR required (round up to 25 ml)

   Note: 1 ml of the WR is required for each sample in the Test Tube Procedure, while only 150 µl of WR is required for each sample in the Microplate Procedure.

2. Prepare WR by mixing 25 parts of Micro BCA Reagent MA and 24 parts Reagent MB with 1 part of Reagent MC (25:24:1, Reagent MA:MB:MC). For the above example, combine 12.5 ml of Reagent MA and 12.0 ml Reagent MB with 0.5 ml of Reagent MC.

   Note: When Reagent MC is initially added to Reagents MA and MB, turbidity occurs that quickly disappears upon mixing to yield a clear-green solution. Prepare sufficient volume of WR based on the number of samples to be assayed. The WR is stable for one day when stored in a closed container at room temperature (RT). It is not necessary to protect the solution from light.

Procedure Summary (Test Tube Procedure)



Test Tube Procedure (linear working range of 0.5-20 µg/ml)

1. Pipette 1.0 ml of each standard and unknown sample replicate into appropriately labeled test tubes.
2. Add 1.0 ml of the WR to each tube and mix well.
3. Cover tubes and incubate at 60°C in a water bath for 1 hour.
4. Cool all tubes to room temperature (RT).
5. With the spectrophotometer set to 562 nm, zero the instrument on a cuvette filled only with water. Subsequently, measure the absorbance of all the samples within 10 minutes.

   Note: Color development continues even after cooling to RT. However, the rate of development at RT is sufficient low that no significant error is introduced if all absorbance measurements are made within a 10 minute period.
6. Subtract the average 562 nm absorbance reading of the Blank standard replicates from the 562 nm reading of all other individual standard and unknown sample replicates.
7. Prepare a standard curve by plotting the average Blank-corrected 562 nm reading for each BSA standard vs. its concentration in µg/ml. Use the standard curve to determine the protein concentration of each unknown sample.

Microplate Procedure (linear working range of 2-40 µg/ml)

1. Pipette 150 µl of each standard or unknown sample replicate into a microplate well (Product No. 15041).
2. Add 150 µl of the WR to each well and mix plate thoroughly on a plate shaker for 30 seconds.
3. Cover plate using Sealing Tape for 96-Well Plates (Product No. 15036) and incubate at 37°C for 2 hours.

   Note: Limit incubations of microplate to less than or equal to 37°C, otherwise high background and aberrant color development may result. Most polystyrene assay plates deform, leach, and become cloudy at 60°C.
4. Cool plate to room temperature (RT).
5. Measure the absorbance at or near 562 nm on a plate reader.
6. Subtract the average 562 nm absorbance reading of the Blank standard replicates from the 562 nm reading of all other individual standard and unknown sample replicates.
7. Prepare a standard curve by plotting the average Blank-corrected 562 nm reading for each BSA standard vs. its concentration in µg/ml. Use the standard curve to determine the protein concentration of each unknown sample.

   Note: If using curve-fitting software, use a best-fit polynomial equation rather than a linear equation for the standard curve. If plotting results by hand, a point-to-point fit is preferable to a linear fit to the standard points.

Troubleshooting

Problem	Possible Cause	Solution
No color in any tubes	Sample contains a copper chelating agent	Dialyze, desalt, or dilute sample Increase copper concentration in working reagent (e.g., use more Reagent MC)
Blank absorbance is OK, but standards and samples show less color than expected	Strong acid or alkaline buffer, alters working reagent pH	Dialyze, desalt, or dilute sample
	Color measured at the wrong wavelength	Measure the absorbance at 562 nm
Color of samples appears darker than expected	Protein concentration is too high	Dilute sample
	Sample contains lipids or lipoproteins	Add 2% SDS to the sample[3]
All tubes (including blank) are dark purple	Buffer contains a reducing agent	Dialyze or dilute sample
	Buffer contains a thiol	
	Buffer contains biogenic amines (catecholamines)	
Need to measure color at a different wavelength	Spectrophotometer or plate reader does not have 562 nm filter	Wavelengths between 540 nm and 590 nm can be used, but standard curve slope and overall assay sensitivity will be decreased. See Tech Tip on web site

Thermo SCIENTIFIC

Additional Information

A. Interfering Substances

Certain substances are known to interfere with the Micro BCA Assay including those with reducing potential, chelating agents, and strong acids or bases. Avoid the following substances as components of the sample buffer:

Ascorbic Acid	Hydrogen Peroxide	Iron	Reducing Sugars
Catecholamines	Hydrazides	Lipids	Tryptophan
Cysteine	Impure Glycerol	Phenol Red	Tyrosine
EGTA	Impure Sucrose	Reducing Agents	Uric Acid

Maximum compatible concentrations for many substances in the Test Tube Procedure are listed in Table 2 (see last page). Substances were considered compatible at the indicated concentration if the error in protein concentration estimation caused by the presence of the substance in the sample was less than or equal to 10%. The substances were tested using WR prepared immediately before each experiment. The Blank-corrected 562 nm absorbance measurements (for the 10 µg/ml BSA standard + substance) were compared to the net 562 nm readings of the same standard prepared in 0.9% saline.

B. Strategies for Eliminating or Minimizing the Effects of Interfering Substances

The effects of interfering substances in the Micro BCA Protein Assay may be eliminated or overcome by several methods.

- Remove the interfering substance by dialysis or gel filtration (see Related Pierce Products).
- Dilute the sample until the substance no longer interferes. (This is only effective for relatively concentrated samples.)
- Precipitate proteins with acetone or trichloroacetic acid (TCA).[4]
- Increase the amount of copper in the WR (prepare WR using a greater proportion of Reagent MC; e.g., MA:MB:MC equal to 25:24:2 or 25:24:3), which may eliminate interference by copper chelating agents.
  Note: For greatest accuracy, the protein standards must be treated identically to the sample(s).

C. Response Characteristics for Different Proteins

Each of the commonly used total protein assay methods exhibits some degree of varying response toward different proteins (Table 3). These differences relate to amino acid sequence, pI, structure and the presence of certain side chains or prosthetic groups that can dramatically alter the protein's color response. Most protein assay methods use BSA or immunoglobulin (IgG) as the standard against which the concentration of protein in the sample is determined. Pierce Albumin Standard (BSA) (Product No. 23209) provides a consistent standard for protein estimations. Nevertheless, individual proteins, including BSA and IgG, differ slightly in their color responses in the Micro BCA Assay (Figure 1). Therefore, for maximum accuracy use a purified (known concentration) sample of the target protein as the assay standard.

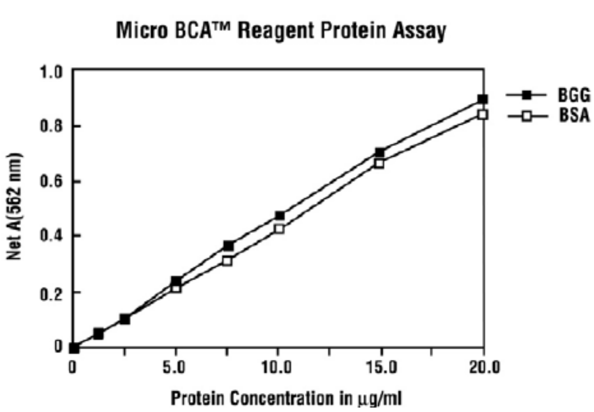


Figure 1. Typical color response curves for BSA and BGG using the Test Tube Procedure.

Table 3. Protein-to-Protein Variation. Absorbance ratios (562 nm) for proteins relative to BSA using the Test Tube Procedure.

Ratio = (avg. "test" net Abs.) / (avg. BSA net Abs.)

Protein Tested	Ratio
Albumin, bovine serum	1.00
Aldolase, rabbit muscle	0.80
α-Chymotrypsinogen, bovine	0.99
Cytochrome C, horse heart	1.11
Gamma globulin, bovine	0.95
IgG, bovine	1.12
IgG, human	1.03
IgG, mouse	1.23
IgG, rabbit	1.12
IgG, sheep	1.14
Insulin, bovine pancreas	1.22
Myoglobin, horse heart	0.92
Ovalbumin	1.08
Transferrin, human	0.98
Average Ratio	**1.05**
Standard Deviation	**0.12**
Coefficient of Variation	**11.4%**

Thermo SCIENTIFIC

D. Alternative Total Protein Assay Reagents

If interference by a reducing substance or metal-chelating substance contained in the sample cannot be overcome, try the Coomassie Plus (Bradford) Protein Assay Kit (Product No. 23236), which is less sensitive to such substances.

E. Cleaning and Re-using Glassware

Care must be exercised when re-using glassware. The Micro BCA WR is sensitive to metal ions, especially copper ions. All glassware must be cleaned and then given a thorough final rinse with ultrapure water.

Related Thermo Scientific Products

15041	**Pierce 96-Well Plates,** 100/pkg.
15075	**Reagent Reservoirs,** 200/pkg.
15036	**Sealing Tape for 96-Well Plates,** 100/pkg.
23209	**Albumin Standard Ampules, 2 mg/ml,** 10 × 1 ml ampules, containing bovine serum albumin (BSA)
23212	**Bovine Gamma Globulin Standard, 2 mg/ml,** 10 × 1 ml ampules, containing bovine gamma globulin
23236	**Coomassie Plus (Bradford) Protein Assay Kit,** working range 1-1,500 µg/ml
89882	**Zeba™ Desalt Spin Columns, 0.5 ml,** for desalting 20-130 µl samples
89889	**Zeba Desalt Spin Columns, 2 ml,** for desalting 200-700 µl samples
69576	**Slide-A-Lyzer® MINI Dialysis Units,** 10 units and float for dialyzing 10-100 µl samples
69576	**Slide-A-Lyzer Dialysis Cassettes,** 10 units and floats for 100-500 µl samples

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Yang, G., *et al.* (2005). Activation-induced deaminase cloning, localization, and protein extraction from young Vh-mutant rabbit appendix. *Proc. Natl. Acad. Sci. USA* **102:**17083-8.

Thermo SCIENTIFIC

Table 2. Compatible Substance Concentrations in the Micro BCA Protein Assay (see text for details).

Substance	Compatible Concentration
Salts/Buffers	
ACES, pH 7.8	10 mM
Ammonium sulfate	--------
Bicine, pH 8.4	2 mM
Bis-Tris, pH 6.5	0.2 mM
Borate (50 mM), pH 8.5 (#28384)	1:4 dilution*
B-PER® Reagent (#78248)	1:10 dilution*
Calcium chloride in TBS, pH 7.2	10 mM
Na-Carbonate/Na-Bicarbonate (0.2 M), pH 9.4 (#28382)	undiluted
Cesium bicarbonate	100 mM
CHES, pH 9.0	100 mM
Na-Citrate (0.6 M), Na-Carbonate (0.1 M), pH 9.0 (#28388)	1:600 dilution*
Na-Citrate (0.6 M), MOPS (0.1 M), pH 7.5 (#28386)	1:600 dilution*
Cobalt chloride in TBS, pH 7.2	--------
EPPS, pH 8.0	100 mM
Ferric chloride in TBS, pH 7.2	0.5 mM
Glycine	n/a
Guanidine•HCl	4 M
HEPES, pH 7.5	100 mM
Imidazole, pH 7.0	12.5 mM
MES, pH 6.1	100 mM
MES (0.1 M), NaCl (0.9%), pH 4.7 (#28390)	1:4 dilution*
MOPS, pH 7.2	100 mM
Modified Dulbecco's PBS, pH 7.4 (#28374)	undiluted
Nickel chloride in TBS, pH 7.2	0.2 mM
PBS; Phosphate (0.1 M), NaCl (0.15 M), pH 7.2 (#28372)	undiluted
PIPES, pH 6.8	100 mM
RIPA lysis buffer; 50 mM Tris, 150 mM NaCl, 0.5% DOC, 1% NP-40, 0.1% SDS, pH 8.0	1:10 dilution*
Sodium acetate, pH 4.8	200 mM
Sodium azide	0.2%
Sodium bicarbonate	100 mM
Sodium chloride	1 M
Sodium citrate, pH 4.8 (or pH 6.4)	5 mM (16.7 mM)
Sodium phosphate	100 mM
Tricine, pH 8.0	2.5 mM
Triethanolamine, pH 7.8	0.5 mM
Tris	50 mM
TBS; Tris (25 mM), NaCl (0.15 M), pH 7.6 (#28376)	1:10 dilution*
Tris (25 mM), Glycine (192 mM), pH 8.0 (#28380)	1:10 dilution*
Tris (25 mM), Glycine (192 mM), SDS (0.1%), pH 8.3 (#28378)	undiluted
Zinc chloride in TBS, pH 7.2	0.5 mM

Substance	Compatible Concentration
Detergents**	
Brij®-35	5.0%
Brij-56, Brij-58	1.0%
CHAPS (CHAPSO)	1.0% (5.0%)
Deoxycholic acid	5.0%
Nonidet P-40 (NP-40)	5.0%
Octyl β-glucoside	0.1%
Octyl β-thioglucopyranoside	5.0%
SDS	5.0%
Span® 20	1.0%
Triton® X-100	5.0%
Triton X-114	0.05%
Triton X-305, X-405	1.0%
Tween®-20, Tween-80	5.0%
Tween-60	0.5%
Zwittergent® 3-14	--------
Chelating agents	
EDTA	0.5 mM
EGTA	--------
Sodium citrate, pH 4.8 (or pH 6.4)	5 mM (16.7 mM)
Reducing & Thiol-Containing Agents	
N-acetylglucosamine in PBS, pH 7.2	--------
Ascorbic acid	--------
Cysteine	--------
Dithioerythritol (DTE)	--------
Dithiothreitol (DTT)	--------
Glucose	1 mM
2-Mercaptoethanol	1 mM
Thimerosal	--------
Misc. Reagents & Solvents	
Acetone	1.0%
Acetonitrile	1.0%
Aprotinin	1 mg/L
DMF, DMSO	1.0%
Ethanol	1.0%
Glycerol (Fresh)	1.0%
Hydrazide	--------
Hydrides (Na_2BH_4 or $NaCNBH_3$)	--------
Hydrochloric Acid	10 mM
Leupeptin	10 mg/L
Methanol	1.0%
Phenol Red	--------
PMSF	1 mM
Sodium Hydroxide	50 mM
Sucrose	4%
TLCK	0.1 mg/L
TPCK	0.1 mg/L
Urea	3 M
o-Vanadate (sodium salt), in PBS, pH 7.2	1 mM

* Diluted with ultrapure water
** Detergents were tested using Pierce high-purity Surfact-Amps® Products, which have low peroxide content
--- Dashed-line entry indicates that the material is incompatible with the assay

Pierce Biotechnology 3747 N. Meridian Road | PO Box 117 Rockford, IL 61105 USA | (815) 968-0747 (815) 968-7316 fax | www.thermo.com/pierce

Appendix H

Pathology Contributing Scientist Report

Pathology Contributing Scientist Report for the

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

(Amended)

Submitted by:

Sheila D. Grimes, D.V.M., Ph.D., D.A.C.V.P.
Pathology Program Manager
Southern Research Institute
Birmingham, Alabama

Southern Research Study Number: 13026.01.01

February 2, 2011

Pathology Contributing Scientist Report for the

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

(Amendment)

Pages 76-80 and 84 (Figures H5, H6, H7, H8, H9, and H13): The original report lacked arrows to point out the lesions described in the figure legends. These arrows have been added.

Sheila D. Grimes 2-2-11

Sheila D. Grimes, D.V.M., Ph.D., D.A.C.V.P. Date
Pathology Program Manager

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1.0 SIGNATURE PAGE

Pathologist's Contributing Scientist Report for the

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

Sheila D. Grimes 12-22-10

Sheila D. Grimes, D.V.M., Ph.D., D.A.C.V.P. Date
Pathology Program Manager

2.0 SUMMARY

The objective of this study was to evaluate the toxicity and potential mechanisms of action of sodium dichromate dihydrate (SDD) administered in drinking water to mice for 90 days. No macroscopic lesions associated with the oral administration of SDD were observed on Days 8 and 91. Microscopic lesions in the duodenum and jejunum associated with the administration of SDD were observed in the 170 and 520 mg/L SDD dose groups on Day 8, and the 60, 170, and 520 mg/L SDD dose groups on Day 91. Test-article related microscopic lesions were crypt epithelial hyperplasia, histiocytic cellular infiltration of the villous lamina propria, cytoplasmic vacuolization of the villous epithelium, multinucleated syncytia of the villous lamina propria, villous atrophy, and apoptosis. On Day 8, cytoplasmic vacuolization of the villous epithelium was observed in the jejunum and duodenum of mice in the 170 and 520 mg/L SDD dose groups, and crypt epithelia hyperplasia and villous atrophy were observed in the duodenum of mice in the 520 mg/L SDD dose group. On Day 91, crypt epithelial hyperplasia, histiocytic cellular infiltration of the villous lamina propria, cytoplasmic vacuolization of the villous epithelium, multinucleated syncytia of the villous lamina propria, villous atrophy, and apoptosis were test article-related microscopic lesions in the small intestine. Injury (cytoplasmic vacuolization) of the villous epithelium resulted in villous atrophy with subsequent crypt stimulation leading to crypt epithelial hyperplasia. On Day 91, test article-related microscopic lesions were observed in the duodenum and jejunum of mice in the 60, 170, and 520 mg/L SDD dose groups. In general, the incidence and/or severity of lesions, particularly crypt epithelial hyperplasia and villous atrophy, were greater in the duodenum than the jejunum on Days 8 and 91. No test article-related microscopic lesions were observed in the oral mucosa of any of the dose groups on Days 8 and 91. The no observable adverse effect level was determined to be 14 mg/L SDD. The incidence and/or severity of lesions were greatest in the 520 mg/L dose group on Days 8 and 91.

3.0 METHODS AND MATERIALS

For histopathologic evaluation, one hundred and five female mice were assigned to six test article dose groups or to a vehicle control group, with 15 mice assigned to each group. Mice were assigned to the following seven groups: Group 1 (vehicle control - water) – 0 mg/L; Group 2 – 0.3 mg/L SDD; Group 3 – 4 mg/L SDD; Group 4 – 14 mg/L SDD; Group 5 –

60 mg/L SDD; Group 6 – 170 mg/L SDD; and Group 7 – 520 mg/L SDD. Five mice per test article dose group or vehicle control group were euthanized on Day 8, and ten mice per test article dose group or vehicle control group were euthanized on Day 91.

A complete gross necropsy examination was performed on each animal in the study that was designated for histopathologic evaluation. The set of tissues as defined in the protocol for histological processing and gross lesions was evaluated microscopically from each animal and assigned morphologic diagnoses including topographic qualifiers where indicated, with the exception of missing or insufficient tissues for which evaluation was not possible. Most lesions were graded for severity using a numerical scoring regimen in which 1 = minimal, 2 = mild, 3 = moderate and 4 = marked.

4.0 RESULTS

Macroscopic Observations

Individual animal macroscopic observations are presented in Table H1; a summary of macroscopic observations is presented in Table H2.

No test article-related macroscopic observations were noted on Days 8 and 91.

Microscopic Observations

Individual animal microscopic observations are presented in Table H3; a summary of microscopic observations is presented in Table H4.

Test-article related microscopic lesions in the small intestine were the following: crypt epithelial hyperplasia, histiocytic cellular infiltration of the villous lamina propria, cytoplasmic vacuolization of the villous epithelium, multinucleated syncytia of the villous lamina propria, villous atrophy, and apoptosis.

Crypt epithelial hyperplasia consisted of elongated crypts containing an increased number of epithelial cells and generally increased numbers of mitotic figures (Figures H1-H4 and Figures H14-H16). Crypt epithelial hyperplasia was graded based upon the following criteria designated by the study pathologist: minimal = >1 and ≤2 times the normal crypt depth; mild = >2 and ≤3 times the normal crypt depth; moderate = >3 and ≤4 times the normal crypt depth; and marked = >4 times the normal crypt depth. Histiocytic cellular infiltration consisted of macrophages with a granular eosinophilic cytoplasm located in the lamina propria at the tips of the villi (Figure H5 and Figure H6). In some cases, the histiocytes formed plump eosinophilic aggregates which were referred to as multinucleate syncytial cells (giant cells) (Figure H7 and Figure H8). Histiocytic infiltration cellular was graded based upon the following criteria: minimal = a few macrophages in fewer than half of the villi; mild = macrophages in the villi which were readily discernible at 10x and present in ≥50% and <75% of the villi; moderate = macrophages in the villi which were readily discernible at 10x and present in ≥75% and < 90% of the villi; marked = macrophages in the villi which were readily discernible at 10x and present in ≥90% of the villi. Cytoplasmic vacuolization of the villous epithelium consisted of discrete to indiscrete clear vacuoles in the apical cytoplasm of the villous epithelium (Figures H9-H13). Epithelium near the villous tips was primarily affected. Cytoplasmic vacuolization was graded based upon the following criteria: minimal = cytoplasmic vacuolization of <25% of the villous epithelium; mild = cytoplasmic vacuolization of ≥25% and <50% of the villous epithelium; moderate = cytoplasmic vacuolization of ≥50% and <75% of the villous epithelium; and marked = cytoplasmic vacuolization of ≥75% of the villous epithelium. Apoptosis (Figure H13) was graded based upon the following criteria: minimal = <5 apoptotic cells per 400x field; mild = ≥5 and <10 apoptotic cells per 400x field; moderate = ≥10 and <20 apoptotic cells per 400x field; and marked = ≥20 apoptotic cells per 400x field. Villous atrophy consisted of shortened villi which were slightly blunted and occasionally fused (Figures H14, H15, and H16). Villous atrophy was graded based upon the following criteria: minimal = <25% reduction of the villous length; mild = ≥25 and <50% reduction of villous length; moderate = ≥50% and <75% reduction of villous length; and marked = ≥75% reduction of villous length.

Day 8

On Day 8, cytoplasmic vacuolization of the villous epithelium of the duodenum and jejunum (minimal), crypt epithelial hyperplasia of the duodenum (minimal), and villous atrophy of the duodenum (minimal) were test article-related microscopic lesions. Cytoplasmic vacuolization of the villous epithelium was observed in the jejunum and duodenum of the 170 and 520 mg/L SDD dose groups. Crypt epithelia hyperplasia and villous atrophy were observed in the duodenum of the 520 mg/L SDD dose group.

Day 91

On Day 91, crypt epithelial hyperplasia (minimal to mild), histiocytic cellular infiltration of the villous lamina propria (minimal to mild), cytoplasmic vacuolization of the villous epithelium (minimal), multinucleated syncytia of the villous lamina propria, villous atrophy (minimal to mild), and apoptosis (minimal) were test article-related microscopic lesions in the small intestine.

The duodenum had histiocytic cellular infiltration in the villous lamina propria and cytoplasmic vacuolization of the villous epithelium in the 60, 170, and 520 mg/L SDD dose groups. In addition, crypt epithelial hyperplasia, multinucleated syncytia in the villous lamina propria, apoptosis, and villous atrophy were observed in the duodenum in the 170 and 520 mg/L SDD dose groups.

The jejunum had cytoplasmic vacuolization of the villous epithelium in the 60, 170, and 520 mg/L SDD dose groups; histiocytic cellular infiltration in the villous lamina propria, crypt epithelial hyperplasia and villous atrophy in the 170 and 520 mg/L SDD dose groups; and multinucleated syncytia in the lamina propria and apoptosis in the 520 mg/L SDD dose group.

5.0 DISCUSSION AND CONCLUSIONS

The objective of this study was to evaluate the toxicity and potential mechanisms of action of sodium dichromate dihydrate (SDD) administered in drinking water to mice for 90 days. Microscopic lesions associated with the administration of SDD were observed in the 170 and 520 mg/L SDD dose groups on Day 8 and in the 60, 170, and 520 mg/L SDD dose groups on Day 91. No macroscopic lesions associated with the administration of SDD were observed on Days 8 and 91.

On Day 8, minimal cytoplasmic vacuolization of the villous epithelium was observed in the duodenum and jejunum of mice in the 170 and 520 mg/L SDD dose groups, and minimal crypt epithelial hyperplasia and minimal villous atrophy were observed in the duodenum of mice in the

520 mg/L SDD dose group. The incidence of the cytoplasmic vacuolization was greater in the duodenum than in the jejunum in the 170 and 520 mg/L SDD dose groups. The crypt epithelial hyperplasia and villous atrophy were limited to the duodenum in the 520 mg/L SDD dose groups.

On Day 91, microscopic lesions were observed in the duodenum and jejunum of mice in the 60, 170, and 520 mg/L SDD dose groups. Test article-related microscopic lesions observed on Day 91 were the following: crypt epithelial hyperplasia, histiocytic cellular infiltration of the villous lamina propria, cytoplasmic vacuolization of the villous epithelium, multinucleated syncytia of the villous lamina propria, villous atrophy, and apoptosis. In the 60 mg/L SDD dose group, microscopic lesions were minimal and were limited to cytoplasmic vacuolization of the villous epithelium in the jejunum and duodenum, and histiocytic infiltration cellular of the villous lamina propria in the duodenum. In addition to the previously listed lesions, crypt epithelial hyperplasia, multinucleated syncytial cells of the villous lamina propria, apoptosis and villous atrophy were observed in the small intestine of the 170 and 520 mg/L SDD dose groups. The lesions observed in the duodenum of mice in the 170 and 520 mg/L SDD dose groups were similar. In the duodenum and jejunum, the incidence and severity of villous atrophy, and the severity of crypt epithelial hyperplasia and histiocytic cellular infiltration were greater in the 520 mg/L SDD than in the 170 mg/L SDD dose group. Multinucleated syncytia and apoptosis were limited to the 520 mg/L dose group in the jejunum. The cytoplasmic vacuolization of the villous epithelium, crypt epithelial hyperplasia, and villous atrophy suggest injury to the villous epithelium associated with the administration of the test article.

No test article-related macroscopic lesions and no test article related microscopic lesions in the oral mucosa were observed in any of the dose groups on Days 8 and 91. No test article-related microscopic lesions were observed in the 0.3, 4, 14, and 60 mg/L SDD dose groups on Day 8; and in the 0.3, 4, and 14 mg/L SDD dose groups on Day 91. The no observable adverse effect level was determined to be 14 mg/L SDD.

On Day 8 the initial lesion observed was a minor injury, cytoplasmic vacuolization, to the villous epithelium at the tips of the villi in the duodenum and jejunum of the 170 and 520 mg/L SDD dose groups. In addition, on Day 8, in the duodenum, crypt epithelial hyperplasia and villous atrophy were observed in the 520 mg/L SDD dose group. An increase in the rate of loss of epithelium from the villous surface due to the villous epithelial injury (cytoplasmic vacuolization) resulted in villous atrophy. Villous atrophy led to a compensatory increase in the proliferative compartment, crypt epithelial hyperplasia. On Day 91, in addition to the previously listed lesions (cytoplasmic vacuolization, crypt epithelial hyperplasia and villous atrophy), histiocytic cellular infiltration, multinucleated syncytia, and apoptosis of the villous lamina propria were observed. Prolonged injury to the villi appeared to result in the latter lesions in the small intestine.

No macroscopic lesions associated with the administration of SDD were observed on Days 8 and 91. Microscopic lesions in the duodenum and jejunum associated with the administration of SDD were observed in the 170 and 520 mg/L SDD dose groups on Day 8, and the 60, 170, and 520 mg/L SDD dose groups on Day 91. Test article-related microscopic lesions were crypt epithelial hyperplasia, histiocytic cellular infiltration of the villous lamina propria, cytoplasmic vacuolization of the villous epithelium, multinucleated syncytia of the villous lamina propria, villous atrophy, and apoptosis. In general, the incidence and severity of lesions was greater in the duodenum than the jejunum and a dose-related effect appeared to be present.

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 8

SEX: FEMALE

GROUP	1	1	1	1	1
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	.46	.47	.48	.49	.50
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
ESOPHAGUS;	N	N	N	N	N
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	N	N	N	N	N
LYMPH NODE, MESENTERIC;	N	N	N	N	N
ORAL MUCOSA;	N	N	N	N	N
STOMACH;	N	N	N	N	N

+ = Tissue observation present N = No visible lesions P= Present- no grade or classification
X = Not examined S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 8

SEX: FEMALE					
GROUP	2	2	2	2	2
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	126	127	128	129	130
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
ESOPHAGUS;	N	N	N	N	N
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	N	N	N	N	N
LYMPH NODE, MESENTERIC;	N	N	N	N	N
ORAL MUCOSA;	N	N	N	N	N
STOMACH;	N	N	N	N	N

+ = Tissue observation present   N = No visible lesions   P= Present- no grade or classification
X = Not examined   S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 8

SEX: FEMALE					
GROUP	3	3	3	3	3
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	206	207	208	209	210
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
ESOPHAGUS;	.	.	.	.	.
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	.	.	.	.	.
LYMPH NODE, MESENTERIC;	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
STOMACH;	.	.	.	.	.

+ = Tissue observation present N = No visible lesions P= Present- no grade or classification
X = Not examined S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 8

SEX: FEMALE					
GROUP	4	4	4	4	4
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	286	287	288	289	290
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
ESOPHAGUS;	N	N	N	N	N
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	N	N	N	N	N
LYMPH NODE, MESENTERIC;	N	N	N	N	N
ORAL MUCOSA;	N	N	N	N	N
STOMACH;	N	N	N	N	N

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+ = Tissue observation present   N = No visible lesions   P= Present- no grade or classification
X = Not examined   S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 8

SEX: FEMALE					
GROUP	5	5	5	5	5
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	366	367	368	369	370
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
ESOPHAGUS;	.	.	.	.	.
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	.	.	.	.	.
LYMPH NODE, MESENTERIC;	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
STOMACH;	.	.	.	.	.

+ = Tissue observation present   N = No visible lesions   P= Present- no grade or classification
X = Not examined   S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 8

SEX: FEMALE					
GROUP	6	6	6	6	6
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	446	447	448	449	450
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
ESOPHAGUS;	.	.	.	.	.
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	.	.	.	.	.
LYMPH NODE, MESENTERIC;	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
STOMACH;	.	.	.	.	.

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+ = Tissue observation present   N = No visible lesions   P= Present- no grade or classification
X = Not examined   S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 8

SEX: FEMALE					
GROUP	7	7	7	7	7
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	526	527	528	529	530
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
ESOPHAGUS;	N	N	N	N	N
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	N	N	N	N	N
LYMPH NODE, MESENTERIC;	N	N	N	N	N
ORAL MUCOSA;	N	N	N	N	N
STOMACH;	N	N	N	N	N

+ = Tissue observation present   N = No visible lesions   P= Present- no grade or classification
X = Not examined   S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 91

SEX: FEMALE

GROUP	1	1	1	1	1
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	1	2	3	4	5
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
BONE MARROW SMEAR;	.	.	.	.	.
Submitted	.	.	.	.	.
ESOPHAGUS;	N	N	N	N	N
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	N	N	N	N	N
LYMPH NODE;	.	.	.	.	.
iliac; Discoloration; dark; left	.	.	.	.	.
inguinal; Discoloration; right	.	.	.	.	.
LYMPH NODE, MESENTERIC;	N	N	N	N	N
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
Cyst; opaque; left	.	.	.	.	.
SKIN;	.	.	.	.	.
face; Alopecia	.	.	.	.	.
head; Alopecia	.	.	.	.	.
neck; Alopecia	.	.	.	.	.
scapula; Alopecia; left	.	.	.	.	.
back; Alopecia	.	.	.	.	.
back; Alopecia; lateral	.	.	.	.	.
STOMACH;	N	N	N	N	N

+ = Tissue observation present N = No visible lesions P= Present- no grade or classification
X = Not examined S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 91

SEX: FEMALE

GROUP	1	1	1	1	1
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	..6	..7	..8	..9	.10
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
BONE MARROW SMEAR;	+	+	+	+	+
Submitted	P	P	P	P	P
ESOPHAGUS;	N	N	N	N	N
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	N	N	N	N	N
LYMPH NODE;	.	.	.	.	.
iliac; Discoloration; dark; left	.	.	.	.	.
inguinal; Discoloration; right	.	.	.	.	.
LYMPH NODE, MESENTERIC;	N	N	N	N	N
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
Cyst; opaque; left	.	.	.	.	.
SKIN;	.	.	.	.	.
face; Alopecia	.	.	.	.	.
head; Alopecia	.	.	.	.	.
neck; Alopecia	.	.	.	.	.
scapula; Alopecia; left	.	.	.	.	.
back; Alopecia	.	.	.	.	.
back; Alopecia; lateral	.	.	.	.	.
STOMACH;	N	N	N	N	N

+ = Tissue observation present　　N = No visible lesions　　P= Present- no grade or classification
X = Not examined　　S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water　Group 2 - 0.3 mg/L SDD　Group 3 - 4 mg/L SDD　Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD　Group 6 - 170 mg/L SDD　Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 91

SEX: FEMALE					
GROUP	2	2	2	2	2
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	.81	.82	.83	.84	.85
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
BONE MARROW SMEAR;	.	.	.	.	.
Submitted	.	.	.	.	.
ESOPHAGUS;	N	N	N	N	N
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	N	N	N	N	N
LYMPH NODE;	.	.	.	.	.
iliac; Discoloration; dark; left	.	.	.	.	.
inguinal; Discoloration; right	.	.	.	.	.
LYMPH NODE, MESENTERIC;	N	N	N	N	N
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
Cyst; opaque; left	.	.	.	.	.
SKIN;	.	.	.	.	.
face; Alopecia	.	.	.	.	.
head; Alopecia	.	.	.	.	.
neck; Alopecia	.	.	.	.	.
scapula; Alopecia; left	.	.	.	.	.
back; Alopecia	.	.	.	.	.
back; Alopecia; lateral	.	.	.	.	.
STOMACH;	N	N	N	N	N

+ = Tissue observation present   N = No visible lesions   P= Present- no grade or classification
X = Not examined   S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 91

SEX: FEMALE					
GROUP	2	2	2	2	2
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	.86	.87	.88	.89	.90
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
BONE MARROW SMEAR;	+	+	+	+	+
Submitted	P	P	P	P	P
ESOPHAGUS;	N	N	N	N	N
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	N	N	N	N	N
LYMPH NODE;	.	.	.	.	.
iliac; Discoloration; dark; left	.	.	.	.	.
inguinal; Discoloration; right	.	.	.	.	.
LYMPH NODE, MESENTERIC;	N	N	N	N	N
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
Cyst; opaque; left	.	.	.	.	.
SKIN;	.	.	.	.	.
face; Alopecia	.	.	.	.	.
head; Alopecia	.	.	.	.	.
neck; Alopecia	.	.	.	.	.
scapula; Alopecia; left	.	.	.	.	.
back; Alopecia	.	.	.	.	.
back; Alopecia; lateral	.	.	.	.	.
STOMACH;	N	N	N	N	N

+ = Tissue observation present　N = No visible lesions　P= Present- no grade or classification
X = Not examined　S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water　Group 2 - 0.3 mg/L SDD　Group 3 - 4 mg/L SDD　Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD　Group 6 - 170 mg/L SDD　Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 91

SEX: FEMALE

GROUP	3	3	3	3	3
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	161	162	163	164	165
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
BONE MARROW SMEAR;	.	.	.	.	.
Submitted	.	.	.	.	.
ESOPHAGUS;	.	.	.	.	.
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	.	.	.	.	.
LYMPH NODE;	.	.	.	.	.
iliac; Discoloration; dark; left	.	.	.	.	.
inguinal; Discoloration; right	.	.	.	.	.
LYMPH NODE, MESENTERIC;	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
Cyst; opaque; left	.	.	.	.	.
SKIN;	.	.	.	.	.
face; Alopecia	.	.	.	.	.
head; Alopecia	.	.	.	.	.
neck; Alopecia	.	.	.	.	.
scapula; Alopecia; left	.	.	.	.	.
back; Alopecia	.	.	.	.	.
back; Alopecia; lateral	.	.	.	.	.
STOMACH;	.	.	.	.	.

+ = Tissue observation present   N = No visible lesions   P= Present- no grade or classification
X = Not examined   S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 91

SEX: FEMALE					
GROUP	3	3	3	3	3
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	166	167	168	169	170
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
BONE MARROW SMEAR;	+	+	+	+	+
Submitted	P	P	P	P	P
ESOPHAGUS;	.	.	.	.	.
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	.	.	.	.	.
LYMPH NODE;	.	.	.	.	.
iliac; Discoloration; dark; left	.	.	.	.	.
inguinal; Discoloration; right	.	.	.	.	.
LYMPH NODE, MESENTERIC;	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
Cyst; opaque; left	.	.	.	.	.
SKIN;	.	.	.	.	.
face; Alopecia	.	.	.	.	.
head; Alopecia	.	.	.	.	.
neck; Alopecia	.	.	.	.	.
scapula; Alopecia; left	.	.	.	.	.
back; Alopecia	.	.	.	.	.
back; Alopecia; lateral	.	.	.	.	.
STOMACH;	.	.	.	.	.

+ = Tissue observation present   N = No visible lesions   P= Present- no grade or classification
X = Not examined   S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 91

SEX: FEMALE

GROUP	4	4	4	4	4
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	241	242	243	244	245
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
BONE MARROW SMEAR;	.	.	.	.	.
Submitted	.	.	.	.	.
ESOPHAGUS;	N	N	N	N	N
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	N	N	N	N	N
LYMPH NODE;	.	.	.	.	.
iliac; Discoloration; dark; left	.	.	.	.	.
inguinal; Discoloration; right	.	.	.	.	.
LYMPH NODE, MESENTERIC;	N	N	N	N	N
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
Cyst; opaque; left	.	.	.	.	.
SKIN;	.	.	.	.	.
face; Alopecia	.	.	.	.	.
head; Alopecia	.	.	.	.	.
neck; Alopecia	.	.	.	.	.
scapula; Alopecia; left	.	.	.	.	.
back; Alopecia	.	.	.	.	.
back; Alopecia; lateral	.	.	.	.	.
STOMACH;	N	N	N	N	N

+ = Tissue observation present N = No visible lesions P= Present- no grade or classification
X = Not examined S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 91

SEX: FEMALE

GROUP	4	4	4	4	4
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	246	247	248	249	250
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
BONE MARROW SMEAR;	+	+	+	+	+
Submitted	P	P	P	P	P
ESOPHAGUS;	N	N	N	N	N
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	N	N	N	N	N
LYMPH NODE;	.	.	.	.	.
iliac; Discoloration; dark; left	.	.	.	.	.
inguinal; Discoloration; right	.	.	.	.	.
LYMPH NODE, MESENTERIC;	N	N	N	N	N
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	+
Cyst; opaque; left	.	.	.	.	P
SKIN;	.	.	.	.	.
face; Alopecia	.	.	.	.	.
head; Alopecia	.	.	.	.	.
neck; Alopecia	.	.	.	.	.
scapula; Alopecia; left	.	.	.	.	.
back; Alopecia	.	.	.	.	.
back; Alopecia; lateral	.	.	.	.	.
STOMACH;	N	N	N	N	N

+ = Tissue observation present   N = No visible lesions   P= Present- no grade or classification
X = Not examined   S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 91

SEX: FEMALE

GROUP	5	5	5	5	5
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	321	322	323	324	325
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
BONE MARROW SMEAR;	.	.	.	.	.
Submitted	.	.	.	.	.
ESOPHAGUS;	.	.	.	.	.
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	.	.	.	.	.
LYMPH NODE;	.	.	.	.	.
iliac; Discoloration; dark; left	.	.	.	.	.
inguinal; Discoloration; right	.	.	.	.	.
LYMPH NODE, MESENTERIC;	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
Cyst; opaque; left	.	.	.	.	.
SKIN;	+	.	.	.	.
face; Alopecia	.	.	.	.	.
head; Alopecia	P	.	.	.	.
scapula; Alopecia; left	P	.	.	.	.
back; Alopecia	P	.	.	.	.
back; Alopecia; lateral	.	.	.	.	.
STOMACH;	.	.	.	.	.

370

+ = Tissue observation present   N = No visible lesions   P= Present- no grade or classification
X = Not examined   S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 91

SEX: FEMALE					
GROUP	5	5	5	5	5
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	326	327	328	329	330
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
BONE MARROW SMEAR;	+	+	+	+	+
Submitted	P	P	P	P	P
ESOPHAGUS;	.	.	.	.	.
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	.	.	.	.	.
LYMPH NODE;	.	.	+	.	.
iliac; Discoloration; dark; left	.	.	P	.	.
inguinal; Discoloration; right	.	.	.	.	.
LYMPH NODE, MESENTERIC;	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
Cyst; opaque; left	.	.	.	.	.
SKIN;	.	.	.	.	.
face; Alopecia	.	.	.	.	.
head; Alopecia	.	.	.	.	.
neck; Alopecia	.	.	.	.	.
scapula; Alopecia; left	.	.	.	.	.
back; Alopecia	.	.	.	.	.
back; Alopecia; lateral	.	.	.	.	.
STOMACH;	.	.	.	.	.

+ = Tissue observation present N = No visible lesions P= Present- no grade or classification
X = Not examined S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 91

SEX: FEMALE					
GROUP	6	6	6	6	6
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	401	402	403	404	405
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
BONE MARROW SMEAR;	.	.	.	.	.
Submitted	.	.	.	.	.
ESOPHAGUS;	.	.	.	.	.
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	.	.	.	.	.
LYMPH NODE;	.	.	.	+	.
iliac; Discoloration; dark; left	.	.	.	.	.
inguinal; Discoloration; right	.	.	.	P	.
LYMPH NODE, MESENTERIC;	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
Cyst; opaque; left	.	.	.	.	.
SKIN;	.	.	.	.	.
face; Alopecia	.	.	.	.	.
head; Alopecia	.	.	.	.	.
neck; Alopecia	.	.	.	.	.
scapula; Alopecia; left	.	.	.	.	.
back; Alopecia	.	.	.	.	.
back; Alopecia; lateral	.	.	.	.	.
STOMACH;	.	.	.	.	.

+ = Tissue observation present N = No visible lesions P= Present- no grade or classification
X = Not examined S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 91

SEX: FEMALE

GROUP	6	6	6	6	6
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	406	407	408	409	410
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
BONE MARROW SMEAR;	+	+	+	+	+
Submitted	P	P	P	P	P
ESOPHAGUS;	.	.	.	.	.
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	.	.	.	.	.
LYMPH NODE;	.	.	.	.	.
iliac; Discoloration; dark; left	.	.	.	.	.
inguinal; Discoloration; right	.	.	.	.	.
LYMPH NODE, MESENTERIC;	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
Cyst; opaque; left	.	.	.	.	.
SKIN;	.	.	.	.	.
face; Alopecia	.	.	.	.	.
head; Alopecia	.	.	.	.	.
neck; Alopecia	.	.	.	.	.
scapula; Alopecia; left	.	.	.	.	.
back; Alopecia	.	.	.	.	.
back; Alopecia; lateral	.	.	.	.	.
STOMACH;	.	.	.	.	.

+ = Tissue observation present N = No visible lesions P= Present- no grade or classification
X = Not examined S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 91

SEX: FEMALE

GROUP	7	7	7	7	7
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	481	482	483	484	485
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
BONE MARROW SMEAR;	.	.	.	.	.
Submitted	.	.	.	.	.
ESOPHAGUS;	N	N	N	N	N
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	N	N	N	N	N
LYMPH NODE;	.	.	.	.	.
iliac; Discoloration; dark; left	.	.	.	.	.
inguinal; Discoloration; right	.	.	.	.	.
LYMPH NODE, MESENTERIC;	N	N	N	N	N
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
Cyst; opaque; left	.	.	.	.	.
SKIN;	.	.	.	+	.
face; Alopecia	.	.	.	P	.
head; Alopecia	.	.	.	.	.
neck; Alopecia	.	.	.	.	.
scapula; Alopecia; left	.	.	.	.	.
back; Alopecia	.	.	.	P	.
back; Alopecia; lateral	.	.	.	P	.
STOMACH;	N	N	N	N	N

+ = Tissue observation present   N = No visible lesions   P= Present- no grade or classification
X = Not examined   S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Macroscopic Observations: Day 91

SEX: FEMALE					
GROUP	7	7	7	7	7
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	486	487	488	489	490
ANIMAL IDENTIFICATION;	+	+	+	+	+
Submitted	P	P	P	P	P
BONE MARROW SMEAR;	+	+	+	+	+
Submitted	P	P	P	P	P
ESOPHAGUS;	N	N	N	N	N
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
LIVER;	N	N	N	N	N
LYMPH NODE;	.	.	.	.	.
iliac; Discoloration; dark; left	.	.	.	.	.
inguinal; Discoloration; right	.	.	.	.	.
LYMPH NODE, MESENTERIC;	N	N	N	N	N
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
Cyst; opaque; left	.	.	.	.	.
SKIN;	.	.	.	.	.
face; Alopecia	.	.	.	.	.
head; Alopecia	.	.	.	.	.
neck; Alopecia	.	.	.	.	.
scapula; Alopecia; left	.	.	.	.	.
back; Alopecia	.	.	.	.	.
back; Alopecia; lateral	.	.	.	.	.
STOMACH;	N	N	N	N	N

+ = Tissue observation present   N = No visible lesions   P= Present- no grade or classification
X = Not examined   S = Scheduled euthanasia

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H2

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary of Macroscopic Observations: Day 8

	FEMALES						
Group:	1	2	3	4	5	6	7
Number of Animals:	25	25	25	25	25	25	25
ANIMAL IDENTIFICATION;							
Submitted	(5)	(5)	(5)	(5)	(5)	(5)	(5)
No Visible Lesions	0	0	0	0	0	0	0
Submitted	5	5	5	5	5	5	5
ESOPHAGUS;							
Submitted	(5)	(5)	(0)	(5)	(0)	(0)	(5)
No Visible Lesions	5	5	0	5	0	0	5
SMALL INTESTINE, DUODENUM;							
Submitted	(5)	(5)	(5)	(5)	(5)	(5)	(5)
No Visible Lesions	5	5	5	5	5	5	5
SMALL INTESTINE, JEJUNUM;							
Submitted	(5)	(5)	(5)	(5)	(5)	(5)	(5)
No Visible Lesions	5	5	5	5	5	5	5
LIVER;							
Submitted	(5)	(5)	(0)	(5)	(0)	(0)	(5)
No Visible Lesions	5	5	0	5	0	0	5
LYMPH NODE, MESENTERIC;							
Submitted	(5)	(5)	(0)	(5)	(0)	(0)	(5)
No Visible Lesions	5	5	0	5	0	0	5
ORAL MUCOSA;							
Submitted	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Lesions	5	5	5	5	5	5	5
STOMACH;							
Submitted	(5)	(5)	(0)	(5)	(0)	(0)	(5)
Visible Lesions	5	5	0	5	0	0	5

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H2

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary of Macroscopic Observations: Day 91

	FEMALES						
Group:	1	2	3	4	5	6	7
Number of Animals:	25	25	25	25	25	25	25
ANIMAL IDENTIFICATION;							
Submitted	(10)	(10)	(10)	(10)	(10)	(10)	(10)
No Visible Lesions	0	0	0	0	0	0	0
Submitted	10	10	10	10	10	10	10
BONE MARROW SMEAR;							
Submitted	(5)	(5)	(5)	(5)	(5)	(5)	(5)
No Visible Lesions	0	0	0	0	0	0	0
Submitted	5	5	5	5	5	5	5
ESOPHAGUS;							
Submitted	(10)	(10)	(0)	(10)	(0)	(0)	(10)
No Visible Lesions	10	10	0	10	0	0	10
SMALL INTESTINE, DUODENUM;							
Submitted	(10)	(10)	(10)	(10)	(10)	(10)	(10)
No Visible Lesions	10	10	10	10	10	10	10
SMALL INTESTINE, JEJUNUM;							
Submitted	(10)	(10)	(10)	(10)	(10)	(10)	(10)
No Visible Lesions	10	10	10	10	10	10	10
LIVER;							
Submitted	(10)	(10)	(0)	(10)	(0)	(0)	(10)
No Visible Lesions	10	10	0	10	0	0	10
LYMPH NODE;							
Submitted	(0)	(0)	(0)	(0)	(1)	(1)	(0)
No Visible Lesions	0	0	0	0	0	0	0
Discoloration; dark; iliac; left	0	0	0	0	1	0	0
Discoloration; right; inguinal	0	0	0	0	0	1	0
LYMPH NODE, MESENTERIC;							
Submitted	(10)	(10)	(0)	(10)	(0)	(0)	(10)
No Visible Lesions	10	10	0	10	0	0	10
ORAL MUCOSA;							
Submitted	(10)	(10)	(10)	(10)	(10)	(10)	(10)
No Visible Lesions	10	10	10	10	10	10	10

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H2

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary of Macroscopic Observations: Day 91

	FEMALES						
Group:	1	2	3	4	5	6	7
Number of Animals:	25	25	25	25	25	25	25
OVARY;							
Submitted	(0)	(0)	(0)	(1)	(0)	(0)	(0)
No Visible Lesions	0	0	0	0	0	0	0
Cyst; opaque; left	0	0	0	1	0	0	0
SKIN;							
Submitted	(0)	(0)	(0)	(0)	(1)	(0)	(1)
No Visible Lesions	0	0	0	0	0	0	0
Alopecia; face	0	0	0	0	0	0	1
Alopecia; head	0	0	0	0	1	0	0
Alopecia; neck	0	0	0	0	1	0	0
Alopecia; back	0	0	0	0	1	0	1
Alopecia; lateral; back	0	0	0	0	0	0	1
Alopecia; left; scapula	0	0	0	0	1	0	0
STOMACH;							
Submitted	(10)	(10)	(0)	(10)	(0)	(0)	(10)
No Visible Lesions	10	10	0	10	0	0	10

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 8

SEX: FEMALE

GROUP	1	1	1	1	1
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	.46	.47	.48	.49	.50
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N

X = Not examined | N = No visible lesions | 1= Minimal | 3= Moderate
+ = Tissue observation present | S = Scheduled euthanasia | 2= Mild | 4= Marked
P= Present- no grade or classification

Nominal Dose: Group 1 - 0 mg/L Water | Group 2 - 0.3 mg/L SDD | Group 3 - 4 mg/L SDD | Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD | Group 6 - 170 mg/L SDD | Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 8

SEX: FEMALE

GROUP	2	2	2	2	2
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	126	127	128	129	130
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N

X = Not examined N = No visible lesions 1= Minimal 3= Moderate
+ = Tissue observation present S = Scheduled euthanasia 2= Mild 4= Marked
P= Present- no grade or classification

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 8

SEX: FEMALE					
GROUP	3	3	3	3	3
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	206	207	208	209	210
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N

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X = Not examined　N = No visible lesions　1= Minimal　3= Moderate
+ = Tissue observation present　S = Scheduled euthanasia　2= Mild　4= Marked
P= Present- no grade or classification

Nominal Dose: Group 1 - 0 mg/L Water　Group 2 - 0.3 mg/L SDD　Group 3 - 4 mg/L SDD　Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD　Group 6 - 170 mg/L SDD　Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 8

SEX: FEMALE					
GROUP	4	4	4	4	4
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	286	287	288	289	290
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	N	N	N	N	X
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N

382

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 8

SEX: FEMALE

GROUP	5	5	5	5	5
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	366	367	368	369	370
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water; Group 2 - 0.3 mg/L SDD; Group 3 - 4 mg/L SDD; Group 4 - 14 mg/L SDD; Group 5 - 60 mg/L SDD; Group 6 - 170 mg/L SDD; Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 8

SEX: FEMALE					
GROUP	6	6	6	6	6
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	446	447	448	449	450
SMALL INTESTINE, DUODENUM;	N	N	+	+	+
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	1	1	1
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	N	N	N	+	N
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	1	.
ORAL MUCOSA;	N	N	N	N	N

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X = Not examined   N = No visible lesions   1= Minimal   3= Moderate
+ = Tissue observation present   S = Scheduled euthanasia   2= Mild   4= Marked
P= Present- no grade or classification

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 8

SEX: FEMALE					
GROUP	7	7	7	7	7
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	526	527	528	529	530
SMALL INTESTINE, DUODENUM;	+	+	+	+	+
crypt; epithelium; Hyperplasia	1	1	1	.	.
villus; epithelium; Vacuolization, Cytoplasmic	1	1	1	1	1
villus; Atrophy	1	1	1	.	.
SMALL INTESTINE, JEJUNUM;	N	N	N	N	+
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	1
ORAL MUCOSA;	N	N	N	N	N

385

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE					
GROUP	1	1	1	1	1
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	1	2	3	4	5
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	N	X	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
LYMPH NODE;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
iliac; Pigmentation	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation; left	.	.	.	.	.

X = Not examined N = No visible lesions 1= Minimal 3= Moderate
+ = Tissue observation present S = Scheduled euthanasia 2= Mild 4= Marked
P= Present- no grade or classification

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE

GROUP	1	1	1	1	1
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	1	2	3	4	5

SKIN;	.	.	.	.	.
Inflammation; acute; left	.	.	.	.	.
back; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
back; lateral; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
face; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
head; Inflammation; acute	.	.	.	.	.
head; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
neck; Inflammation; acute	.	.	.	.	.
neck; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
scapula; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water; Group 2 - 0.3 mg/L SDD; Group 3 - 4 mg/L SDD; Group 4 - 14 mg/L SDD; Group 5 - 60 mg/L SDD; Group 6 - 170 mg/L SDD; Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE					
GROUP	1	1	1	1	1
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	6	7	8	9	10
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
LYMPH NODE;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
iliac; Pigmentation	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation; left	.	.	.	.	.

X = Not examined N = No visible lesions 1= Minimal 3= Moderate
+ = Tissue observation present S = Scheduled euthanasia 2= Mild 4= Marked
P= Present- no grade or classification

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE

GROUP	1	1	1	1	1
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	6	7	8	9	10
SKIN;	.	.	.	.	.
Inflammation; acute; left	.	.	.	.	.
back; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
back; lateral; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
face; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
head; Inflammation; acute	.	.	.	.	.
head; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
neck; Inflammation; acute	.	.	.	.	.
neck; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
scapula; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE

GROUP	2	2	2	2	2
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	.81	.82	.83	.84	.85
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
LYMPH NODE;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
iliac; Pigmentation	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation; left	.	.	.	.	.

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE	GROUP	2	2	2	2	2
	REMOVAL REASON	S	S	S	S	S
	ANIMAL NUMBER	.81	.82	.83	.84	.85
SKIN;		.	.	.	.	.
Inflammation; acute; left		.	.	.	.	.
back; No Microscopic Correlation To Macroscopic Observation		.	.	.	.	.
back; lateral; No Microscopic Correlation To Macroscopic Observation		.	.	.	.	.
face; No Microscopic Correlation To Macroscopic Observation		.	.	.	.	.
head; Inflammation; acute		.	.	.	.	.
head; No Microscopic Correlation To Macroscopic Observation		.	.	.	.	.
neck; Inflammation; acute		.	.	.	.	.
neck; No Microscopic Correlation To Macroscopic Observation		.	.	.	.	.
scapula; No Microscopic Correlation To Macroscopic Observation		.	.	.	.	.

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification

N = No visible lesions
S = Scheduled euthanasia

1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE

GROUP	2	2	2	2	2
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	.86	.87	.88	.89	.90
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
LYMPH NODE;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
iliac; Pigmentation	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation; left	.	.	.	.	.

X = Not examined N = No visible lesions 1= Minimal 3= Moderate
+ = Tissue observation present S = Scheduled euthanasia 2= Mild 4= Marked
P= Present- no grade or classification

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE					
GROUP	2	2	2	2	2
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	.86	.87	.88	.89	.90
SKIN;	.	.	.	.	.
Inflammation; acute; left	.	.	.	.	.
back; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
back; lateral; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
face; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
head; Inflammation; acute	.	.	.	.	.
head; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
neck; Inflammation; acute	.	.	.	.	.
neck; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
scapula; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.

X = Not examined N = No visible lesions 1= Minimal 3= Moderate
+ = Tissue observation present S = Scheduled euthanasia 2= Mild 4= Marked
P= Present- no grade or classification

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE					
GROUP	3	3	3	3	3
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	161	162	163	164	165
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
LYMPH NODE;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
iliac; Pigmentation	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation; left	.	.	.	.	.

X = Not examined N = No visible lesions 1= Minimal 3= Moderate
+ = Tissue observation present S = Scheduled euthanasia 2= Mild 4= Marked
P= Present- no grade or classification

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE	GROUP	3	3	3	3	3
	REMOVAL REASON	S	S	S	S	S
	ANIMAL NUMBER	161	162	163	164	165
SKIN;		.	.	.	.	.
Inflammation; acute; left		.	.	.	.	.
back; No Microscopic Correlation To Macroscopic Observation		.	.	.	.	.
back; lateral; No Microscopic Correlation To Macroscopic Observation		.	.	.	.	.
face; No Microscopic Correlation To Macroscopic Observation		.	.	.	.	.
head; Inflammation; acute		.	.	.	.	.
head; No Microscopic Correlation To Macroscopic Observation		.	.	.	.	.
neck; Inflammation; acute		.	.	.	.	.
neck; No Microscopic Correlation To Macroscopic Observation		.	.	.	.	.
scapula; No Microscopic Correlation To Macroscopic Observation		.	.	.	.	.

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water, Group 2 - 0.3 mg/L SDD, Group 3 - 4 mg/L SDD, Group 4 - 14 mg/L SDD, Group 5 - 60 mg/L SDD, Group 6 - 170 mg/L SDD, Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE

GROUP	3	3	3	3	3
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	166	167	168	169	170
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
LYMPH NODE;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
iliac; Pigmentation	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation; left	.	.	.	.	.

X = Not examined   N = No visible lesions   1= Minimal   3= Moderate
+ = Tissue observation present   S = Scheduled euthanasia   2= Mild   4= Marked
P= Present- no grade or classification

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE

GROUP	3	3	3	3	3
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	166	167	168	169	170
SKIN;	.	.	.	.	.
Inflammation; acute; left	.	.	.	.	.
back; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
back; lateral; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
face; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
head; Inflammation; acute	.	.	.	.	.
head; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
neck; Inflammation; acute	.	.	.	.	.
neck; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
scapula; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.

X = Not examined N = No visible lesions 1= Minimal 3= Moderate
+ = Tissue observation present S = Scheduled euthanasia 2= Mild 4= Marked
P= Present- no grade or classification

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE

GROUP	4	4	4	4	4
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	241	242	243	244	245
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
LYMPH NODE;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
iliac; Pigmentation	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation; left	.	.	.	.	.

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE

GROUP	4	4	4	4	4
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	241	242	243	244	245
SKIN;	.	.	.	.	.
Inflammation; acute; left	.	.	.	.	.
back; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
back; lateral; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
face; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
head; Inflammation; acute	.	.	.	.	.
head; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
neck; Inflammation; acute	.	.	.	.	.
neck; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
scapula; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE

GROUP	4	4	4	4	4
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	246	247	248	249	250
SMALL INTESTINE, DUODENUM;	N	N	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
LYMPH NODE;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
iliac; Pigmentation	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	+
No Microscopic Correlation To Macroscopic Observation; left	.	.	.	.	P

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE					
GROUP	4	4	4	4	4
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	246	247	248	249	250
SKIN;	.	.	.	.	.
Inflammation; acute; left	.	.	.	.	.
back; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
back; lateral; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
face; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
head; Inflammation; acute	.	.	.	.	.
head; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
neck; Inflammation; acute	.	.	.	.	.
neck; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
scapula; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.

X = Not examined   N = No visible lesions   1= Minimal   3= Moderate
+ = Tissue observation present   S = Scheduled euthanasia   2= Mild   4= Marked
P= Present- no grade or classification

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE

GROUP	5	5	5	5	5
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	321	322	323	324	325
SMALL INTESTINE, DUODENUM;	N	N	+	N	+
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	1
villus; epithelium; Vacuolization, Cytoplasmic	.	.	1	.	1
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	N	+	+	+	+
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	1	1	1	1
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
LYMPH NODE;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
iliac; Pigmentation	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation; left	.	.	.	.	.

X = Not examined N = No visible lesions 1= Minimal 3= Moderate
+ = Tissue observation present S = Scheduled euthanasia 2= Mild 4= Marked
P= Present- no grade or classification

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE

GROUP	5	5	5	5	5
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	321	322	323	324	325
SKIN;	+	.	.	.	.
Inflammation; acute; left	1	.	.	.	.
back; No Microscopic Correlation To Macroscopic Observation	P	.	.	.	.
back; lateral; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
face; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
head; Inflammation; acute	1	.	.	.	.
head; No Microscopic Correlation To Macroscopic Observation	P	.	.	.	.
neck; Inflammation; acute	1	.	.	.	.
neck; No Microscopic Correlation To Macroscopic Observation	P	.	.	.	.
scapula; No Microscopic Correlation To Macroscopic Observation	P	.	.	.	.

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water; Group 2 - 0.3 mg/L SDD; Group 3 - 4 mg/L SDD; Group 4 - 14 mg/L SDD; Group 5 - 60 mg/L SDD; Group 6 - 170 mg/L SDD; Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE					
GROUP	5	5	5	5	5
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	326	327	328	329	330
SMALL INTESTINE, DUODENUM;	N	+	+	+	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	1	1	1	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	N	N	N	N	N
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	.	.	.	.	.
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	.
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
LYMPH NODE;	.	.	+	.	.
No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
iliac; Pigmentation	.	.	1	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation; left	.	.	.	.	.

X = Not examined   N = No visible lesions   1= Minimal   3= Moderate
+ = Tissue observation present   S = Scheduled euthanasia   2= Mild   4= Marked
P= Present- no grade or classification

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE					
GROUP	5	5	5	5	5
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	326	327	328	329	330
SKIN;	.	.	.	.	.
Inflammation; acute; left	.	.	.	.	.
back; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
back; lateral; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
face; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
head; Inflammation; acute	.	.	.	.	.
head; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
neck; Inflammation; acute	.	.	.	.	.
neck; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
scapula; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE					
GROUP	6	6	6	6	6
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	401	402	403	404	405
SMALL INTESTINE, DUODENUM;	+	+	+	+	+
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	1	1	1	1	1
villus; lamina propria; Infiltration Cellular; histiocytic	1	1	1	2	1
villus; epithelium; Vacuolization, Cytoplasmic	1	1	1	1	1
villus; lamina propria; Syncytia; multinucleated	.	.	.	P	.
villus; Atrophy	.	.	.	.	.
SMALL INTESTINE, JEJUNUM;	+	+	+	+	+
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	1	1	.	1	1
villus; lamina propria; Infiltration Cellular; histiocytic	1	1	1	1	1
villus; epithelium; Vacuolization, Cytoplasmic	1	1	1	1	1
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	1	1	1	.	.
LYMPH NODE;	.	.	.	+	.
No Microscopic Correlation To Macroscopic Observation	.	.	.	P	.
iliac; Pigmentation	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation; left	.	.	.	.	.

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE

GROUP	6	6	6	6	6
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	401	402	403	404	405
SKIN;	.	.	.	.	.
Inflammation; acute; left	.	.	.	.	.
back; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
back; lateral; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
face; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
head; Inflammation; acute	.	.	.	.	.
head; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
neck; Inflammation; acute	.	.	.	.	.
neck; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
scapula; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE

GROUP	6	6	6	6	6
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	406	407	408	409	410
SMALL INTESTINE, DUODENUM;	+	+	+	+	+
Apoptosis	1	1	.	1	.
crypt; epithelium; Hyperplasia	1	1	1	1	.
villus; lamina propria; Infiltration Cellular; histiocytic	1	2	1	1	1
villus; epithelium; Vacuolization, Cytoplasmic	1	1	1	1	1
villus; lamina propria; Syncytia; multinucleated	.	P	.	.	.
villus; Atrophy	1	.	.	.	.
SMALL INTESTINE, JEJUNUM;	+	N	+	+	+
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	1	.	.	.	.
villus; lamina propria; Infiltration Cellular; histiocytic	1	.	1	1	1
villus; epithelium; Vacuolization, Cytoplasmic	.	.	1	1	1
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	.	.	.	.	.
LYMPH NODE;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
iliac; Pigmentation	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation; left	.	.	.	.	.

X = Not examined N = No visible lesions 1= Minimal 3= Moderate
+ = Tissue observation present S = Scheduled euthanasia 2= Mild 4= Marked
P= Present- no grade or classification

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE

GROUP	6	6	6	6	6
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	406	407	408	409	410
SKIN;	.	.	.	.	.
Inflammation; acute; left	.	.	.	.	.
back; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
back; lateral; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
face; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
head; Inflammation; acute	.	.	.	.	.
head; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
neck; Inflammation; acute	.	.	.	.	.
neck; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
scapula; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.

409

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water, Group 2 - 0.3 mg/L SDD, Group 3 - 4 mg/L SDD, Group 4 - 14 mg/L SDD, Group 5 - 60 mg/L SDD, Group 6 - 170 mg/L SDD, Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Day 91

SEX: FEMALE					
GROUP	7	7	7	7	7
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	481	482	483	484	485
SMALL INTESTINE, DUODENUM;	+	+	+	+	+
Apoptosis	1	1	.	1	1
crypt; epithelium; Hyperplasia	2	2	2	2	2
villus; lamina propria; Infiltration Cellular; histiocytic	2	2	1	2	1
villus; epithelium; Vacuolization, Cytoplasmic	1	1	1	1	1
villus; lamina propria; Syncytia; multinucleated	P	.	.	.	.
villus; Atrophy	2	2	.	2	1
SMALL INTESTINE, JEJUNUM;	+	+	+	+	+
Apoptosis	1	1	.	.	.
crypt; epithelium; Hyperplasia	2	2	1	2	2
villus; lamina propria; Infiltration Cellular; histiocytic	1	1	1	1	2
villus; epithelium; Vacuolization, Cytoplasmic	.	1	1	1	1
villus; lamina propria; Syncytia; multinucleated	.	.	.	.	.
villus; Atrophy	2	2	.	1	2
LYMPH NODE;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
iliac; Pigmentation	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation; left	.	.	.	.	.

410

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Days 91

SEX: FEMALE					
GROUP	7	7	7	7	7
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	481	482	483	484	485
SKIN;	.	.	.	+	.
Inflammation; acute; left	.	.	.	.	.
back; No Microscopic Correlation To Macroscopic Observation	.	.	.	P	.
back; lateral; No Microscopic Correlation To Macroscopic Observation	.	.	.	P	.
face; No Microscopic Correlation To Macroscopic Observation	.	.	.	P	.
head; Inflammation; acute	.	.	.	.	.
head; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
neck; Inflammation; acute	.	.	.	.	.
neck; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
scapula; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.

X = Not examined N = No visible lesions 1= Minimal 3= Moderate
+ = Tissue observation present S = Scheduled euthanasia 2= Mild 4= Marked
P= Present- no grade or classification

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Days 91

SEX: FEMALE GROUP	7	7	7	7	7
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	486	487	488	489	490
SMALL INTESTINE, DUODENUM;	+	+	+	+	+
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	1	1	1	1
villus; lamina propria; Infiltration Cellular; histiocytic	1	2	2	1	1
villus; epithelium; Vacuolization, Cytoplasmic	1	.	.	.	1
villus; lamina propria; Syncytia; multinucleated	.	P	P	P	.
villus; Atrophy	.	1	.	.	.
SMALL INTESTINE, JEJUNUM;	+	+	+	+	+
Apoptosis	.	.	.	.	.
crypt; epithelium; Hyperplasia	.	.	1	.	1
villus; lamina propria; Infiltration Cellular; histiocytic	1	1	1	1	1
villus; epithelium; Vacuolization, Cytoplasmic	.	.	.	.	1
villus; lamina propria; Syncytia; multinucleated	.	.	P	.	.
villus; Atrophy	.	.	.	.	.
LYMPH NODE;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
iliac; Pigmentation	.	.	.	.	.
ORAL MUCOSA;	N	N	N	N	N
OVARY;	.	.	.	.	.
No Microscopic Correlation To Macroscopic Observation; left	.	.	.	.	.

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Microscopic Observations: Days 91

SEX: FEMALE

GROUP	7	7	7	7	7
REMOVAL REASON	S	S	S	S	S
ANIMAL NUMBER	486	487	488	489	490
SKIN;	.	.	.	.	.
Inflammation; acute; left	.	.	.	.	.
back; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
back; lateral; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
face; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
head; Inflammation; acute	.	.	.	.	.
head; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
neck; Inflammation; acute	.	.	.	.	.
neck; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.
scapula; No Microscopic Correlation To Macroscopic Observation	.	.	.	.	.

X = Not examined
+ = Tissue observation present
P= Present- no grade or classification
N = No visible lesions
S = Scheduled euthanasia
1= Minimal
2= Mild
3= Moderate
4= Marked

Nominal Dose: Group 1 - 0 mg/L Water Group 2 - 0.3 mg/L SDD Group 3 - 4 mg/L SDD Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD Group 6 - 170 mg/L SDD Group 7 - 520 mg/L SDD

Table H4

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary of Microscopic Observations: Day 8

	FEMALES						
Groups:	1	2	3	4	5	6	7
Number of Animals:	25	25	25	25	25	25	25
SMALL INTESTINE, DUODENUM;							
Examined	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Within Normal Limits	5	5	5	5	5	2	0
Hyperplasia; crypt; epithelium	0	0	0	0	0	0	3
Vacuolization, Cytoplasmic; villus; epithelium	0	0	0	0	0	3	5
Atrophy; villus	0	0	0	0	0	0	3
SMALL INTESTINE, JEJUNUM;							
Examined	(5)	(5)	(5)	(4)	(5)	(5)	(5)
Within Normal Limits	5	5	5	4	5	4	4
Not Examined: Not Present	0	0	0	1	0	0	0
Vacuolization, Cytoplasmic; villus; epithelium	0	0	0	0	0	1	1
ORAL MUCOSA;							
Examined	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Within Normal Limits	5	5	5	5	5	5	5

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H4

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary of Microscopic Observations: Day 91

	FEMALES						
Group:	1	2	3	4	5	6	7
Number of Animals:	45	45	45	45	45	44	45
SMALL INTESTINE, DUODENUM;							
Examined	(10)	(10)	(10)	(10)	(10)	(10)	(10)
Within Normal Limits.	10	10	10	10	5	0	0
Hyperplasia; crypt; epithelium	0	0	0	0	0	9	9
Infiltration Cellular; histiocytic; villus; lamina propria	0	0	0	0	1	10	10
Vacuolization, Cytoplasmic; villus; epithelium	0	0	0	0	5	10	7
Syncytia; multinucleated; villus; lamina propria	0	0	0	0	0	2	4
Apoptosis	0	0	0	0	0	3	4
Atrophy; villus	0	0	0	0	0	1	5
SMALL INTESTINE, JEJUNUM;							
Examined	(9)	(10)	(10)	(10)	(10)	(10)	(10)
Within Normal Limits	9	10	10	10	6	1	0
Not Examined: Not Present	1	0	0	0	0	0	0
Hyperplasia; crypt; epithelium	0	0	0	0	0	5	7
Infiltration Cellular; histiocytic; villus; lamina propria	0	0	0	0	0	9	10
Vacuolization, Cytoplasmic; villus; epithelium	0	0	0	0	4	8	5
Syncytia; multinucleated; villus; lamina propria	0	0	0	0	0	0	1
Apoptosis	0	0	0	0	0	0	2
Atrophy; villus	0	0	0	0	0	3	4
LYMPH NODE;							
Examined	(0)	(0)	(0)	(0)	(1)	(1)	(0)
Within Normal Limits	0	0	0	0	0	0	0
No Microscopic Correlation To Macroscopic Observation	0	0	0	0	0	1	0
Pigmentation; iliac	0	0	0	0	1	0	0
ORAL MUCOSA;							
Examined	(10)	(10)	(10)	(10)	(10)	(10)	(10)
Within Normal Limits	10	10	10	10	10	10	10

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

Table H4

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Summary of Microscopic Observations: Day 91

	FEMALES						
Group:	1	2	3	4	5	6	7
Number of Animals:	45	45	45	45	45	44	45
OVARY;							
Examined	(0)	(0)	(0)	(1)	(0)	(0)	(0)
Within Normal Limits	0	0	0	0	0	0	0
No Microscopic Correlation To Macroscopic Observation; left	0	0	0	1	0	0	0
SKIN;							
Examined	(0)	(0)	(0)	(0)	(1)	(0)	(1)
Within Normal Limits	0	0	0	0	0	0	0
Inflammation; acute; left	0	0	0	0	1	0	0
Inflammation; acute; head	0	0	0	0	1	0	0
Inflammation; acute; neck	0	0	0	0	1	0	0
No Microscopic Correlation To Macroscopic Observation; back	0	0	0	0	1	0	1
No Microscopic Correlation To Macroscopic Observation; back; lateral	0	0	0	0	0	0	1
No Microscopic Correlation To Macroscopic Observation; face	0	0	0	0	0	0	1
No Microscopic Correlation To Macroscopic Observation; head	0	0	0	0	1	0	0
No Microscopic Correlation To Macroscopic Observation; neck	0	0	0	0	1	0	0
No Microscopic Correlation To Macroscopic Observation; scapula	0	0	0	0	1	0	0

Nominal Dose: Group 1 - 0 mg/L Water   Group 2 - 0.3 mg/L SDD   Group 3 - 4 mg/L SDD   Group 4 - 14 mg/L SDD
Group 5 - 60 mg/L SDD   Group 6 - 170 mg/L SDD   Group 7 - 520 mg/L SDD

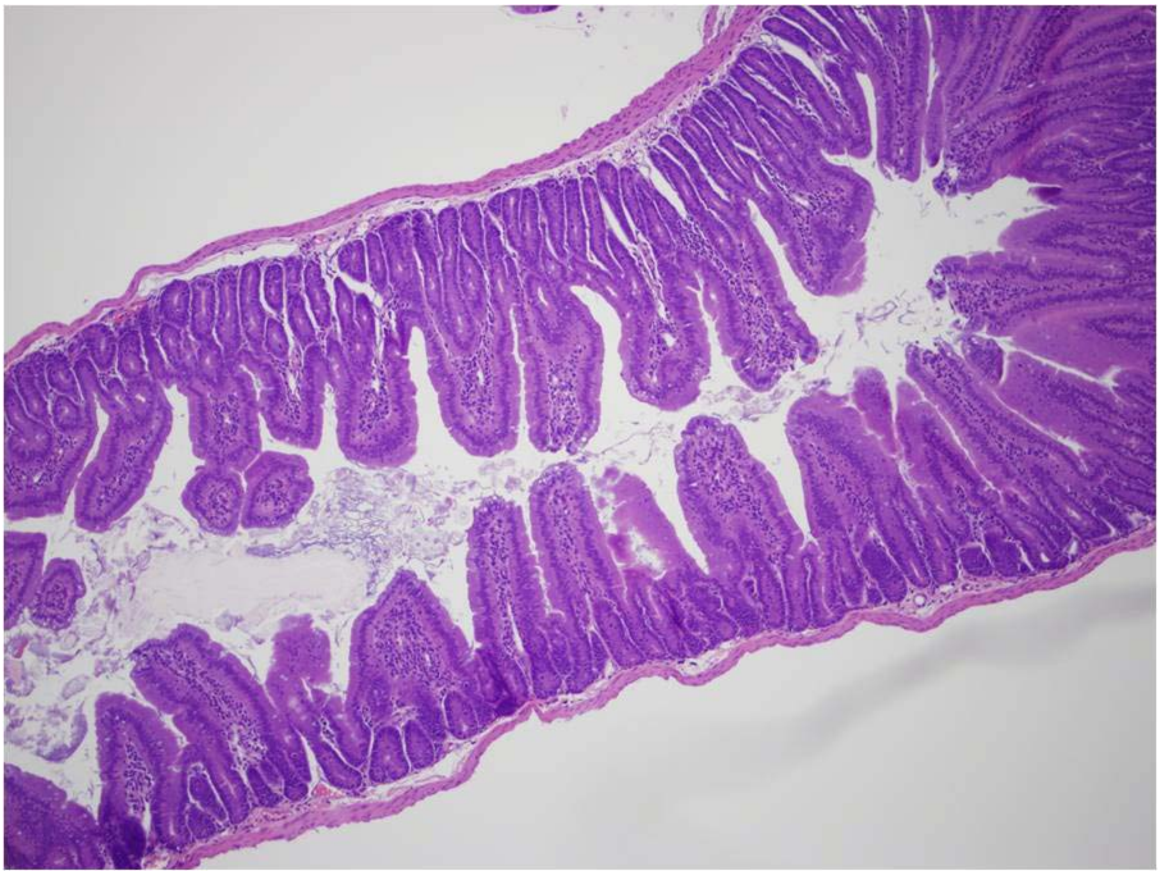

Figure H1
Duodenum; mouse; 520 mg/L SDD; animal ID 7F 526; Day 8.
Duodenum with minimal crypt epithelial hyperplasia and villous atrophy. Note blunting of villous tips and fusion of villi.
(H&E, 100x)

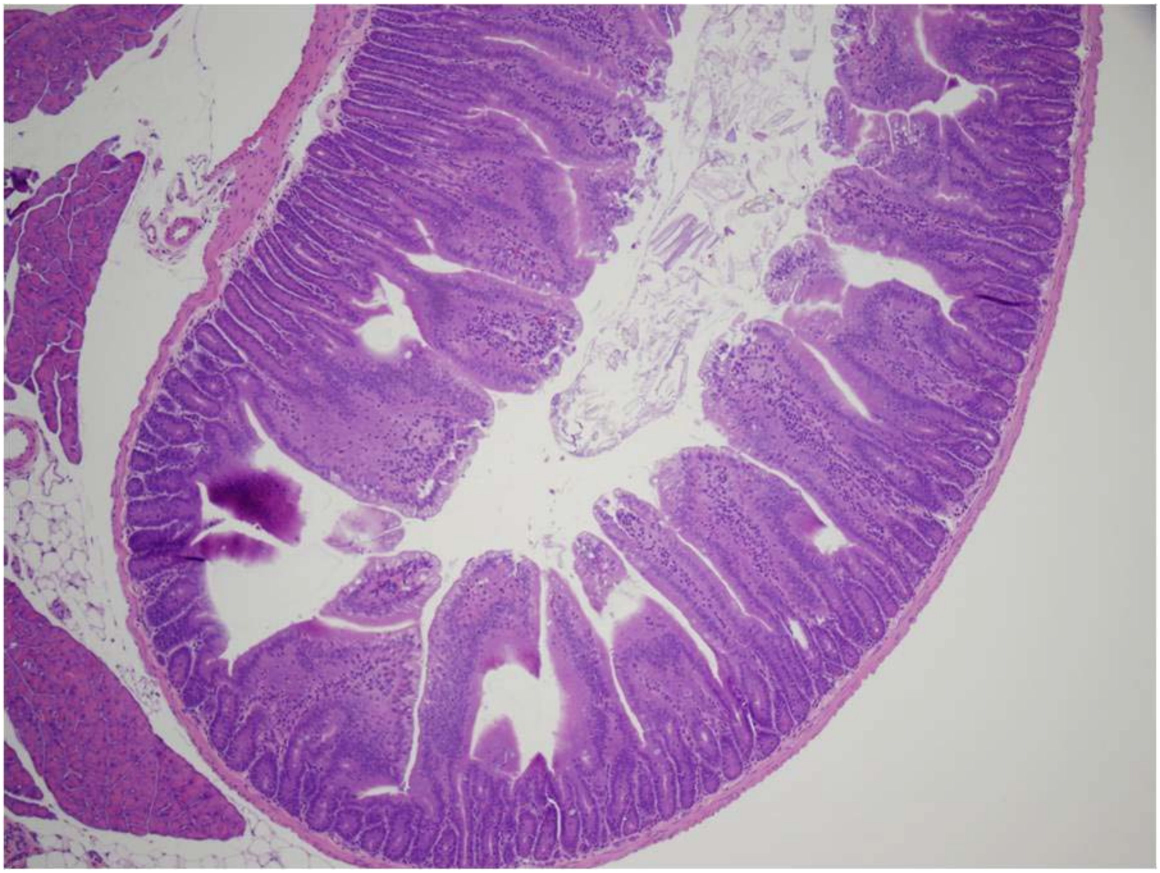

Figure H2
Duodenum; mouse; animal ID 6F 406; 170 mg/L SDD; Day 91.
Duodenum with crypt epithelial hyperplasia and villous atrophy, blunting and fusion.
(H&E, 100x)

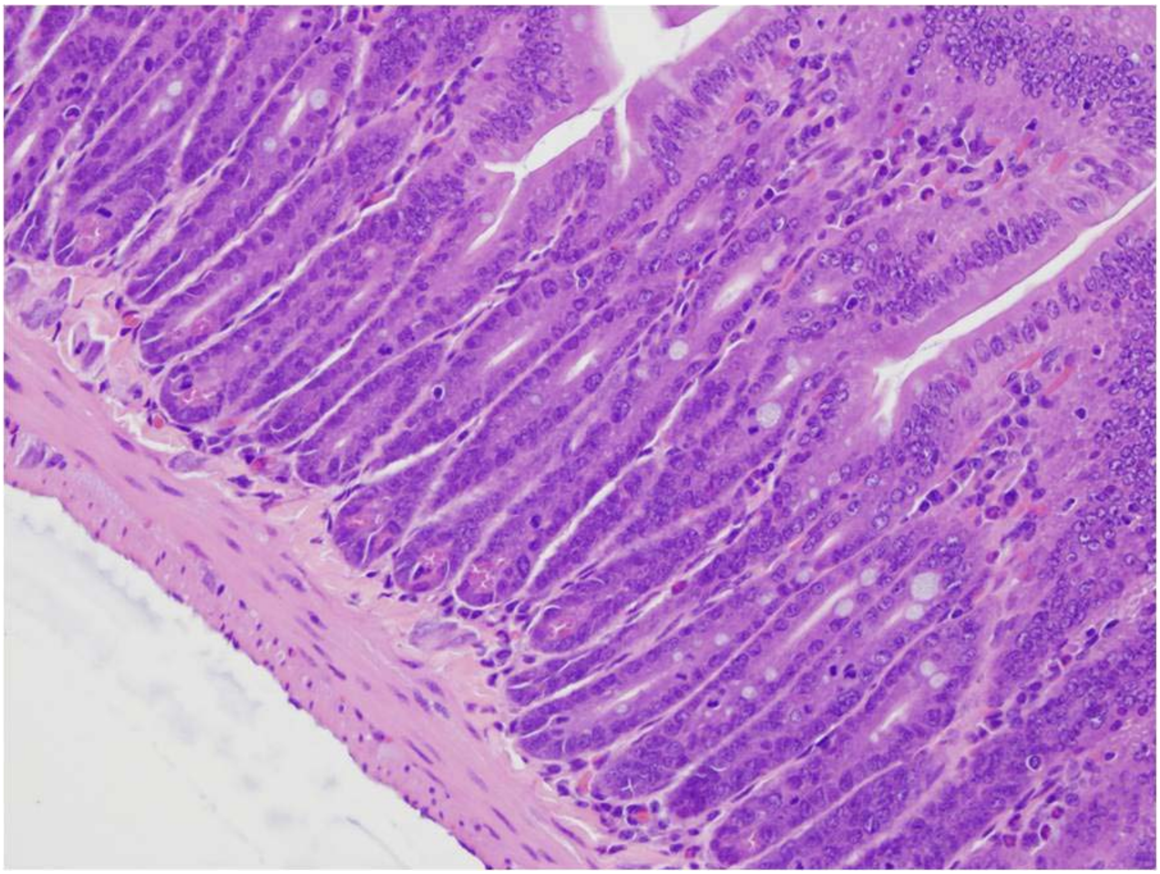

Figure H3
Duodenum; mouse; animal ID 6F 402; 170 mg/L SDD; Day 91.
Duodenum with crypt epithelial hyperplasia.
(H&E, 400x)

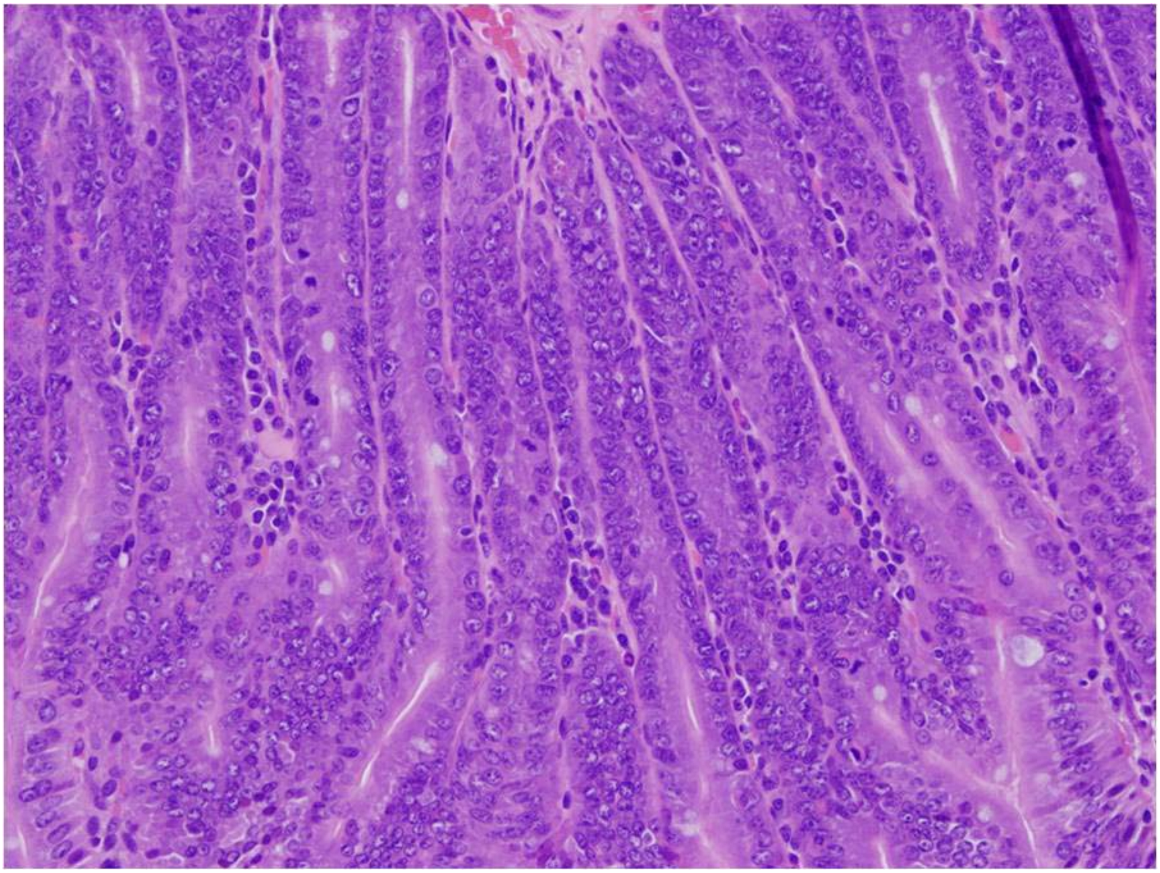

Figure H4
Duodenum; mouse; 520 mg/L SDD; animal ID 7F 485; Day 91.
Duodenum with elongated, hyperplastic crypts.
(H&E, 400x)

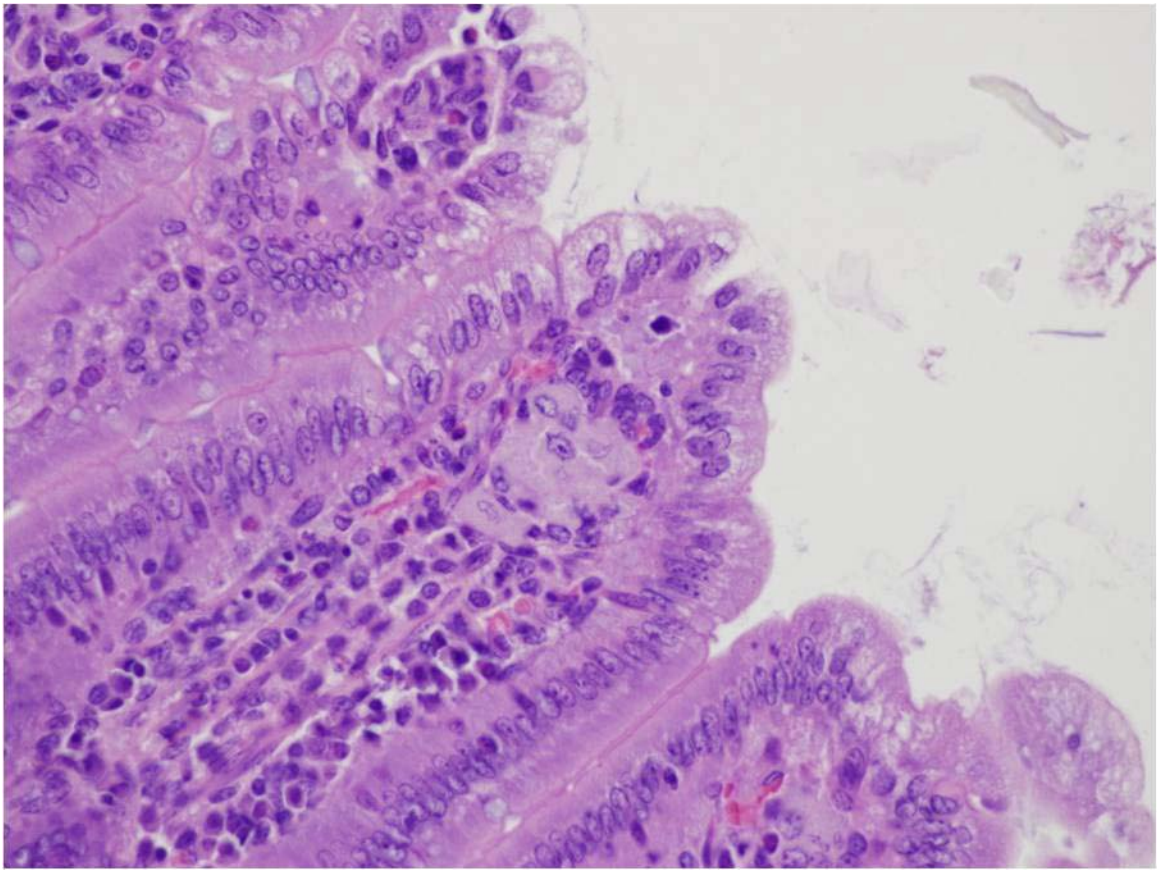

Figure H5
Jejunum; mouse; 170 mg/L SDD; animal ID 6F 401; Day 91.
Jejunum with histiocytic cellular infiltration of the villous lamina propria (arrow).
(H&E, 400x)

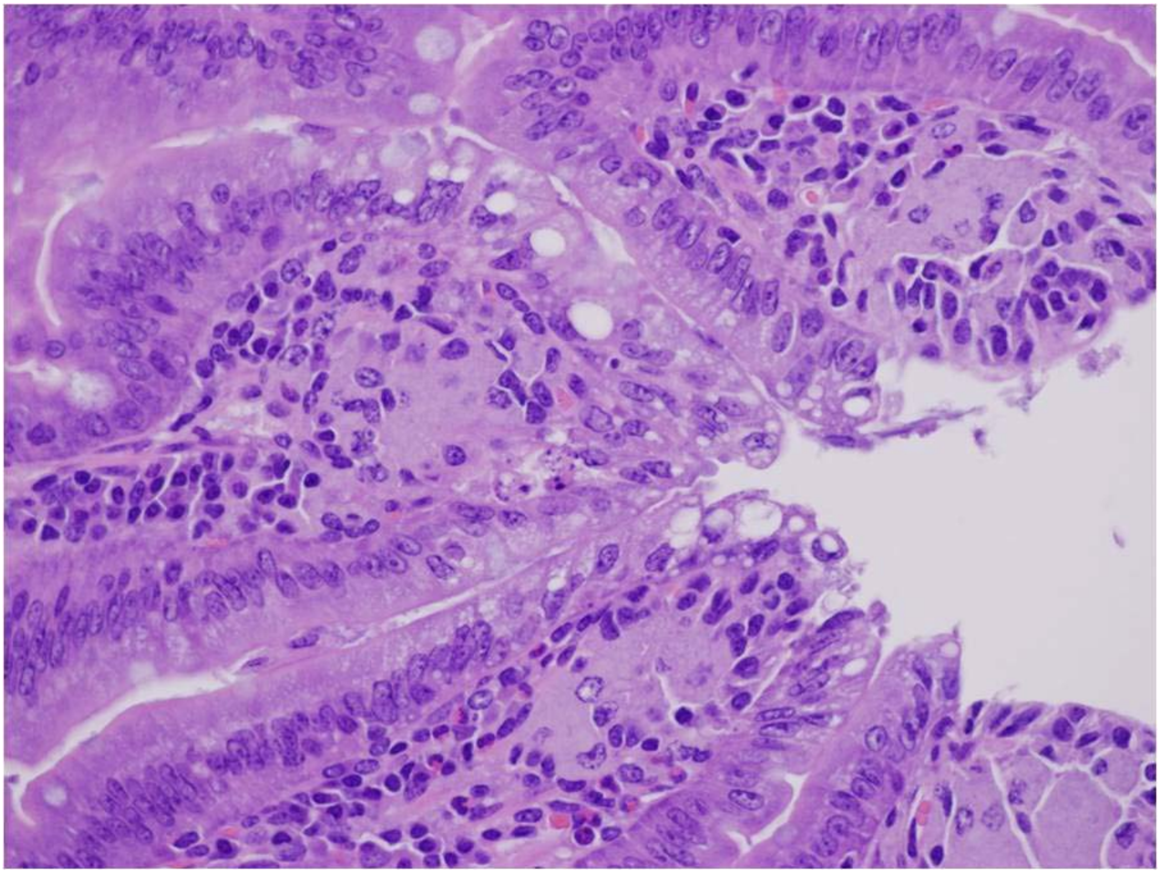

Figure H6
Duodenum; mouse; 520 mg/L SDD; animal ID 7F 481; Day 91 .
Duodenum with histiocytic cellular infiltration of the villous lamina propria (arrows) and cytoplasmic vacuolization of the villous epithelium.
(H&E, 600x)

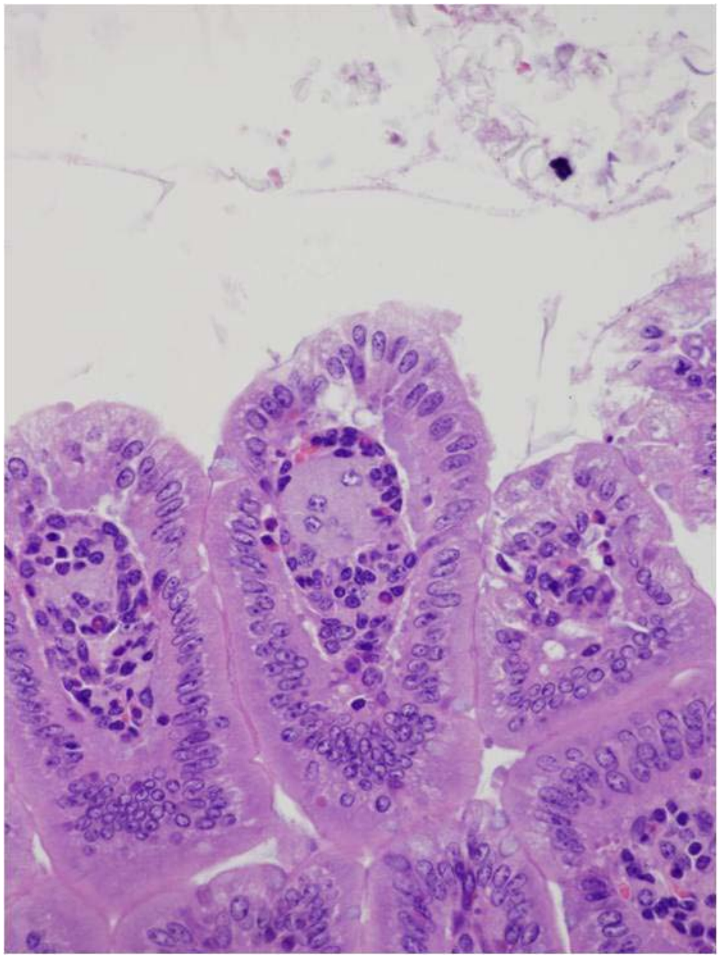

Figure H7
Jejunum; mouse; 170 mg/L SDD; animal ID 6F 401; Day 91.
Jejunum with a multinucleate syncytium in the villous lamina propria (arrow).
(H&E, 600x)

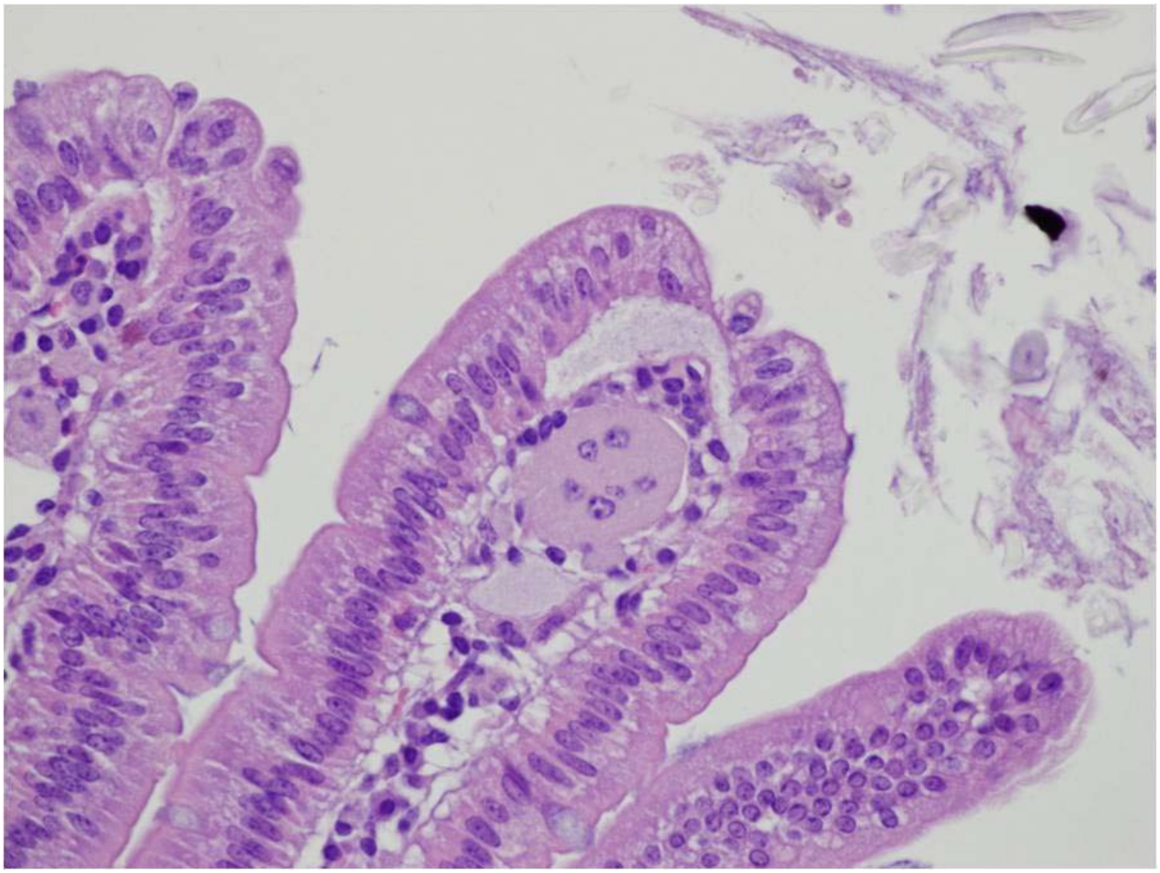

Figure H8
Duodenum; mouse; 520 mg/L SDD; animal ID 7F 488; Day 91.
Duodenum with a multinucleate syncytium in the villous lamina
propria (arrow).
(H&E, 600x)

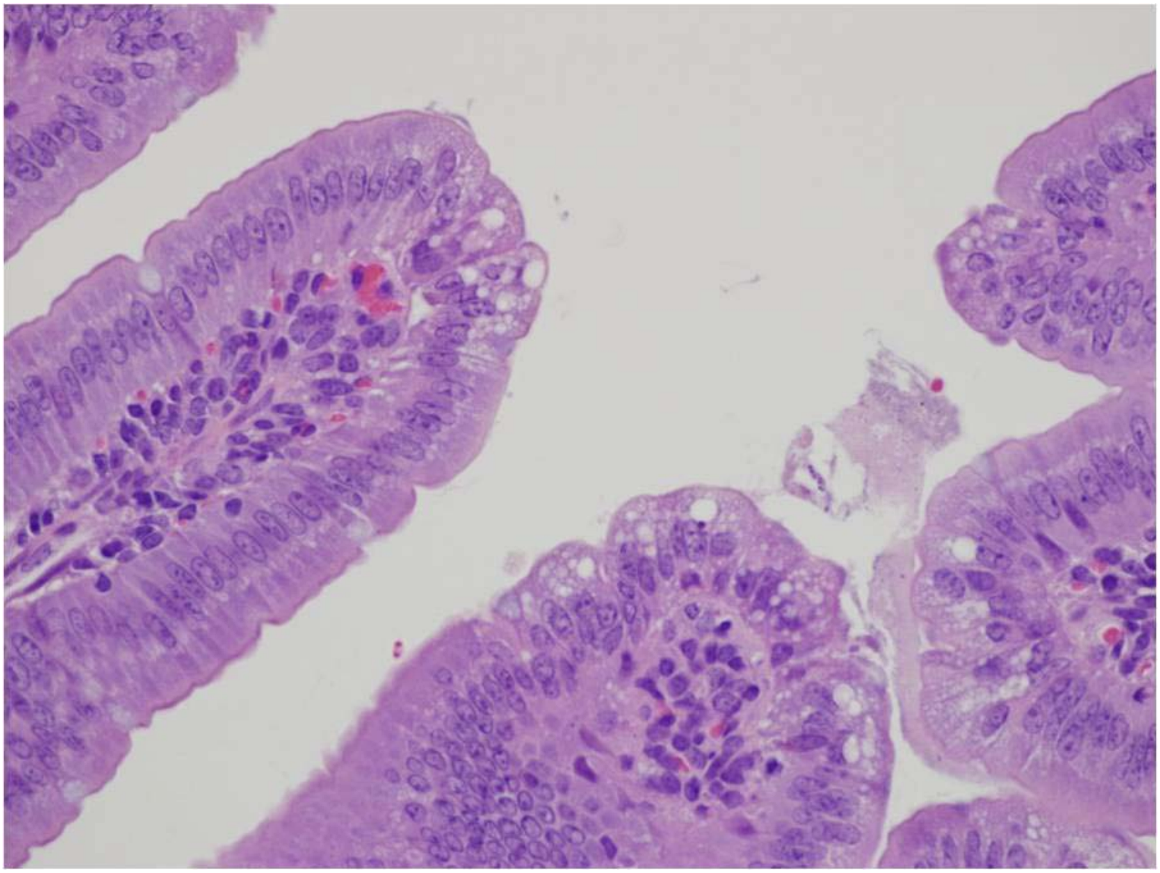

Figure H9
Jejunum; mouse; 170 mg/L SDD; animal ID 6F 449; Day 8.
Jejunum with cytoplasmic vacuolization of the villous epithelium (arrows) .
(H&E, 600x)

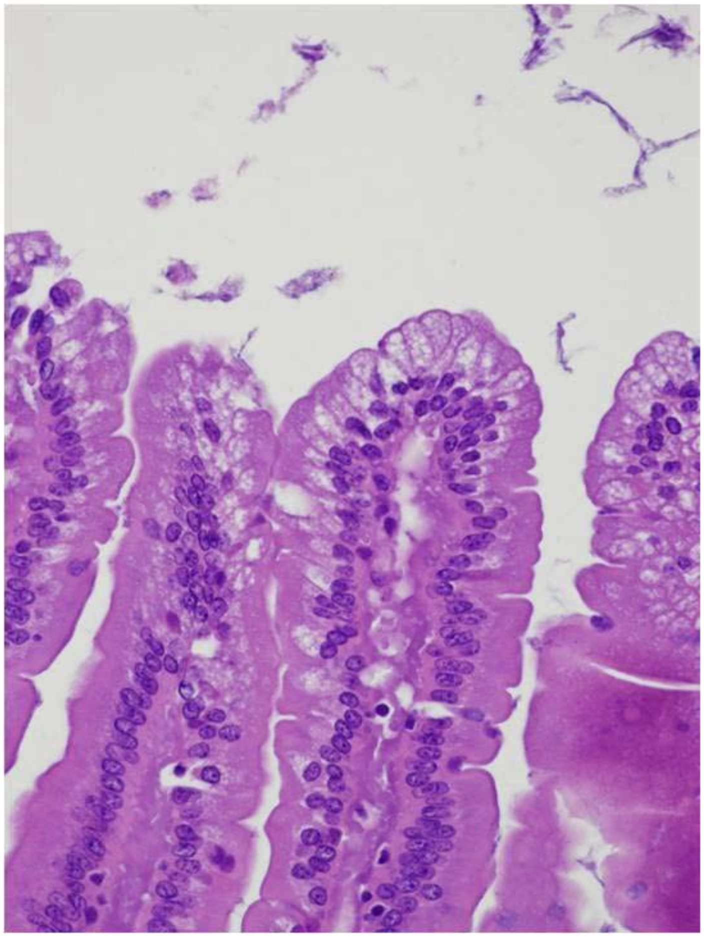

Figure H10
Duodenum; mouse; 60 mg/L SDD; animal ID 5F 325; Day 91.
Duodenum with cytoplasmic vacuolization of the villous epithelium.
(H&E, 600x)

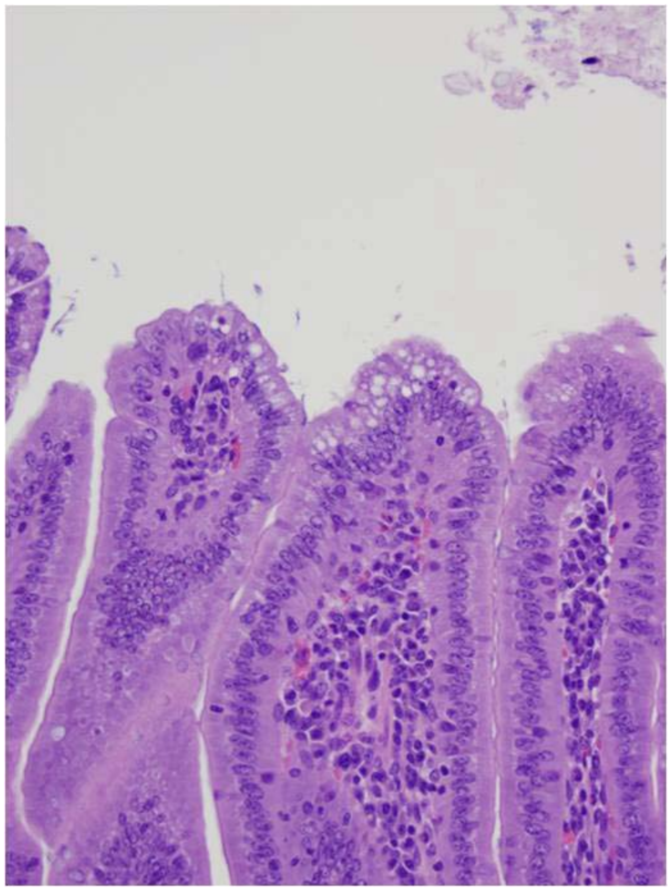

Figure H11
Duodenum; mouse; 520 mg/L SDD; animal ID 7F 529; Day 8.
Duodenum with cytoplasmic vacuolization of the villous epithelium.
(H&E, 400x)

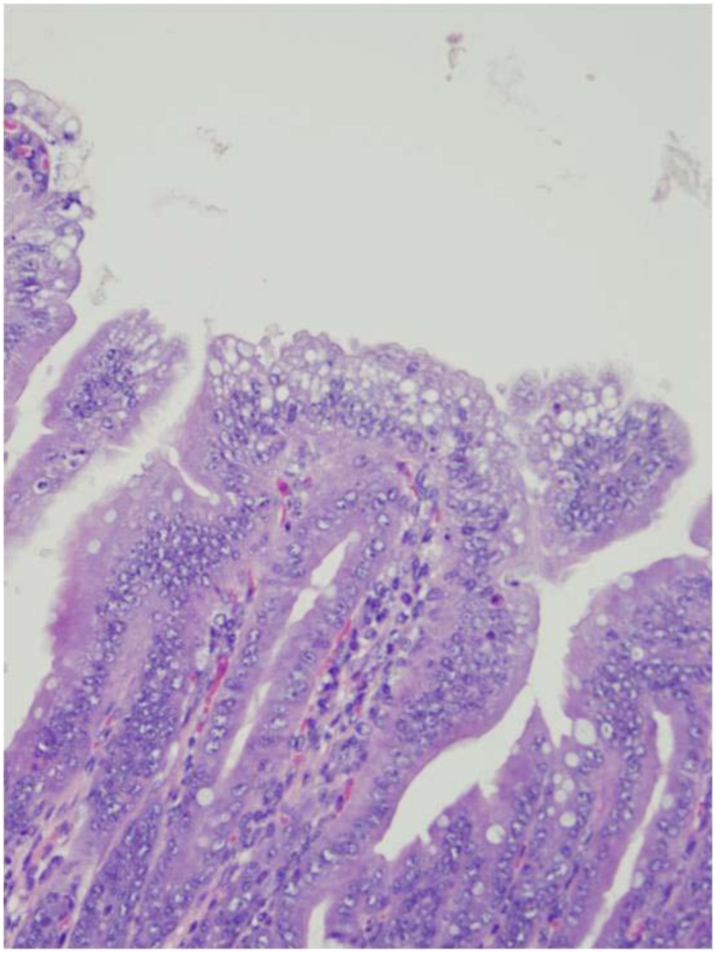

Figure H12
Duodenum; mouse; 520 mg/L SDD; animal ID 7F 482; Day 91.
Duodenum with cytoplasmic vacuolization of the villous epithelium and villous atrophy.
(H&E, 400x)

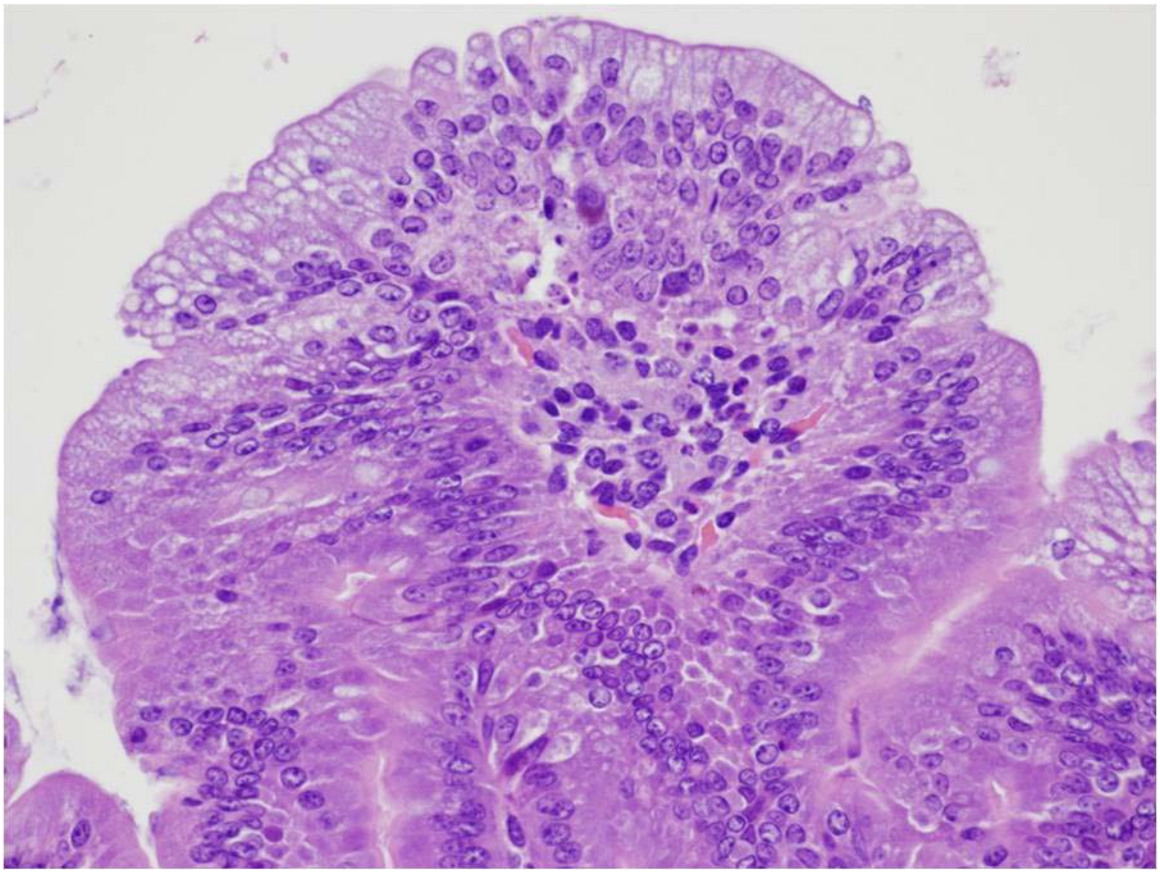

Figure H13
Duodenum; mouse; 520 mg/L SDD; animal ID 7F 485; Day 91.
Duodenum with minimal apoptosis in the lamina propria (arrow) and cytoplasmic vacuolization of the villous epithelium.
(H&E, 600x)

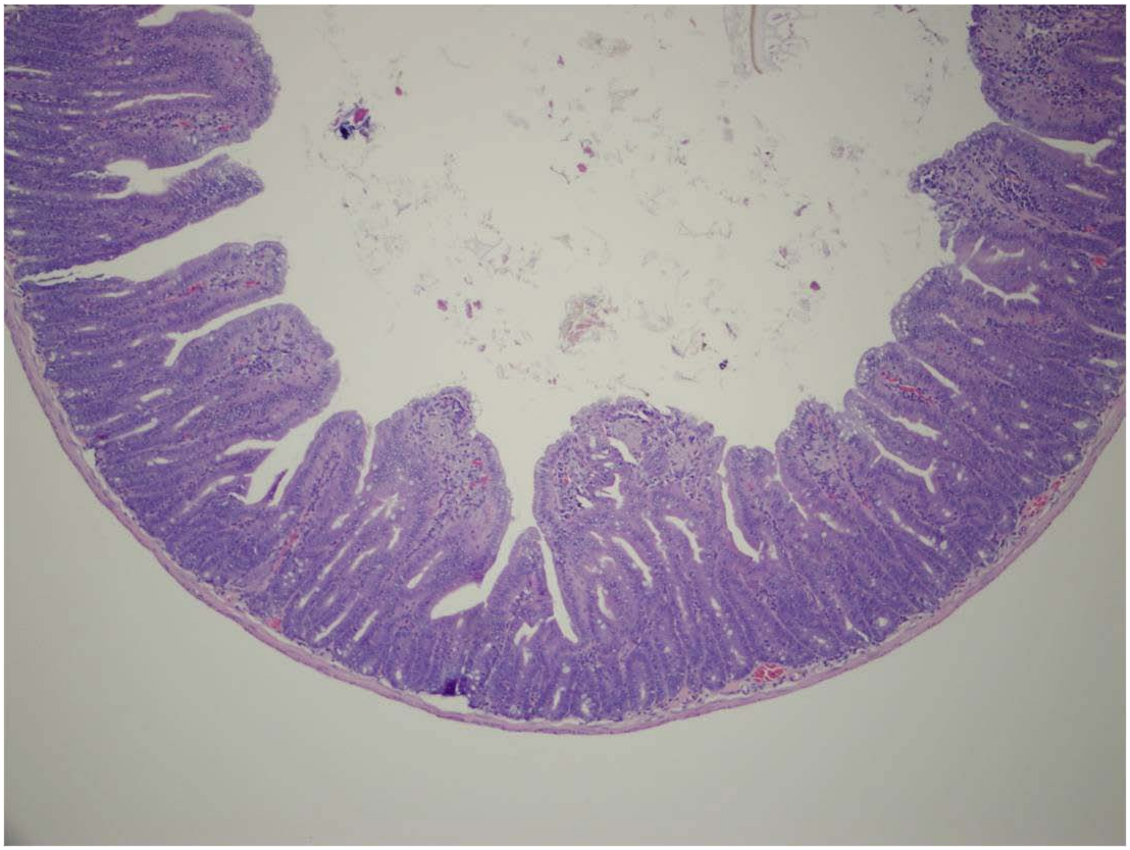

Figure H14
Duodenum; mouse; 520 mg/L SDD; animal ID 7F 482; Day 91.
Duodenum with mild villous atrophy, blunting and fusion, and mild crypt epithelial hyperplasia.
(H&E, 100x)

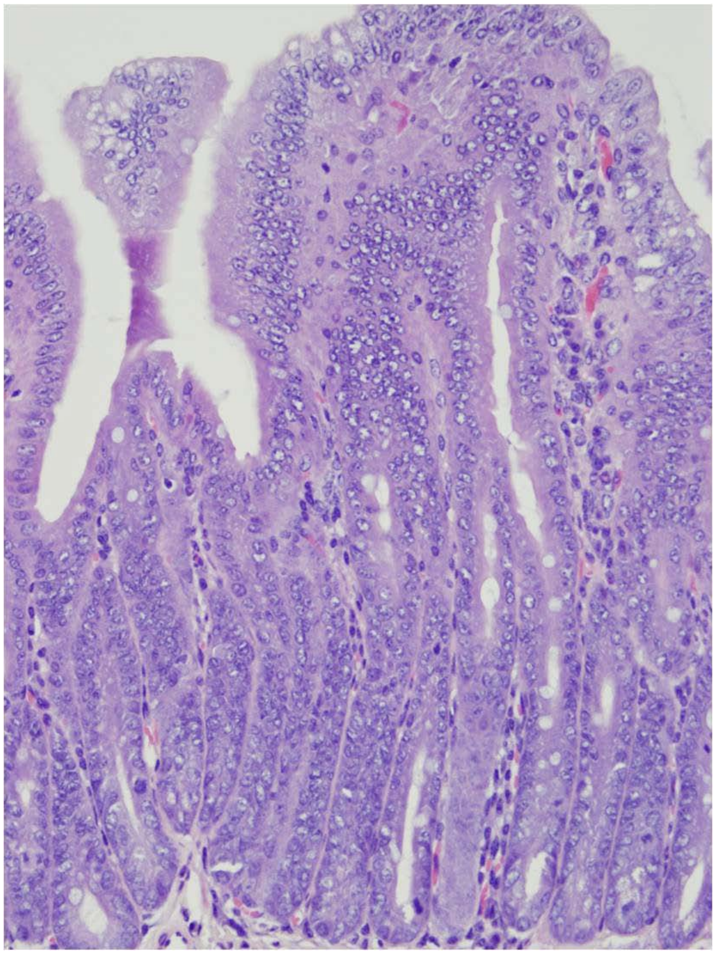

Figure H15
Duodenum; mouse; 520 mg/L SDD; animal ID 7F 482; Day 91. Duodenum with villous atrophy, blunting and fusion, and crypt epithelial hyperplasia.   (H&E, 400x)

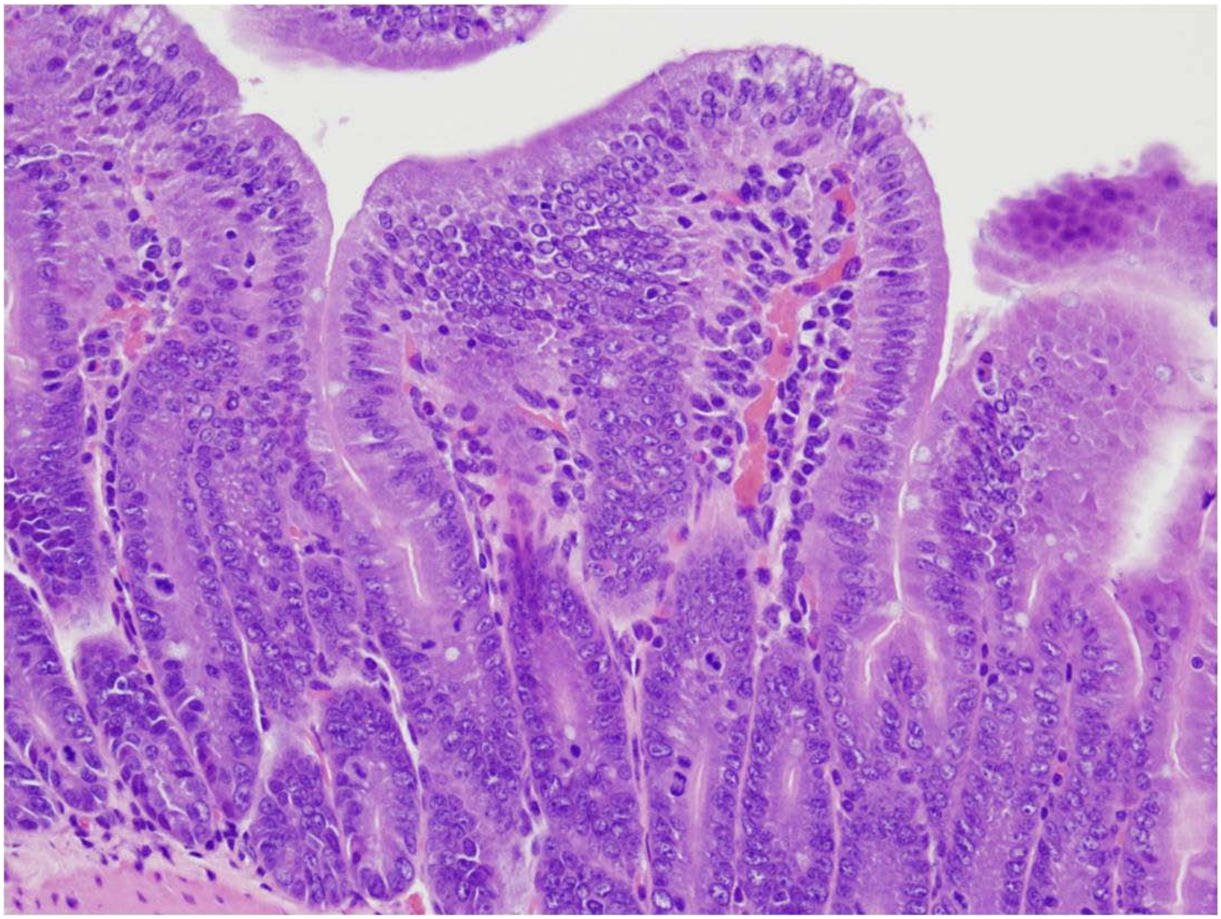

Figure H16
Duodenum; mouse; 520 mg/L SDD; animal ID 7F 485; Day 91.
Duodenum with villous atrophy, blunting and fusion, and crypt epithelial hyperplasia.
(H&E, 400x)

Appendix I

Clinical Pathology Contributing Scientist Report

Clinical Pathology Contributing Scientist Report for

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

Submitted by:

Brenda Yamamoto, D.V.M., Ph.D., D.A.C.V.P.
Clinical Pathologist
Southern Research Institute
Birmingham, Alabama

Southern Research Study Number: 13026.01.01

December 27, 2010

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Clinical Pathology Contributing Scientist Report for the Study

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate Administered in Drinking Water to B6C3F1 Mice

12/27/10

Brenda Yamamoto, D.V.M., Ph.D., D.A.C.V.P.
Clinical Pathologist
Southern Research Institute

Date

2.0 SUMMARY

Administration of 520 mg/L sodium dichromate dihydrate (SDD) for 90 days via drinking water to female mice was associated with a slight decrease in serum iron levels. Although a clear dose-related impact on serum iron was not observed with lower SDD administration levels, biologically relevant effects on serum iron at higher levels of SDD cannot be excluded.

SDD administration had no discernible impact upon stored iron as assessed by examination of Prussian blue-stained bone marrow smears.

3.0 METHODS AND MATERIALS

The objective of this study was to evaluate the toxicity and potential mechanisms of action of SDD administered in drinking water to mice for 90 days.

Female B6C3F1 mice were assigned to seven dosage groups receiving 0 mg/L (water only; Group 1) or 0.3, 4, 14, 60, 170, or 520 mg/L of SDD (Groups 2-7, respectively) in their drinking water. Serum iron levels were determined from five mice per group on Day 91. Additionally, bone marrow smears were stained with Prussian blue to perform a semi-quantitative estimate of iron content.[1]

The analysis/comparisons of data for serum iron levels were done using EXCEL 2007 (Microsoft, Inc., Redmond, WA). The control group (0 mg/L SDD in water) mean calculated by Provantis 7 (Instem; Staffordshire, UK) was compared to individual and group mean serum iron values. Qualifiers used to describe increases in serum iron include: minimal (30-45%), mild (>45-60%), moderate (>60-75%), and marked (>75%). Qualifiers used to describe decreases in serum iron include: minimal (25-30%), mild (>30-35%), and moderate (>35%). The bone marrow iron content of the SDD treatment groups was compared to that of the control group.

4.0 RESULTS

Serum Iron

Individual sera collected from five mice per group were analyzed for total iron content. A clear dose-related test article (SDD) effect upon serum iron could not be discerned at the dosages administered. However, at the highest SDD dose group (520 mg/L) a minimal decrease in mean serum iron along with a pattern of individual decreases in serum iron was observed.

Individual and mean serum iron levels for the different SDD treatment groups were examined. Table I1 presents the mean, standard deviation, and percent change relative to the mean for the control group. Individual serum iron data are presented in Table I2. The mean serum iron for each SDD dose group is also presented in graph form (Figure I1). Sporadic minimal to moderate increases in individual serum iron levels were present in all SDD treatment groups except the highest (i.e. Groups 2-6). At the highest SDD administration level (520 mg/L) serum iron values were minimally decreased in 1/5 individuals and moderately decreased in 2/5 individuals. Overall, there was a minimal decrease of the mean serum iron for the high SDD treatment group.

Bone Marrow Iron Staining

Individual bone marrow smears from five mice per group were stained with Prussian blue stain to visualize iron. The results are presented in Table I3. The bone marrows of the SDD treatment groups were compared to that of the untreated control group based upon the grading scheme described by Gale *et. al*.[1] There were no discernible difference in iron storage present that could be attributed to SDD consumption.

5.0 DISCUSSION AND CONCLUSIONS

The objective of the study was to evaluate the toxicity and potential mechanisms of action of Sodium Dichromate Dihydrate (SDD) administered in drinking water to mice for 90 days. A previous study by the NTP in which SDD was administered to female B6C3F1 mice for 2 years by drinking water demonstrated a consistent, statistically significant, minimal decrease in mean erythrocyte mean cell volume (MCV) and decrease in mean cell hemoglobin (MCH) at all time points (from Day 22) for the 172 and 516 mg/L SDD treatment groups.[2] Additionally, small increases in mean erythrocyte counts were present at all time point, with impact most consistently seen in the 516 mg/L SDD treatment group.[2] This suggests that SDD administration may potentially have an effect upon iron metabolism which may have secondarily manifested as changes in erythrocyte parameters. Although hemograms were not performed to reconfirm development of decreased MCV and MCH, five mice per group were utilized at the end of this study to examine select parameters of iron metabolism. Blood was collected for serum iron measurements and bone marrow smears were stained with Prussian blue stain to examine iron content/storage.

The Prussian blue-stained bone marrow smears of the SDD treatment groups were compared to that of the control (water) group. No significant differences in iron stores were observed. Iron was present in the smears of all individuals from all treatment groups (Table I2). The caveat of this methodology is that it is semi-quantitative and dependent upon the quality of the smear (i.e., cellularity).

Iron levels from the sera of the SDD treatment groups (individual and group mean) were compared to the control group mean. Sporadic minimal to moderate increase in individual serum iron levels were scattered amongst the lower SDD treatment groups (0.3, 4, 14, 60, and 170 mg/L). The sporadic nature, absence of dose-related pattern, and overlap with the control group suggests this is not significant nor of biological relevance. However, at the highest SDD dose group (520 mg/L), both individual mice and group mean serum iron levels were decreased. The consistent pattern of decrease amongst 5/5 individuals resulted in a mean serum iron level that was minimally decreased relative to the control mean. In conjunction with the findings from the NTP study of decreased MCV and MCH, and increased erythrocyte counts,[2] the minimal decrease in serum iron in the 520 mg/L SDD treatment group may suggest biologically-relevant SDD impact upon iron metabolism.

In conclusion, based upon the data obtained from this study, the administration of 0.3 to 520 mg/L of SDD in drinking water for 90 days had no test article-related effects upon bone marrow iron stores as assessed by Prussian blue stain. Although there was no clear dose-related impact upon serum iron levels at the lower levels of SDD administered (0.3-170 mg/L), the minimal decrease of serum iron at the highest dose of 520 mg/L SDD may be of biological significance.

6.0 REFERENCES

1. Gale E., Torrance J., and Bothwell, T. (1963). The quantitative estimation of total iron stores in human bone marrow. *J. Clin. Invest.* **42,** 1076-82.
2. National Toxicology Program (NTP) (2008). NTP Technical Report on the Toxicology and Carcinogenesis Studies of Sodium Dichromate Dihydrate (CAS No. 7789-12-0) in F344/N Rats and B6C3F1 Mice (Drinking Water Studies). NTP TR 546. NIH Publication No. 08-5887. National Institutes of Health.

Table I1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Serum Iron Relative to SDD Dose

SDD dose (mg/L)	**Mean Serum Iron (µg/dL)**	**S.D. (µg/dL)**	**Percent Change Relative to Group 1**
0	167.2	22.0	--
0.3	194.6	25.6	16.4
4	217.2	19.9	29.9
14	212.0	50.6	26.8
60	190.0	23.2	13.6
170	213.2	40.2	27.5
520	117.6	17.7	-29.7

Table I2

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Serum Iron Levels

Day: 91 relative to Start Date

Group	Sex	Animal	Iron ug/dL
1	f	6	167
		7	189
		8	186
		9	135
		10	159
		Mean	167.2
		S.D.	22.0
		N	5

Group	Sex	Animal	Iron ug/dL
2	f	86	186
		87	231
		88	161
		89	204
		90	191
		Mean	194.6
		S.D.	25.6
		N	5

Group	Sex	Animal	Iron ug/dL
3	f	166	195
		167	245
		168	229
		169	212
		170	205
		Mean	217.2
		S.D.	19.9
		N	5

Table I2

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Serum Iron Levels

Day: 91 relative to Start Date

Group	Sex	Animal	Iron ug/dL
4	f	246	196
		247	174
		248	292
		249	229
		250	169
		Mean	212.0
		S.D.	50.6
		N	5

Group	Sex	Animal	Iron ug/dL
5	f	326	219
		327	180
		328	176
		329	165
		330	210
		Mean	190.0
		S.D.	23.2
		N	5

Group	Sex	Animal	Iron ug/dL
6	f	406	268
		407	155
		408	208
		409	218
		410	217
		Mean	213.2
		S.D.	40.2
		N	5

Table I2

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Individual Serum Iron Levels

Day: 91 relative to Start Date

Group	Sex	Animal	Iron ug/dL
7	f	486	133
		487	125
		488	99
		489	98
		490	133
		Mean	117.6
		S.D.	17.7
		N	5

Table I3

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

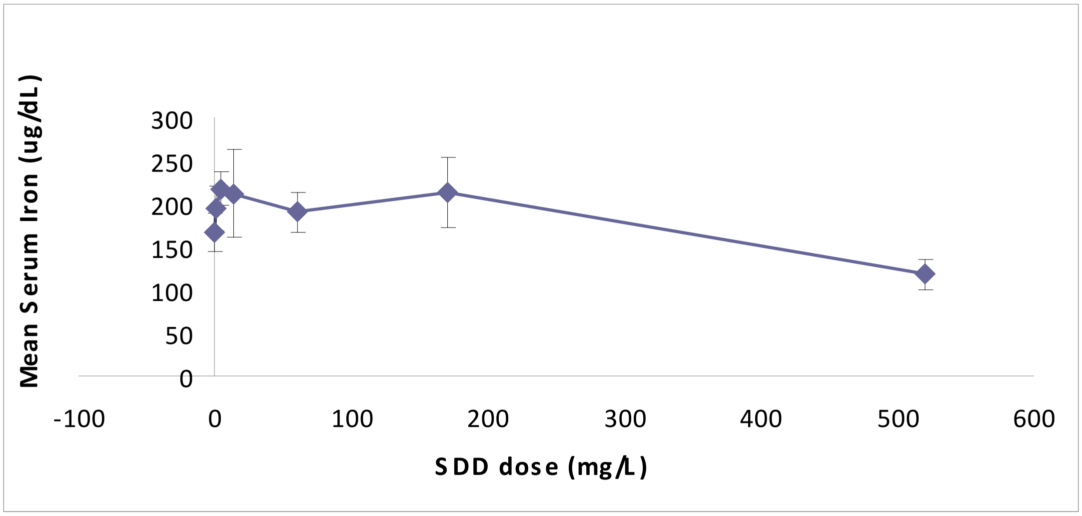
Semi-quantitative assessment of Prussian blue-stained bone marrow smears

ID	**Quality (cellularity)**	**Fragment (Grade 0-6)**	**Macrophage (Iron: + or -)**
1F6	adequate	3	+
1F7	adequate	3-4	+
1F8	low/adequate	3-4	+
1F9	adequate	3-4	+
1F10	low	3-4	+
2F86	low	3	+
2F87	low	3	+
2F88	low/adequate	3-4	+
2F89	low/adequate	3-4	+
2F90	low/adequate	3	+
3F166	low/adequate	3	+
3F167	low/adequate	3-4	+
3F168	adequate	3-4	+
3F169	adequate	3-4	+
3F170	adequate	3	+
4F246	low/adequate	3	+
4F247	low	3	+
4F248	adequate	3	+
4F249	low/adequate	3	+
4F250	adequate	3	+
5F326	adequate	3	+
5F327	low	2-3	+
5F328	low/adequate	3-4	+
5F329	adequate	3	+
5F330	adequate	3-4	+
6F406	adequate	3-4	+
6F407	adequate	3	+
6F408	low/adequate	3	+
6F409	adequate	3-4	+
6F410	low/adequate	3	+
7F486	low	2	+
7F487	low/adequate	3	+
7F488	adequate	3	+
7F489	adequate	3	+
7F490	low/adequate	3-4	+

Figure I1

90-Day Repeat Dose Toxicity Study of Sodium Dichromate Dihydrate
Administered in Drinking Water to B6C3F1 Mice

Mean serum iron relative to SDD dose



Appendix J

Statistics Contributing Scientist Report

Project# 13026.01.01 Amended v1.0 2-1-2011 nicola@alphastatconsult.com

Statistical Report for 13026.01.01 Water Intake, Food Intake and Other Endpoints

Amended v1.0

Southern Research Institute Project 13026.01.01

Submitted by:

Nicola Richardson-Harman Ph.D.

Statistical Consultant

Alpha StatConsult LLC.

www.alphastatconsult.com

February 1st 2011

Statistical Report for 13026.01.01 Water Intake, Food Intake and Other Endpoints

General: This report is amended to include re-analysis of water intake data from Days 50-57, 57-64, 71-78 ,and 85-91. This re-analysis was necessary because, according to criteria for exclusion of values, several of the values in the original report either should have been excluded and were not, and several values were excluded from the original report that should not have been. In addition, the report is amended to include analysis of additional data sets.

(Cover Page): The title of the report has been revised to reflect the fact that assessment of additional endpoints has been added to the report, and to indicate that this is an amended report. The date has been changed to reflect the date the amended report was signed.

Signature Page: The signature page has been revised to indicate that this is an amended report, and to reflect that date the amended report was signed.

Contents: The Contents page has been revised to reflect the additional evaluations performed.

Section 1.0 Objectives: The objectives were revised to reflect the additional evaluations performed.

Section 2.0 Data: This section was revised to reflect the additional data that were provided for analysis in the amended report.

Section 3.0 Statistical Methods: This section was revised to reflect the statistical analyses that were performed for all data sets.

Section 4.0 Results: This section was revised to reflect changes in the results from the statistical analyses on the water intake data that were due to the corrected data sets, and to add the results of the additional endpoints.

Figures and Tables: This section was revised to reflect changes in the results from the statistical analyses on the water intake data that were due to the corrected data sets, and to add the results of the additional endpoints.

SIGNATURE PAGE

Statistical Report for 13026.01.01 Water Intake, Food Intake and Other Endpoints

Amended v1.0

Nicola Richardson-Harman | 2-1-2011

Name and credentials of statistician | Date

Nicola Richardson-Harman Ph.D.

Alpha StatConsult LLC.

9820 Warthen Drive

Damascus MD 20872

Contents

Project# 13026.01.01 Amended v1.0 2-1-2011 nicola@alphastatconsult.com

1.0 Objectives

To compare daily food intake, per cage (g/mouse/day) between placebo group 1 and treatment groups 2-7.

- To compare daily water intake, per cage (mL/mouse/day) between placebo group 1 and treatment groups 2-7.
- To compare body weight (g) between placebo group 1 and treatment groups 2-7.
- To compare a series of bio-measures between placebo group 1 and treatment groups 2-7

2.0 Data

Food intake (g/mouse/day) were provided, per cage, for 13 time points: Days 1-8, 8-15, 15-22, 22-29, 29-36, 36-43, 43-50, 50-57, 57-64, 64-71, 71-78, 78-85 and 85-91.

Water intake (mL/mouse/day) were provided, per cage, for 14 time points: Days 1-8, 8-15, 15-22, 22-29, 29-36, 36-43, 43-50, 50-57, 57-64, 64-71, 71-78, 78-85, 85-91 and 85-92.

Body weight (g) data were provided, per animal, for week-1, and Days 1, 8, 15, 22, 29, 36, 43,50, 57, 64, 71, 78, 85, 91 and 92.

The following bio-measures were provided, per animal:

- 8-Isoprostane in Duodenum (ng/mL) on Day 91.
- 8-Isoprostane in Oral Cavity (ng/mL) on Day 91.
- 8-OHdG in Duodenum (ng/mL) on Day 91.
- 8-OHdG in Oral Cavity (ng/mL) on Day 91.

- Ferritin Levels (ng/mL) on Day 92.
- Serum Iron (µg/dL) on Day 91.
- Transferrin Levels (mg/mL) on Day 92.

3.0 Statistical Methods

The Kolmogorov-Smirnov test (alpha = 0.001) was used to test whether the data were normally distributed. The Kolmogorov-Smirnov test was run for data pooled across time points/groups and per each time point and group.

For normally distributed data: a one-way Analysis of Variance (alpha = 0.05) was performed at each time point followed by Dunnett's post hoc comparison (alpha = 0.05) to compare groups 2-7 to control group 1.

For data found to be non-normally distributed: a Kruskall Wallis test (alpha = 0.05) was performed at each time point followed by Wilcoxon (ie. Wilcoxon-Mann-Whitney) test using a Bonferroni adjusted alpha to compare groups 2-7 to control the group 1.

4.0 Results

Food Intake

The food intake data were positively skewed and did not meet criteria for normality. The results of the Kruskall Wallis and Wilcoxon comparisons are given in Table 1a&b. There were no statistically significant between group differences in food intake for any of the time points tested (Figure 1, Table 1 a&b).

Water Intake

The water intake data met criteria for normality. The results of the one way ANOVA across groups (groups 1-7) and Dunnett's post hoc test between groups 2-7 and the control group 1, are given in Table 2 a&b. Water intake was lower for groups 5 at Days 43-50; for group 6 at Days 29-36, 43-57 and 64-78; and for group 7 at Days 1-8, 15-22, 29-50 and 57-91, when compared to the control group 1 (Figure 2, Table 2).

Body Weight

Body weight data met criteria for normality. The results of the one way ANOVA across groups (groups 1-7) and Dunnett's post hoc test between groups 2-7 and the control group 1, are given in Table 3 a&b. Body weight was higher for group 3, 4 and 5 at Day 22 (Table 3a and b) compared to the control. Body weight was lower for group 6 at Day 36, 57 and 78 (Table 3b) and for group 7 at Days 15 and 29-91 (Table 3b).

Bio Measures

All bio-measures met criteria for normality. The results of the one way ANOVA across bio-measures for groups (groups 1-7) and Dunnett's post hoc test between groups 2-7 and the control group 1, are given in Tables 4-10. 8-Isoprostane Duodenum at Day 91 was higher for group 6 and 7 (Table 4) compared to the control group. 8-OHdG Duodenum at Day 91 was lower for group 6 (Table 6) compared to the control group. There was a significant main effect of group on Iron levels at Day 92 (Table 9) but this was not due to significant between group (2-7) and placebo differences. The one way ANOVA across groups (groups 1-7) was non-significant for 8-Isoprostane Oral Cavity at Day 91 (Table 5), 8-OHdG Oral Cavity at Day 91 (Table 7), Ferritin Levels at Day 92 (Table 8) and Transferrin Levels at Day 92 (Table 10).

Figures and Tables

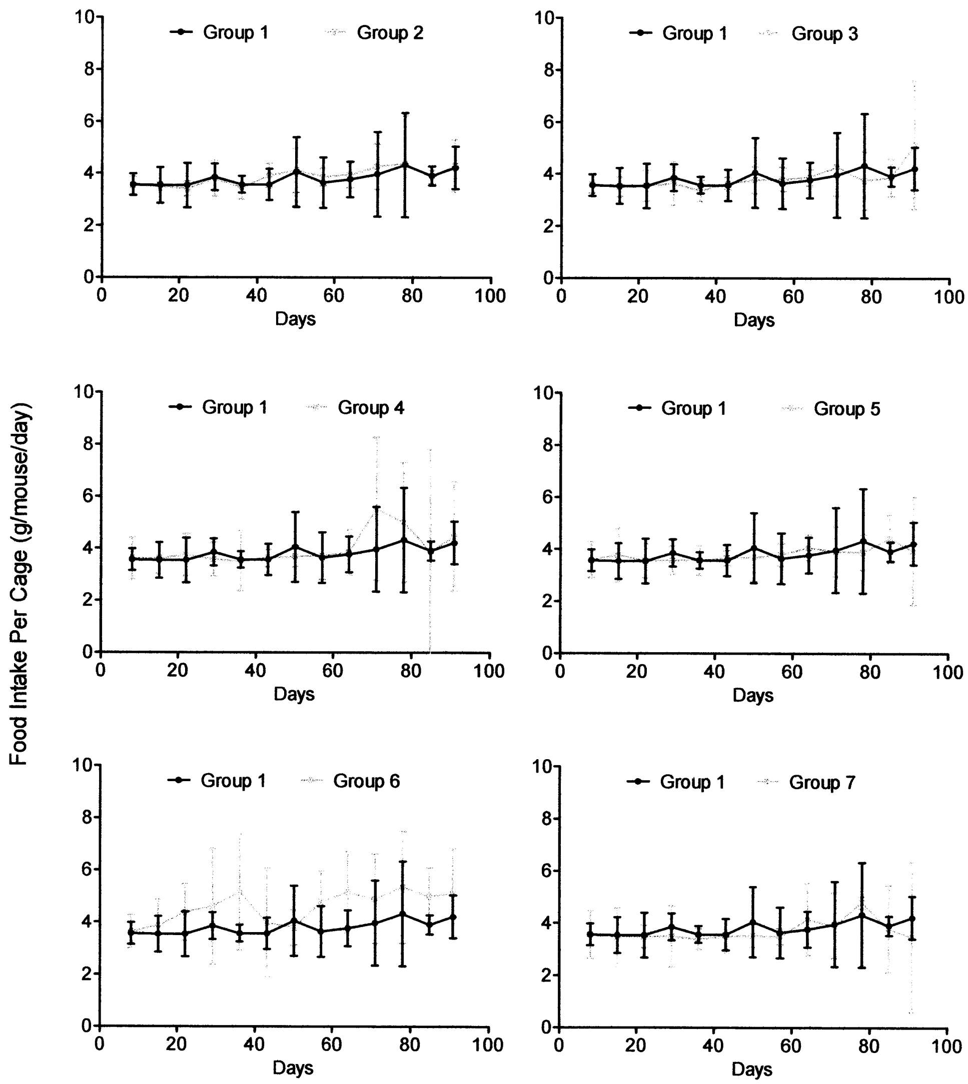


Figure 1. Food Intake Per Cage (g/mouse/day).

Median ± inter-quartile range shown.

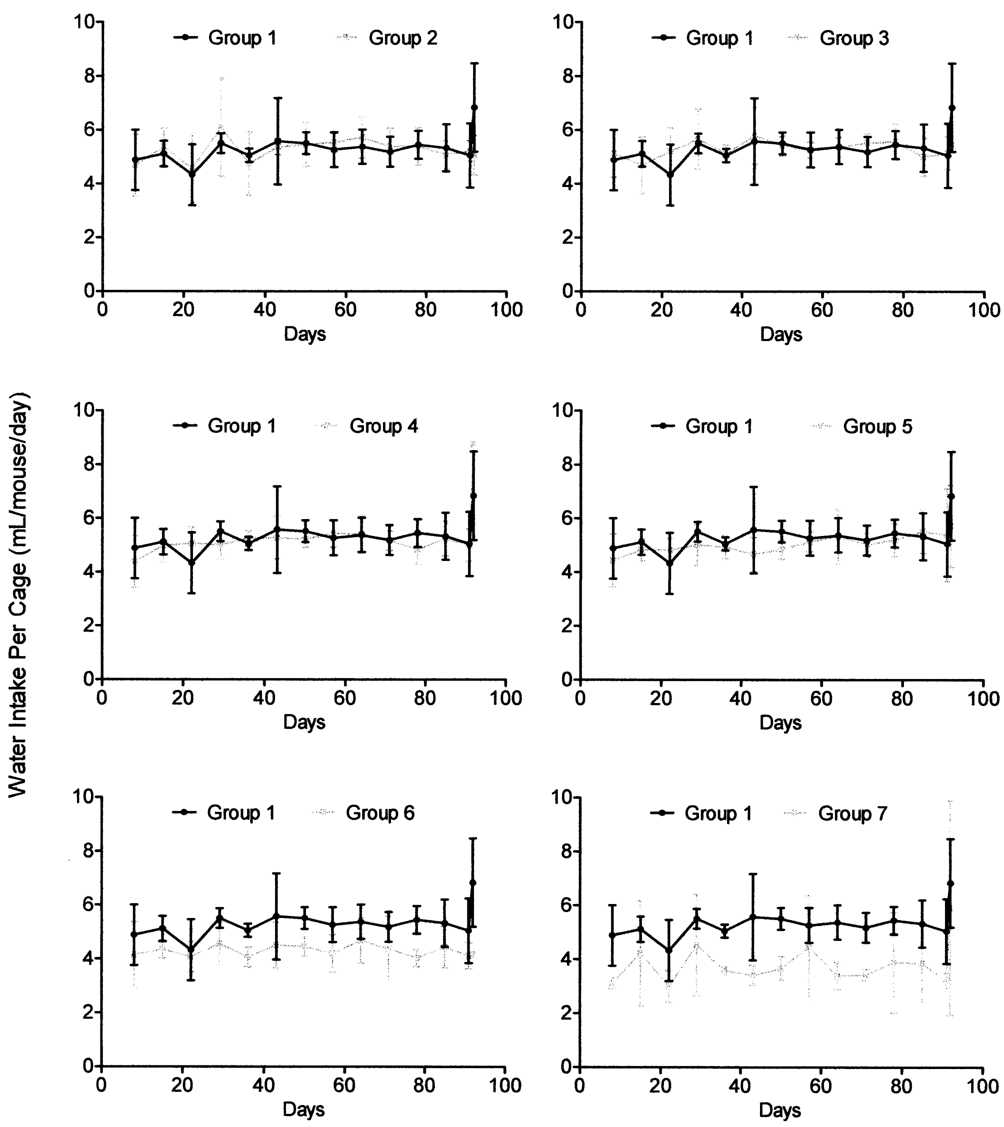


Figure 2. Water Intake Per Cage (mL/mouse/day).

Mean ± standard deviation shown.

Table 1. Food Intake Per Cage (g/mouse/day).

Kruskall Wallis ANOVA and Wilcoxon test results to compare Group 1 (placebo) with: (a) Groups 2-4; (b) Groups 5-7. Group median (inter-quartile range) and number of cages per group are given.

a.

Days	KW	Prob.	Group 1	Group 2	W_2	Group 3	W_3	Group 4	W_4
1-8	0.9683	ns	3.57 (0.41) n=16	3.53 (0.34) n=16	ns	3.6 (0.34) n=15	ns	3.61 (0.81) n=12	ns
8-15	0.7315	ns	3.54 (0.69) n=10	3.5 (0.14) n=10	ns	3.5 (0.37) n=10	ns	3.61 (0.6) n=10	ns
15-22	0.0963	ns	3.54 (0.86) n=11	3.4 (0.29) n=11	ns	3.54 (0.6) n=11	ns	3.74 (0.8) n=10	ns
22-29	0.2545	ns	3.86 (0.51) n=11	3.8 (0.69) n=11	ns	3.63 (0.83) n=11	ns	3.57 (0.66) n=11	ns
29-36	0.1400	ns	3.57 (0.31) n=11	3.46 (0.46) n=11	ns	3.34 (0.4) n=10	ns	3.51 (1.14) n=10	ns
36-43	0.4786	ns	3.57 (0.6) n=11	3.91 (0.46) n=11	ns	3.64 (0.23) n=10	ns	3.63 (0.34) n=11	ns
43-50	0.1754	ns	4.06 (1.34) n=11	4.11 (0.86) n=11	ns	3.77 (0.51) n=10	ns	3.69 (0.4) n=9	ns
50-57	0.2210	ns	3.64 (0.97) n=8	3.86 (0.34) n=9	ns	3.8 (0.46) n=9	ns	3.71 (0.91) n=8	ns
57-64	0.2617	ns	3.77 (0.69) n=10	3.94 (0.49) n=9	ns	3.87 (0.31) n=8	ns	3.84 (0.87) n=4	ns
64-71	0.3628	ns	3.97 (1.63) n=11	4.26 (0.89) n=8	ns	4.29 (1.11) n=7	ns	5.51 (2.76) n=8	ns
71-78	0.6979	ns	4.33 (2) n=10	4.37 (1.83) n=10	ns	3.74 (1.11) n=6	ns	5 (2.29) n=7	ns
78-85	0.2541	ns	3.91 (0.37) n=9	3.86 (0.26) n=9	ns	3.87 (0.71) n=8	ns	3.89 (3.91) n=7	ns
85-91	0.3410	ns	4.22 (0.82) n=8	4.3 (1) n=7	ns	5.13 (2.47) n=7	ns	4.45 (2.1) n=6	ns

Where KW = Kruskal Wallis probability of no difference between groups 1-7; Prob. = Kruskal Wallis probability level; W_n = Wilcoxon test result where group n is compared to placebo Group 1; ns = non-significant at P<0.05 and for Wilcoxon test with Bonferroni adjustment.

Table 1. continued.

b.

Days	**KW**	**Prob.**	**Group 1**	**Group 5**	**W_5**	**Group 6**	**W_6**	**Group 7**	**W_7**
1-8	0.9683	ns	3.57 (0.41) n=16	3.59 (0.69) n=12	ns	3.63 (0.63) n=13	ns	3.56 (0.91) n=12	ns
8-15	0.7315	ns	3.54 (0.69) n=10	3.77 (1.03) n=11	ns	3.86 (1) n=7	ns	3.46 (1.11) n=10	ns
15-22	0.0963	ns	3.54 (0.86) n=11	3.54 (0.66) n=10	ns	4.37 (1.09) n=9	ns	3.49 (0.43) n=10	ns
22-29	0.2545	ns	3.86 (0.51) n=11	3.57 (0.54) n=11	ns	4.6 (2.23) n=10	ns	3.5 (1.17) n=10	ns
29-36	0.1400	ns	3.57 (0.31) n=11	3.57 (0.57) n=11	ns	5.14 (2.23) n=8	ns	3.39 (0.4) n=10	ns
36-43	0.4786	ns	3.57 (0.6) n=11	3.66 (0.29) n=11	ns	3.97 (2.09) n=10	ns	3.5 (0.66) n=10	ns
43-50	0.1754	ns	4.06 (1.34) n=11	3.69 (0.91) n=9	ns	3.79 (0.67) n=8	ns	3.53 (0.46) n=10	ns
50-57	0.2210	ns	3.64 (0.97) n=8	3.79 (0.43) n=10	ns	4.79 (1.16) n=4	ns	3.49 (0.31) n=8	ns
57-64	0.2617	ns	3.77 (0.69) n=10	4.06 (0.49) n=9	ns	5.14 (1.54) n=3	ns	4.14 (1.37) n=5	ns
64-71	0.3628	ns	3.97 (1.63) n=11	3.91 (0.97) n=9	ns	4.89 (1.71) n=8	ns	3.91 (1.26) n=9	ns
71-78	0.6979	ns	4.33 (2) n=10	3.89 (0.69) n=9	ns	5.34 (2.14) n=5	ns	4.8 (0.23) n=5	ns
78-85	0.2541	ns	3.91 (0.37) n=9	4.4 (0.91) n=9	ns	4.99 (1.09) n=10	ns	3.77 (1.66) n=9	ns
85-91	0.3410	ns	4.22 (0.82) n=8	3.93 (2.07) n=6	ns	5.1 (1.73) n=5	ns	3.47 (2.87) n=7	ns

Where KW = Kruskal Wallis probability of no difference between groups 1-7; Prob. = Kruskal Wallis probability level; W_n = Wilcoxon test result where group n is compared to placebo Group 1; ns = non-significant at $P<0.05$ and for Wilcoxon test with Bonferroni adjustment.

Table 2. Water Intake Per Cage (mL/mouse/day).

ANOVA and Dunnett's test results to compare Group 1 (placebo) with: (a) Groups 2-4; (b) Groups 5-7. Group means (standard deviation) and number of animals per group are given.

a.

Days	Pr > F	Prob.	Group 1	Group 2	D_2	Group 3	D_3	Group 4	D_4
1-8	0.0024	<0.01	4.88 (1.12) n=12	4.68 (1.14) n=13	ns	5.12 (0.89) n=11	ns	4.37 (0.96) n=11	ns
8-15	0.1818	ns	5.11 (0.47) n=9	5.36 (0.69) n=8	ns	4.68 (1.04) n=7	ns	4.98 (0.62) n=8	ns
15-22	<.0001	<0.001	4.33 (1.13) n=7	4.57 (1.3) n=10	ns	5.21 (0.86) n=8	ns	5.05 (0.61) n=10	ns
22-29	0.1243	ns	5.51 (0.36) n=8	6.09 (1.82) n=5	ns	5.66 (1.13) n=8	ns	5 (0.53) n=9	ns
29-36	<.0001	<0.001	5.05 (0.25) n=8	4.74 (1.18) n=8	ns	5.12 (0.32) n=8	ns	5.25 (0.29) n=7	ns
36-43	0.0001	<0.001	5.57 (1.6) n=7	5.37 (0.3) n=7	ns	5.78 (1.06) n=6	ns	5.27 (0.8) n=6	ns
43-50	<.0001	<0.001	5.51 (0.4) n=9	5.45 (0.8) n=9	ns	5.41 (0.36) n=8	ns	5.22 (0.31) n=7	ns
50-57	0.0063	<0.01	5.27 (0.64) n=8	5.53 (0.35) n=10	ns	5.25 (0.28) n=7	ns	5.43 (0.5) n=9	ns
57-64	<.0001	<0.001	5.37 (0.64) n=8	5.71 (0.76) n=10	ns	5.36 (0.36) n=8	ns	5.4 (0.69) n=6	ns
64-71	<.0001	<0.001	5.18 (0.55) n=9	5.37 (0.69) n=10	ns	5.52 (0.35) n=9	ns	5.16 (0.36) n=9	ns
71-78	0.0002	<0.001	5.45 (0.52) n=10	5.38 (0.69) n=9	ns	5.56 (0.65) n=9	ns	4.84 (0.55) n=7	ns
78-85	0.0056	<0.01	5.33 (0.87) n=7	5.06 (0.52) n=9	ns	5 (0.7) n=10	ns	5.23 (0.64) n=8	ns
85-91	0.0002	<0.001	5.05 (1.19) n=6	5.22 (0.39) n=7	ns	5.13 (0.61) n=9	ns	4.99 (0.6) n=6	ns
85-92	n/a	n/a	6.83 (1.64) n=2	5.05 (0.73) n=2	n/a	5.45 (0.08) n=2	n/a	8.73 (.) n=1	n/a

Where: Pr>F = ANOVA Probability of no difference between groups 1-7; Prob. = ANOVA Probability level; D_n = Dunnett test result where Group n is compared to placebo Group 1; * Dunnett P<0.05; ns = non-significant at P<0.05; n/a = not applicable.

Table 2. continued.

b.

Days	Pr > F	Prob.	Group 1	Group 5	D_5	Group 6	D_6	Group 7	D_7
1-8	0.0024	<0.01	4.88 (1.12) n=12	4.43 (0.99) n=10	ns	4.14 (1.22) n=10	ns	3.11 (0.19) n=8	*
8-15	0.1818	ns	5.11 (0.47) n=9	4.83 (0.41) n=8	ns	4.35 (0.33) n=8	ns	4.22 (1.95) n=8	ns
15-22	<.0001	<0.001	4.33 (1.13) n=7	4.82 (0.43) n=5	ns	4.07 (0.56) n=5	ns	2.98 (0.59) n=9	*
22-29	0.1243	ns	5.51 (0.36) n=8	5.02 (0.77) n=8	ns	4.55 (0.79) n=7	ns	4.53 (1.87) n=8	ns
29-36	<.0001	<0.001	5.05 (0.25) n=8	4.94 (0.43) n=9	ns	4.06 (0.36) n=10	*	3.57 (0.14) n=10	*
36-43	0.0001	<0.001	5.57 (1.6) n=7	4.66 (0.63) n=9	ns	4.5 (0.85) n=11	ns	3.4 (0.37) n=7	*
43-50	<.0001	<0.001	5.51 (0.4) n=9	4.84 (0.35) n=9	*	4.44 (0.36) n=9	*	3.65 (0.43) n=8	*
50-57	0.0063	<0.01	5.27 (0.64) n=8	5.13 (0.36) n=8	ns	4.19 (0.69) n=10	*	4.43 (1.94) n=8	ns
57-64	<.0001	<0.001	5.37 (0.64) n=8	5.32 (1.02) n=4	ns	4.67 (0.84) n=7	ns	3.38 (0.51) n=6	*
64-71	<.0001	<0.001	5.18 (0.55) n=9	5.03 (0.43) n=9	ns	4.37 (1.2) n=11	*	3.42 (0.21) n=10	*
71-78	0.0002	<0.001	5.45 (0.52) n=10	5.19 (0.61) n=10	ns	4.03 (0.32) n=9	*	3.88 (1.86) n=11	*
78-85	0.0056	<0.01	5.33 (0.87) n=7	5.5 (0.81) n=8	ns	4.43 (0.76) n=7	ns	3.85 (1.48) n=8	*
85-91	0.0002	<0.001	5.05 (1.19) n=6	5.38 (1.72) n=7	ns	4.12 (0.49) n=9	ns	3.22 (0.29) n=7	*
85-92	n/a	n/a	6.83 (1.64) n=2	5.71 (1.52) n=2	n/a	4.17 (.) n=1	n/a	5.9 (3.98) n=2	n/a

Where: Pr>F = ANOVA Probability of no difference between groups 1-7; Prob. = ANOVA Probability level; D_n = Dunnett test result where Group *n* is compared to placebo Group 1; * Dunnett $P<0.05$; ns = non-significant at $P<0.05$. n/a = not applicable.

Table 3. Animal Body Weight (g) Week-1 to Day 92.

ANOVA and Dunnett's test results to compare Group 1 (placebo) with: (a) Groups 2-4; (b) Groups 5-7. Group means (standard deviation) and number of animals per group are given.

a.

Day	Pr > F	Prob.	Group 1	Group 2	D_2	Group 3	D_3	Group 4	D_4
Week -1	0.9999	ns	16.96 (1.44) n=80	16.92 (1.45) n=80	ns	16.97 (1.43) n=80	ns	16.99 (1.43) n=80	ns
1	0.6183	ns	17.8 (1.6) n=80	18.1 (1.25) n=80	ns	18.2 (1.36) n=80	ns	17.9 (1.42) n=80	ns
8	0.3938	ns	18.51 (1.85) n=80	18.7 (1.76) n=80	ns	19.1 (1.53) n=80	ns	18.73 (1.93) n=80	ns
15	0.0001	<0.001	20.25 (1.16) n=55	20.46 (0.97) n=55	ns	20.5 (1.29) n=55	ns	20.36 (1.15) n=55	ns
22	0.0006	<0.001	19.98 (2.56) n=55	20.15 (2.45) n=55	ns	20.87 (1.52) n=55	*	21.05 (1.07) n=55	*
29	0.0001	<0.001	21.49 (1.14) n=55	21.6 (1.14) n=55	ns	21.71 (1.55) n=55	ns	21.51 (1.04) n=55	ns
36	<.0001	<0.001	22.2 (1.24) n=55	22.17 (1.25) n=55	ns	22.39 (1.44) n=55	ns	22.17 (1.08) n=55	ns
43	<.0001	<0.001	22.54 (1.27) n=55	23.16 (1.22) n=55	ns	22.86 (1.73) n=55	ns	22.8 (1.17) n=55	ns
50	<.0001	<0.001	23.13 (1.55) n=55	23.5 (1.23) n=55	ns	23.63 (1.82) n=55	ns	23.22 (1.32) n=55	ns
57	<.0001	<0.001	23.95 (1.63) n=55	24.14 (1.37) n=55	ns	24.14 (1.91) n=55	ns	23.84 (1.35) n=55	ns
64	<.0001	<0.001	23.98 (1.45) n=55	24.6 (1.6) n=55	ns	24.41 (1.94) n=55	ns	24.34 (1.55) n=55	ns
71	<.0001	<0.001	24.37 (2.09) n=55	25.05 (1.8) n=55	ns	25.16 (2.29) n=55	ns	24.71 (2.03) n=55	ns
78	<.0001	<0.001	25.01 (1.8) n=55	25.38 (1.77) n=55	ns	25.61 (2.5) n=55	ns	24.71 (1.79) n=55	ns
85	<.0001	<0.001	24.86 (2.01) n=55	25.55 (1.98) n=55	ns	25.63 (2.64) n=55	ns	25.62 (1.86) n=55	ns
91	<.0001	<0.001	25.83 (2.57) n=44	26.37 (2.08) n=44	ns	25.85 (2.43) n=45	ns	26.31 (2.07) n=45	ns
92	0.2289	ns	24.94 (1.89) n=10	26.03 (1.9) n=10	ns	26.68 (4.37) n=10	ns	25.03 (1.81) n=10	ns

Where: Pr>F = ANOVA Probability of no difference between groups 1-7; Prob. = ANOVA Probability level; D_n = Dunnett's test result where Group n is compared to placebo Group 1; * Dunnett P<0.05; ns = non-significant at P<0.05.

Table 3. continued.

b.

Day	Pr > F	Prob.	Group 1	Group 5	D_5	Group 6	D_6	Group 7	D_7
Week -1	0.9999	ns	16.96 (1.44) n=80	16.97 (1.44) n=80	ns	16.98 (1.44) n=80	ns	17 (1.44) n=80	ns
1	0.6183	ns	17.8 (1.6) n=80	17.98 (1.49) n=80	ns	18.07 (1.4) n=80	ns	17.91 (1.43) n=80	ns
8	0.3938	ns	18.51 (1.85) n=80	18.8 (1.67) n=80	ns	18.62 (1.61) n=80	ns	18.58 (1.44) n=80	ns
15	0.0001	<0.001	20.25 (1.16) n=55	20.2 (1.01) n=55	ns	19.95 (1.07) n=55	ns	19.53 (1.35) n=55	*
22	0.0006	<0.001	19.98 (2.56) n=55	20.87 (1.02) n=55	*	20.04 (1.48) n=55	ns	20.08 (1.28) n=55	ns
29	0.0001	<0.001	21.49 (1.14) n=55	21.47 (1.22) n=55	ns	21.12 (1.07) n=55	ns	20.67 (1.3) n=55	*
36	<.0001	<0.001	22.2 (1.24) n=55	22.05 (1.18) n=55	ns	21.54 (1.32) n=55	*	21.21 (1.33) n=55	*
43	<.0001	<0.001	22.54 (1.27) n=55	22.46 (1.73) n=55	ns	22.01 (1.11) n=55	ns	21.47 (1.29) n=55	*
50	<.0001	<0.001	23.13 (1.55) n=55	22.79 (1.37) n=55	ns	22.58 (1.27) n=55	ns	21.61 (1.57) n=55	*
57	<.0001	<0.001	23.95 (1.63) n=55	23.55 (1.27) n=55	ns	23.07 (1.34) n=55	*	22.66 (1.69) n=55	*
64	<.0001	<0.001	23.98 (1.45) n=55	23.86 (1.5) n=55	ns	23.27 (1.44) n=55	ns	22.33 (1.53) n=55	*
71	<.0001	<0.001	24.37 (2.09) n=55	24.17 (1.5) n=55	ns	23.5 (1.6) n=55	ns	22.97 (1.51) n=55	*
78	<.0001	<0.001	25.01 (1.8) n=55	24.73 (1.71) n=55	ns	23.93 (1.69) n=55	*	22.97 (1.57) n=55	*
85	<.0001	<0.001	24.86 (2.01) n=55	24.7 (2.15) n=55	ns	24.01 (1.74) n=55	ns	23.15 (1.57) n=55	*
91	<.0001	<0.001	25.83 (2.57) n=44	25.3 (2.02) n=45	ns	24.85 (1.41) n=45	ns	23.34 (1.74) n=45	*
92	0.2289	ns	24.94 (1.89) n=10	25.51 (1.68) n=10	ns	24.7 (2.31) n=10	ns	23.96 (1.6) n=10	ns

Where: Pr>F = ANOVA Probability of no difference between groups 1-7; Prob. = ANOVA Probability level; D_n = Dunnett's test result where Group n is compared to placebo Group 1; * Dunnett $P<0.05$; ns = non-significant at $P<0.05$.

Table 4. 8-Isoprostane Duodenum (ng/mL) at Day 91.

ANOVA and Dunnett's test results to compare Group 1 (placebo) with Groups 2-7. Group means (standard deviation) and number of animals per group are given.

Group	8-Isoprostane Duodenum (ng/mL)	Dunnett's[α]
1	23.87 (7.5) n=10	
2	26.35 (5.46) n=10	ns
3	24.3 (4.25) n=10	ns
4	20.78 (9.94) n=10	ns
5	34.33 (11.39) n=10	ns
6	42.47 (14.4) n=10	*
7	50.23 (8.43) n=9	*
ANOVA Probability	<0.0001	
Significance	<0.0001	

[α]Dunnett's comparison between Group 1 (placebo) and groups 2-7.
*Dunnett's $P<0.05$
ns = non significant

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Table 5. 8-Isoprostane Oral Cavity (ng/mL) at Day 91.

ANOVA and Dunnett's test results to compare Group 1 (placebo) with Groups 2-7. Group means (standard deviation) and number of animals per group are given.

Group	8-Isoprostane Oral Cavity (ng/mL)	Dunnett's[a]
1	3.19 (1.21) n=10	
2	3.12 (1.43) n=10	ns
3	2.12 (1.01) n=10	ns
4	2.96 (1.11) n=10	ns
5	2.53 (0.75) n=10	ns
6	3.32 (0.91) n=10	ns
7	2.85 (0.8) n=10	ns
ANOVA Probability	0.1658	
Significance	ns	

[a]Dunnett's comparison between Group 1 (placebo) and groups 2-7.
ns = non significant

Table 6. 8-OHdG Duodenum (ng/mL) at Day 91.

ANOVA and Dunnett's test results to compare Group 1 (placebo) with Groups 2-7. Group means (standard deviation) and number of animals per group are given.

Group	8-OHdG Duodenum (ng/mL)	Dunnett's[α]
1	101.21 (22.34) n=10	
2	95.64 (20.27) n=10	ns
3	85.01 (27.02) n=10	ns
4	89.14 (47.76) n=10	ns
5	72.4 (31.33) n=10	ns
6	49.51 (32.46) n=10	*
7	77.17 (38.58) n=10	ns
ANOVA Probability	0.0179	
Significance	<0.05	

[α]Dunnett's comparison between Group 1 (placebo) and groups 2-7.
*Dunnett's $P<0.05$
ns = non significant

Table 7. 8-OHdG Oral Cavity (ng/mL) at Day 91.

ANOVA and Dunnett's test results to compare Group 1 (placebo) with Groups 2-7. Group means (standard deviation) and number of animals per group are given.

Group	8-OHdG Oral Cavity (ng/mL)	Dunnett's[a]
1	17.63 (18.02) n=10	
2	49.77 (43.81) n=10	ns
3	44.23 (40.24) n=10	ns
4	42.55 (33.89) n=10	ns
5	32.47 (15.38) n=10	ns
6	42.01 (44.77) n=10	ns
7	31.26 (28.56) n=10	ns
ANOVA Probability	0.4259	
Significance	ns	

[a]Dunnett's comparison between Group 1 (placebo) and groups 2-7.
ns = non significant

Table 8. Ferritin Levels (ng/mL) at Day 92.

ANOVA and Dunnett's test results to compare Group 1 (placebo) with Groups 2-7. Group means (standard deviation) and number of animals per group are given.

Group	Ferritin Levels (ng/mL)	Dunnett's[a]
1	393.6 (58.62) n=5	
2	394.2 (50.89) n=5	ns
3	350 (69.13) n=5	ns
4	328.25 (67.62) n=4	ns
5	263.2 (37) n=5	ns
6	351.8 (136.49) n=5	ns
7	317 (76.94) n=5	ns
ANOVA Probability	0.1466	
Significance	ns	

[a]Dunnett's comparison between Group 1 (placebo) and groups 2-7.
ns = non significant

Table 9. Iron Levels (μg/dL) at Day 91.

ANOVA and Dunnett's test results to compare Group 1 (placebo) with Groups 2-7. Group means (standard deviation) and number of animals per group are given.

Group	Iron (μg/dL)	Dunnett's[α]
1	167.2 (21.98) n=5	
2	194.6 (25.64) n=5	ns
3	217.2 (19.88) n=5	ns
4	212 (50.59) n=5	ns
5	190 (23.25) n=5	ns
6	213.2 (40.17) n=5	ns
7	117.6 (17.74) n=5	ns
ANOVA Probability	0.0002	
Significance	<0.001	

[α]Dunnett's comparison between Group 1 (placebo) and groups 2-7.
ns = non significant

Table 10. Transferrin Levels (mg/mL) at Day 92.

ANOVA and Dunnett's test results to compare Group 1 (placebo) with Groups 2-7. Group means (standard deviation) and number of animals per group are given.

Group	Transferrin Levels (mg/mL)	Dunnett's[α]
1	3.67 (0.13) n=5	
2	3.64 (0.32) n=5	ns
3	3.71 (0.28) n=5	ns
4	3.52 (0.17) n=5	ns
5	3.6 (0.09) n=5	ns
6	3.54 (0.2) n=5	ns
7	3.78 (0.77) n=5	ns
ANOVA Probability	0.9159	
Significance	ns	

[α]Dunnett's comparison between Group 1 (placebo) and groups 2-7.
ns = non significant

Table 1. Food Consumption Per Cage (g/mouse/day).

Group medians (inter-quartile range) and number of cages per group are given.

Days	KW	Prob.	Group 1	Group 2	W2	Group 3	W3	Group 4	W4	Group 5	W5	Group 6	W6	Group 7	W7
1-8	0.9683	ns	3.57 (0.41) n=16	3.53 (0.34) n=16	ns	3.6 (0.34) n=15	ns	3.61 (0.81) n=12	ns	3.59 (0.69) n=12	ns	3.63 (0.63) n=13	ns	3.56 (0.91) n=12	ns
8-15	0.7315	ns	3.54 (0.69) n=10	3.5 (0.14) n=10	ns	3.5 (0.37) n=10	ns	3.61 (0.6) n=10	ns	3.77 (1.03) n=11	ns	3.86 (1) n=7	ns	3.46 (1.11) n=10	ns
15-22	0.0963	ns	3.54 (0.86) n=11	3.4 (0.29) n=11	ns	3.54 (0.6) n=11	ns	3.74 (0.8) n=10	ns	3.54 (0.66) n=10	ns	4.37 (1.09) n=9	ns	3.49 (0.43) n=10	ns
22-29	0.2545	ns	3.86 (0.51) n=11	3.8 (0.69) n=11	ns	3.63 (0.83) n=11	ns	3.57 (0.66) n=11	ns	3.57 (0.54) n=11	ns	4.6 (2.23) n=10	ns	3.5 (1.17) n=10	ns
29-36	0.1400	ns	3.57 (0.31) n=11	3.46 (0.46) n=11	ns	3.34 (0.4) n=10	ns	3.51 (1.14) n=10	ns	3.57 (0.57) n=11	ns	5.14 (2.23) n=8	ns	3.39 (0.4) n=10	ns
36-43	0.4786	ns	3.57 (0.6) n=11	3.91 (0.46) n=11	ns	3.64 (0.23) n=10	ns	3.63 (0.34) n=11	ns	3.66 (0.29) n=11	ns	3.97 (2.09) n=10	ns	3.5 (0.66) n=10	ns
43-50	0.1754	ns	4.06 (1.34) n=11	4.11 (0.86) n=11	ns	3.77 (0.51) n=10	ns	3.69 (0.4) n=9	ns	3.69 (0.91) n=9	ns	3.79 (0.67) n=8	ns	3.53 (0.46) n=10	ns
50-57	0.2210	ns	3.64 (0.97) n=8	3.86 (0.34) n=9	ns	3.8 (0.46) n=9	ns	3.71 (0.91) n=8	ns	3.79 (0.43) n=10	ns	4.79 (1.16) n=4	ns	3.49 (0.31) n=8	ns
57-64	0.2617	ns	3.77 (0.69) n=10	3.94 (0.49) n=9	ns	3.87 (0.31) n=8	ns	3.84 (0.87) n=4	ns	4.06 (0.49) n=9	ns	5.14 (1.54) n=3	ns	4.14 (1.37) n=5	ns
64-71	0.3628	ns	3.97 (1.63) n=11	4.26 (0.89) n=8	ns	4.29 (1.11) n=7	ns	5.51 (2.76) n=8	ns	3.91 (0.97) n=9	ns	4.89 (1.71) n=8	ns	3.91 (1.26) n=9	ns
71-78	0.6979	ns	4.33 (2) n=10	4.37 (1.83) n=10	ns	3.74 (1.11) n=6	ns	5 (2.29) n=7	ns	3.89 (0.69) n=9	ns	5.34 (2.14) n=5	ns	4.8 (0.23) n=5	ns
78-85	0.2541	ns	3.91 (0.37) n=9	3.86 (0.26) n=9	ns	3.87 (0.71) n=8	ns	3.89 (3.91) n=7	ns	4.4 (0.91) n=9	ns	4.99 (1.09) n=10	ns	3.77 (1.66) n=9	ns
85-91	0.3410	ns	4.22 (0.82) n=8	4.3 (1) n=7	ns	5.13 (2.47) n=7	ns	4.45 (2.1) n=6	ns	3.93 (2.07) n=6	ns	5.1 (1.73) n=5	ns	3.47 (2.87) n=7	ns

Where KW = Kruskal Wallis probability of no difference between groups 1-7; Prob. = Kruskal Wallis probability level; W*n* = Wilcoxon test result where group *n* is compared to placebo Group 1; ns = non-significant at $P<0.05$ and for Wilcoxon test with Bonferroni adjustment.

Table 2. Water Consumption Per Cage (mL/mouse/day).

Group means (standard deviation) and number of cages per group are given.

Days	Pr > F	Prob.	Group 1	Group 2	D2	Group 3	D3	Group 4	D4	Group 5	D5	Group 6	D6	Group 7	D7
1-8	0.0024	<0.01	4.88 (1.12) n=12	4.68 (1.14) n=13	ns	5.12 (0.89) n=11	ns	4.37 (0.96) n=11	ns	4.43 (0.99) n=10	ns	4.14 (1.22) n=10	ns	3.11 (0.19) n=8	*
8-15	0.1818	ns	5.11 (0.47) n=9	5.36 (0.69) n=8	ns	4.68 (1.04) n=7	ns	4.98 (0.62) n=8	ns	4.83 (0.41) n=8	ns	4.35 (0.33) n=8	ns	4.22 (1.95) n=8	ns
15-22	<.0001	<0.001	4.33 (1.13) n=7	4.57 (1.3) n=10	ns	5.21 (0.86) n=8	ns	5.05 (0.61) n=10	ns	4.82 (0.43) n=5	ns	4.07 (0.56) n=5	ns	2.98 (0.59) n=9	*
22-29	0.1243	ns	5.51 (0.36) n=8	6.09 (1.82) n=5	ns	5.66 (1.13) n=8	ns	5 (0.53) n=9	ns	5.02 (0.77) n=8	ns	4.55 (0.79) n=7	ns	4.53 (1.87) n=8	ns
29-36	<.0001	<0.001	5.05 (0.25) n=8	4.74 (1.18) n=8	ns	5.12 (0.32) n=8	ns	5.25 (0.29) n=7	ns	4.94 (0.43) n=9	ns	4.06 (0.36) n=10	*	3.57 (0.14) n=10	*
36-43	0.0001	<0.001	5.57 (1.6) n=7	5.37 (0.3) n=7	ns	5.78 (1.06) n=6	ns	5.27 (0.8) n=6	ns	4.66 (0.63) n=9	ns	4.5 (0.85) n=11	ns	3.4 (0.37) n=7	*
43-50	<.0001	<0.001	5.51 (0.4) n=9	5.45 (0.8) n=9	ns	5.41 (0.36) n=8	ns	5.22 (0.31) n=7	ns	4.84 (0.35) n=9	*	4.44 (0.36) n=9	*	3.65 (0.43) n=8	*
50-57	0.0078	<0.01	5.27 (0.64) n=8	5.53 (0.35) n=10	ns	5.25 (0.28) n=7	ns	5.43 (0.5) n=9	ns	5.13 (0.36) n=8	ns	4.09 (0.75) n=8	*	4.43 (1.94) n=8	ns
57-64	<.0001	<0.001	5.37 (0.64) n=8	5.71 (0.76) n=10	ns	5.36 (0.36) n=8	ns	5.4 (0.69) n=6	ns	5.32 (1.02) n=4	ns	4.67 (0.84) n=7	ns	3.38 (0.51) n=6	*
64-71	<.0001	<0.001	5.18 (0.55) n=9	5.37 (0.69) n=10	ns	5.52 (0.35) n=9	ns	5.16 (0.36) n=9	ns	5.03 (0.43) n=9	ns	4.37 (1.2) n=11	*	3.42 (0.21) n=10	*
71-78	0.0002	<0.001	5.45 (0.52) n=10	5.38 (0.69) n=9	ns	5.56 (0.65) n=9	ns	4.84 (0.55) n=7	ns	5.19 (0.61) n=10	ns	4.03 (0.32) n=9	*	3.88 (1.86) n=11	*
78-85	0.0056	<0.01	5.33 (0.87) n=7	5.06 (0.52) n=9	ns	5 (0.7) n=10	ns	5.23 (0.64) n=8	ns	5.5 (0.81) n=8	ns	4.43 (0.76) n=7	ns	3.85 (1.48) n=8	*
85-91	0.0037	<0.01	5.05 (1.19) n=6	6.1 (2.51) n=8	ns	5.13 (0.61) n=9	ns	4.99 (0.6) n=6	ns	5.38 (1.72) n=7	ns	4.12 (0.49) n=9	ns	3.22 (0.29) n=7	ns
85-92	0.7447	ns	6.83 (1.64) n=2	5.05 (0.73) n=2	ns	5.45 (0.08) n=2	ns	8.73 (.) n=1	ns	5.71 (1.52) n=2	ns	4.17 (.) n=1	ns	5.9 (3.98) n=2	ns

Where: Pr>F = ANOVA Probability of no difference between groups 1-7; Prob. = ANOVA Probability level; D*n* = Dunnett test result where Group *n* is compared to placebo Group 1; * Dunnett $P<0.05$; ns = non-significant at $P<0.05$.