

Study Number: C03038-03

Test Type: TOX

Route: Dosing in Water

Species/Strain: Rat/Harlan Sprague Dawley

C Number:

Study Gender:

PWG Approval Date

PA48: Summary of Tissue Concentration

Test Compound: Sodium Tungstate Dihydrate

CAS Number: 10213-10-2

C03038-03

Both

See web page for date of PWG Approval

Date Report Requested: 11/06/2019

Time Report Requested: 12:29:25

Lab: Battelle

		F0 Female			
Phase	Dose (mg/L)	0	250	500	1000
LD 21	Tungsten Concentration in Maternal Plasma (ug/mL)	BD	1.54 ± 0.17 (5)	2.35 ± 0.10 (5)	3.82 ± 0.84 (5)
LD 21	Tungsten Concentration in Male Pup Plasma (ug/mL)	BD	0.84 ± 0.17 (5)	1.48 ± 0.30 (5)	3.68 ± 0.89 (5)
LD 21	Tungsten Concentration in Female Pup Plasma (ug/mL)	BD	0.76 ± 0.26 (5)	1.35 ± 0.18 (5)	2.58 ± 0.56 (4)

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		F1 Male: F1 3 Mnth Int Male			
Phase	Dose (mg/L)	0	250	500	1000
SD 93	Tungsten Concentration in Kidney (ug/g)	BD	2.79 ± 0.24 (10)	5.30 ± 0.50 (10)	10.50 ± 2.94 (10)
SD 93	Tungsten Concentration in Plasma (ug/mL)	0.01 ± 0.00 (10) **	1.34 ± 0.20 (10) **	2.91 ± 0.27 (10) **	5.87 ± 0.54 (10) **
SD 93	Tungsten Kidney/Plasma Ratio (ug/ug)	BD	2.51 ± 0.42 (10)	1.87 ± 0.16 (10)	1.83 ± 0.51 (10)
SD 93	Urine Creatinine (mg/dL)	142.10 ± 17.30 (10)	139.78 ± 10.97 (9)	126.56 ± 10.69 (9)	134.80 ± 11.37 (10)
SD 93	Urine Tungsten Concentration (ug/mL)	0.04 ± 0.01 (10) **	135.36 ± 16.14 (9) **	321.33 ± 21.53 (9) **	862.80 ± 58.27 (10) **
SD 93	Urine Tungsten/Creatinine Ratio (ug/mg)	0.02 ± 0.00 (10) **	101.00 ± 12.63 (9) **	268.52 ± 30.82 (9) **	663.17 ± 41.98 (10) **
SD 93	Urine Volume (mL)	13.35 ± 2.40 (10)	10.61 ± 0.92 (9)	13.44 ± 1.54 (9)	11.60 ± 1.59 (10)

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		F1 Male: F1 6 Mnth Int Male			
Phase	Dose (mg/L)	0	250	500	1000
SD 185	Tungsten Concentration in Kidney (ug/g)	BD	6.77 ± 2.13 (10)	13.40 ± 1.86 (10)	14.11 ± 1.05 (10)
SD 185	Tungsten Concentration in Plasma (ug/mL)	0.02 ± 0.00 (10) **	1.37 ± 0.14 (10) **	4.89 ± 1.02 (10) **	6.48 ± 0.78 (10) **
SD 185	Tungsten Kidney/Plasma Ratio (ug/ug)	BD	5.55 ± 2.04 (10)	3.39 ± 0.64 (10)	2.45 ± 0.33 (10)
SD 185	Urine Creatinine (mg/dL)	149.40 ± 13.26 (10)	146.60 ± 24.72 (10)	135.20 ± 15.25 (10)	183.90 ± 18.68 (10)
SD 185	Urine Tungsten Concentration (ug/mL)	0.04 ± 0.00 (10) **	143.37 ± 16.83 (10) **	258.30 ± 27.17 (10) **	572.10 ± 59.06 (10) **
SD 185	Urine Tungsten/Creatinine Ratio (ug/mg)	0.03 ± 0.00 (10) **	107.36 ± 10.22 (10) **	216.91 ± 30.97 (10) **	338.59 ± 41.61 (10) **
SD 185	Urine Volume (mL)	10.55 ± 1.19 (10)	11.15 ± 1.40 (10)	14.65 ± 3.27 (10)	8.17 ± 1.00 (9)

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		F1 Male: F1 12 Mnth Int Male			
Phase	Dose (mg/L)	0	250	500	1000
SD 367	Tungsten Concentration in Kidney (ug/g)	BD	14.84 ± 2.09 (10)	20.42 ± 3.85 (10)	27.98 ± 2.71 (10)
SD 367	Tungsten Concentration in Plasma (ug/mL)	0.01 ± 0.00 (8) **	2.22 ± 0.25 (10) **	3.85 ± 0.62 (10) **	7.05 ± 0.55 (10) **
SD 367	Tungsten Kidney/Plasma Ratio (ug/ug)	BD	7.50 ± 1.09 (10)	6.22 ± 1.26 (10)	4.11 ± 0.45 (10)
SD 367	Urine Creatinine (mg/dL)	131.50 ± 19.29 (8)	196.90 ± 21.60 (10)	158.10 ± 18.17 (10)	158.90 ± 29.40 (10)
SD 367	Urine Tungsten Concentration (ug/mL)	1.29 ± 0.95 (8) **	161.92 ± 15.97 (10) **	368.70 ± 52.38 (10) **	654.23 ± 125.91 (10) **
SD 367	Urine Tungsten/Creatinine Ratio (ug/mg)	2.05 ± 1.76 (8) **	94.50 ± 14.54 (10) **	284.48 ± 66.96 (10) **	435.73 ± 65.39 (10) **
SD 367	Urine Volume (mL)	18.50 ± 3.60 (8)	10.80 ± 1.33 (10)	13.50 ± 2.65 (10)	15.30 ± 3.40 (10)

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		F1 Male: F1 18 Mnth Int Male			
Phase	Dose (mg/L)	0	250	500	1000
SD 549	Tungsten Concentration in Kidney (ug/g)	0.05 ± 0.01 (6) **	25.74 ± 3.34 (9) **	30.27 ± 5.21 (8) **	74.90 ± 20.04 (9) **
SD 549	Tungsten Concentration in Plasma (ug/mL)	BD	2.64 ± 0.35 (9)	2.34 ± 0.95 (8)	7.59 ± 2.66 (9)
SD 549	Tungsten Kidney/Plasma Ratio (ug/ug)	BD	12.63 ± 3.18 (9)	24.26 ± 8.14 (8)	16.69 ± 4.27 (9)
SD 549	Urine Creatinine (mg/dL)	112.88 ± 14.05 (8)	119.56 ± 11.41 (9)	128.86 ± 13.57 (7)	118.56 ± 16.69 (9)
SD 549	Urine Tungsten Concentration (ug/mL)	0.03 ± 0.01 (9) **	121.77 ± 9.17 (9) **	159.93 ± 28.11 (8) **	390.11 ± 38.03 (9) **
SD 549	Urine Tungsten/Creatinine Ratio (ug/mg)	0.03 ± 0.01 (8) **	104.37 ± 7.08 (9) **	156.40 ± 27.17 (7) **	436.76 ± 109.49 (9) **
SD 549	Urine Volume (mL)	16.69 ± 1.72 (8)	15.89 ± 1.41 (9)	12.50 ± 1.18 (7)	13.78 ± 1.69 (9)

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		F1 Female: F1 3 Mnth Int Fem			
Phase	Dose (mg/L)	0	250	500	1000
SD 93	Tungsten Concentration in Kidney (ug/g)	BD	3.92 ± 0.24 (10)	6.39 ± 0.52 (10)	11.93 ± 0.71 (10)
SD 93	Tungsten Concentration in Plasma (ug/mL)	BD	1.92 ± 0.13 (10)	3.67 ± 0.58 (10)	10.99 ± 1.40 (10)
SD 93	Tungsten Kidney/Plasma Ratio (ug/ug)	BD	2.06 ± 0.08 (10)	1.92 ± 0.18 (10)	1.17 ± 0.09 (10)
SD 93	Urine Creatinine (mg/dL)	84.40 ± 7.08 (10)	68.80 ± 3.85 (10)	77.67 ± 7.59 (9)	69.60 ± 9.08 (10)
SD 93	Urine Tungsten Concentration (ug/mL)	0.04 ± 0.01 (10) **	167.30 ± 9.11 (10) **	355.50 ± 26.36 (8) **	512.20 ± 43.84 (10) **
SD 93	Urine Tungsten/Creatinine Ratio (ug/mg)	0.05 ± 0.01 (10) **	247.12 ± 14.01 (10) **	484.15 ± 56.46 (8) **	809.98 ± 103.55 (10) **
SD 93	Urine Volume (mL)	10.20 ± 1.87 (10)	11.20 ± 1.57 (10)	8.72 ± 1.80 (9)	10.89 ± 0.95 (9)

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		F1 Female: F1 6 Mnth Int Fem			
Phase	Dose (mg/L)	0	250	500	1000
SD 185	Tungsten Concentration in Kidney (ug/g)	BD	6.65 ± 0.92 (10)	9.89 ± 0.67 (10)	17.11 ± 1.81 (10)
SD 185	Tungsten Concentration in Plasma (ug/mL)	0.05 ± 0.01 (10) **	2.41 ± 0.43 (10) **	4.01 ± 0.39 (10) **	10.44 ± 1.38 (10) **
SD 185	Tungsten Kidney/Plasma Ratio (ug/ug)	BD	2.96 ± 0.32 (10)	2.56 ± 0.13 (10)	1.70 ± 0.11 (10)
SD 185	Urine Creatinine (mg/dL)	72.70 ± 11.62 (10)	87.70 ± 15.59 (10)	95.90 ± 10.87 (10)	74.40 ± 6.95 (10)
SD 185	Urine Tungsten Concentration (ug/mL)	0.04 ± 0.01 (10) **	174.10 ± 10.74 (10) **	413.30 ± 20.05 (10) **	619.20 ± 50.46 (10) **
SD 185	Urine Tungsten/Creatinine Ratio (ug/mg)	0.05 ± 0.00 (10) **	228.49 ± 20.07 (10) **	467.46 ± 40.93 (10) **	856.85 ± 58.29 (10) **
SD 185	Urine Volume (mL)	12.70 ± 1.64 (10)	12.19 ± 1.88 (8)	10.70 ± 1.63 (10)	8.90 ± 0.91 (10)

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		F1 Female: F1 12 Mnth Int Fem			
Phase	Dose (mg/L)	0	250	500	1000
SD 367	Tungsten Concentration in Kidney (ug/g)	BD	10.62 ± 0.53 (10)	19.26 ± 1.89 (10)	31.65 ± 2.20 (10)
SD 367	Tungsten Concentration in Plasma (ug/mL)	0.03 ± 0.01 (8) **	2.47 ± 0.29 (10) **	4.55 ± 0.33 (10) **	12.06 ± 1.31 (10) **
SD 367	Tungsten Kidney/Plasma Ratio (ug/ug)	4.57 ± 0.85 (4) **	4.76 ± 0.50 (10)	4.36 ± 0.42 (10)	2.96 ± 0.48 (10)
SD 367	Urine Creatinine (mg/dL)	54.25 ± 9.14 (8)	56.10 ± 4.93 (10)	53.80 ± 5.44 (10)	66.80 ± 6.75 (10)
SD 367	Urine Tungsten Concentration (ug/mL)	0.07 ± 0.02 (9) **	158.00 ± 8.45 (10) **	291.60 ± 17.88 (10) **	672.30 ± 51.25 (10) **
SD 367	Urine Tungsten/Creatinine Ratio (ug/mg)	0.10 ± 0.02 (8) **	298.03 ± 26.20 (10) **	567.24 ± 42.20 (10) **	1036.16 ± 57.95 (10) **
SD 367	Urine Volume (mL)	23.89 ± 6.82 (9)	20.30 ± 1.38 (10)	21.60 ± 2.65 (10)	13.00 ± 1.61 (10)

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		F1 Female: F1 18 Mnth Int Fem							
Phase	Dose (mg/L)	0	250	500	1000				
SD 549	Tungsten Concentration in Kidney (ug/g)	0.09 ± 0.01 (3) **	25.89 ± 7.69 (8) *	27.96 ± 2.79 (10) **	43.29 ± 2.90 (8) **				
SD 549	Tungsten Concentration in Plasma (ug/mL)	0.02 ± 0.00 (2) **	5.45 ± 3.00 (8) *	5.71 ± 0.59 (10) *	11.78 ± 1.51 (8) **				
SD 549	Tungsten Kidney/Plasma Ratio (ug/ug)	NR	7.11 ± 1.17 (8)	5.47 ± 0.79 (10)	3.99 ± 0.42 (8)				
SD 549	Urine Creatinine (mg/dL)	67.90 ± 9.65 (10)	50.38 ± 7.76 (8)	63.56 ± 10.32 (9)	61.38 ± 10.80 (8)				
SD 549	Urine Tungsten Concentration (ug/mL)	0.03 ± 0.00 (8) **	162.00 ± 17.50 (8) **	328.11 ± 37.85 (9) **	612.38 ± 47.87 (8) **				
SD 549	Urine Tungsten/Creatinine Ratio (ug/mg)	0.05 ± 0.01 (8) **	349.42 ± 34.89 (8) **	628.91 ± 105.62 (9) **	1089.91 ± 100.25 (8) **				
SD 549	Urine Volume (mL)	15.55 ± 2.05 (10)	18.88 ± 2.68 (8)	18.33 ± 3.61 (9)	15.44 ± 2.65 (8)				

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LEGEND

Data are displayed as mean $\pm$ SEM (N) unless otherwise noted.

SD – Study Day

If over 20% of the animals in a group are above the limit of detection, then 1/2 the limit of detection value is substituted for values that are below the limit of detection.

When the control group did not have over 20% of its values above the limit of detection, no mean or standard error were calculated; no statistical analysis was done for the endpoint.

Statistical analysis performed by Jonckheere (trend) and Shirley or Dunn (pairwise) tests.

Statistical significance for the control group indicates a significant trend test

Statistical significance for a treatment group indicates a significant pairwise test compared to the vehicle control group

* Statistically significant at $P \leq 0.05$

** Statistically significant at $P \leq 0.01$

No statistical tests were performed on urine volume.

For the kidney to plasma ratio calculation, a plasma density of 1 g/ml was assumed.

The Tungsten Kidney/Plasma Ratio could not be calculated for the female SD 549 0 mg/L dose group because there were no animals in the group with valid concentration values for both kidney and plasma.

The tungsten concentration in plasma value for one female in the 0 mg/L group on SD 367 was excluded from the analysis as an implausible value.

BD - Group did not have over 20% of its values above the limit of detection.

NR not recorded

**** END OF REPORT ****