

Experiment Number: C07062-01

Test Type: TOX

Route: Whole Body Inhalation

Species/Strain: Rat/Harlan Sprague Dawley

PA47: Summary of Lung Burden

Test Compound: 1020 Long Multiwalled Carbon Nanotube

CAS Number: L-MWNT-1020

Date Report Requested: 04/10/2017

Time Report Requested: 12:36:00

Lab: NTP

C Number: C07062-01

Cage Range: All

Date Range: All

Reasons For Removal: All

Removal Date Range: All

Treatment Groups: All

Study Gender: Both

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Lab: NTP

Male: Male Post Dose 0

Terminal Sacrifice		Treatment Groups (mg/m ³)				
		0.1	0.3	1	3	10
SD 30 - 30	Lung Sample Weight (g)	1.5111 ± 0.0644 (10)	1.5952 ± 0.1052 (10)	1.5986 ± 0.1119 (10)	1.7701 ± 0.0538 (10)	1.7818 ± 0.0372 (10)
SD 30 - 30	Sample Ni Concentration (ug/g)	0.028 ± 0.001 (10)	0.095 ± 0.015 (10)	0.327 ± 0.019 (10)	0.818 ± 0.030 (10)	2.060 ± 0.102 (10)
SD 30 - 30	Total Ni Lung Burden (ug/lung)	0.042 ± 0.002 (10)	0.141 ± 0.014 (10)	0.506 ± 0.018 (10)	1.440 ± 0.046 (10)	3.659 ± 0.163 (10)
SD 30 - 30	Total Test Article Lung Burden (ug/lung)	8.052 ± 0.405 (10)	27.090 ± 2.796 (10)	97.188 ± 3.421 (10)	276.817 ± 8.902 (10)	703.493 ± 31.279 (10)
SD 30 - 30	Normalized Total Test Article Lung Burden (ug/lung per mg/m ³)	80.521 ± 4.047 (10)	90.301 ± 9.319 (10)	97.188 ± 3.421 (10)	92.273 ± 2.967 (10)	70.349 ± 3.128 (10)

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Terminal Sacrifice		Treatment Groups (mg/m ³)				
		0.1	0.3	1	3	10
SD 44 - 44	Lung Sample Weight (g)	1.8066 ± 0.1577 (5)	1.8250 ± 0.0361 (5)	1.7516 ± 0.0781 (5)	2.1055 ± 0.0747 (5)	2.2858 ± 0.1388 (5)
SD 44 - 44	Sample Ni Concentration (ug/g)	0.017 ± 0.002 (5)	0.052 ± 0.003 (5)	0.313 ± 0.019 (5)	0.721 ± 0.047 (5)	1.803 ± 0.082 (4)
SD 44 - 44	Total Ni Lung Burden (ug/lung)	0.030 ± 0.003 (5)	0.095 ± 0.005 (5)	0.543 ± 0.017 (5)	1.523 ± 0.129 (5)	3.869 ± 0.115 (4)
SD 44 - 44	Total Test Article Lung Burden (ug/lung)	5.832 ± 0.641 (5)	18.240 ± 1.036 (5)	104.346 ± 3.377 (5)	292.865 ± 24.803 (5)	743.918 ± 22.072 (4)
SD 44 - 44	Normalized Total Test Article Lung Burden (ug/lung per mg/m ³)	58.319 ± 6.413 (5)	60.801 ± 3.453 (5)	104.346 ± 3.377 (5)	97.622 ± 8.268 (5)	74.392 ± 2.207 (4)

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Terminal Sacrifice		Treatment Groups (mg/m ³)				
		0.1	0.3	1	3	10
SD 72 - 72	Lung Sample Weight (g)	1.7725 ± 0.1009 (5)	1.7492 ± 0.0760 (5)	2.1229 ± 0.1352 (5)	2.1349 ± 0.1468 (5)	1.9729 ± 0.1116 (5)
SD 72 - 72	Sample Ni Concentration (ug/g)	0.012 ± 0.002 (5)	0.041 ± 0.004 (5)	0.204 ± 0.020 (5)	0.576 ± 0.060 (5)	1.657 ± 0.057 (5)
SD 72 - 72	Total Ni Lung Burden (ug/lung)	0.020 ± 0.002 (5)	0.072 ± 0.006 (5)	0.430 ± 0.043 (5)	1.203 ± 0.092 (5)	3.258 ± 0.168 (5)
SD 72 - 72	Total Test Article Lung Burden (ug/lung)	3.858 ± 0.410 (5)	13.719 ± 1.247 (5)	82.642 ± 8.158 (5)	231.423 ± 17.695 (5)	626.519 ± 32.398 (5)
SD 72 - 72	Normalized Total Test Article Lung Burden (ug/lung per mg/m ³)	38.577 ± 4.103 (5)	45.731 ± 4.159 (5)	82.642 ± 8.158 (5)	77.141 ± 5.898 (5)	62.652 ± 3.240 (5)

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Terminal Sacrifice	Treatment Groups (mg/m ³)				
	0.1	0.3	1	3	10
SD 156 - 156 Lung Sample Weight (g)	1.8849 ± 0.0565 (5)	2.0088 ± 0.1990 (5)	2.1528 ± 0.2080 (5)	2.1911 ± 0.2578 (5)	2.1745 ± 0.0681 (5)
SD 156 - 156 Sample Ni Concentration (ug/g)	0.005 ± 0.001 (5)	0.020 ± 0.005 (5)	0.097 ± 0.016 (5)	0.427 ± 0.062 (5)	1.426 ± 0.084 (5)
SD 156 - 156 Total Ni Lung Burden (ug/lung)	0.010 ± 0.002 (5)	0.038 ± 0.006 (5)	0.202 ± 0.027 (5)	0.891 ± 0.091 (5)	3.096 ± 0.179 (5)
SD 156 - 156 Total Test Article Lung Burden (ug/lung)	1.908 ± 0.331 (5)	7.262 ± 1.074 (5)	38.737 ± 5.273 (5)	171.269 ± 17.486 (5)	595.288 ± 34.342 (5)
SD 156 - 156 Normalized Total Test Article Lung Burden (ug/lung per mg/m ³)	19.075 ± 3.311 (5)	24.205 ± 3.579 (5)	38.737 ± 5.273 (5)	57.090 ± 5.829 (5)	59.529 ± 3.434 (5)

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Female: Female Post Dose 0

Terminal Sacrifice	Treatment Groups (mg/m ³)				
	0	0.1	0.3	1	3
SD 31 - 31 Lung Sample Weight (g)	1.2296 ± 0.0334 (10) **	1.2215 ± 0.0503 (10)	1.2001 ± 0.0252 (10)	1.2123 ± 0.0351 (10)	1.3781 ± 0.0410 (10) *
SD 31 - 31 Sample Ni Concentration (ug/g)	0.001 ± 0.000 (10) **	0.026 ± 0.001 (10) **	0.101 ± 0.009 (10) **	0.374 ± 0.013 (10) **	0.885 ± 0.028 (10) **
SD 31 - 31 Total Ni Lung Burden (ug/lung)	0.001 ± 0.000 (10) **	0.032 ± 0.001 (10) **	0.120 ± 0.009 (10) **	0.452 ± 0.018 (10) **	1.212 ± 0.027 (10) **
SD 31 - 31 Total Test Article Lung Burden (ug/lung)	0.166 ± 0.005 (10) **	6.177 ± 0.219 (10) **	23.125 ± 1.782 (10) **	86.944 ± 3.465 (10) **	233.019 ± 5.252 (10) **
SD 31 - 31 Normalized Total Test Article Lung Burden (ug/lung per mg/m ³)	NR	61.770 ± 2.188 (10)	77.083 ± 5.940 (10)	86.944 ± 3.465 (10)	77.673 ± 1.751 (10)

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Terminal Sacrifice	Treatment Groups (mg/m ³)
	10
SD 31 - 31 Lung Sample Weight (g)	1.4767 ± 0.0396 (10) **
SD 31 - 31 Sample Ni Concentration (ug/g)	2.351 ± 0.079 (10) **
SD 31 - 31 Total Ni Lung Burden (ug/lung)	3.468 ± 0.138 (10) **
SD 31 - 31 Total Test Article Lung Burden (ug/lung)	666.942 ± 26.609 (10) **
SD 31 - 31 Normalized Total Test Article Lung Burden (ug/lung per mg/m ³)	66.694 ± 2.661 (10)

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Terminal Sacrifice	Treatment Groups (mg/m ³)				
	0	0.1	0.3	1	3
SD 45 - 45 Lung Sample Weight (g)	1.4517 ± 0.0697 (5)	1.2976 ± 0.1067 (5)	1.3302 ± 0.0795 (5)	1.4206 ± 0.0883 (5)	1.4285 ± 0.0660 (5)
SD 45 - 45 Sample Ni Concentration (ug/g)	0.001 ± 0.000 (5) **	0.022 ± 0.002 (5) **	0.065 ± 0.007 (5) **	0.285 ± 0.030 (5) **	0.893 ± 0.048 (5) **
SD 45 - 45 Total Ni Lung Burden (ug/lung)	0.001 ± 0.000 (5) **	0.028 ± 0.002 (5) **	0.085 ± 0.009 (5) **	0.395 ± 0.022 (5) **	1.276 ± 0.087 (5) **
SD 45 - 45 Total Test Article Lung Burden (ug/lung)	0.195 ± 0.009 (5) **	5.344 ± 0.441 (5) **	16.423 ± 1.696 (5) **	76.002 ± 4.270 (5) **	245.327 ± 16.714 (5) **
SD 45 - 45 Normalized Total Test Article Lung Burden (ug/lung per mg/m ³)	NR	53.438 ± 4.407 (5)	54.744 ± 5.652 (5)	76.002 ± 4.270 (5)	81.776 ± 5.571 (5)

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Terminal Sacrifice	Treatment Groups (mg/m ³)
	10
SD 45 - 45 Lung Sample Weight (g)	1.5711 ± 0.0411 (5)
SD 45 - 45 Sample Ni Concentration (ug/g)	2.117 ± 0.069 (5) **
SD 45 - 45 Total Ni Lung Burden (ug/lung)	3.335 ± 0.189 (5) **
SD 45 - 45 Total Test Article Lung Burden (ug/lung)	641.366 ± 36.377 (5) **
SD 45 - 45 Normalized Total Test Article Lung Burden (ug/lung per mg/m ³)	64.137 ± 3.638 (5)

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Female: Female Post Dose 42

Terminal Sacrifice	Treatment Groups (mg/m ³)				
	0	0.1	0.3	1	3
SD 73 - 73 Lung Sample Weight (g)	1.3593 ± 0.0620 (5) **	1.3240 ± 0.0563 (5)	1.2946 ± 0.0339 (5)	1.3707 ± 0.0367 (5)	1.5741 ± 0.0872 (5)
SD 73 - 73 Sample Ni Concentration (ug/g)	0.001 ± 0.000 (5) **	0.015 ± 0.004 (5) **	0.048 ± 0.005 (5) **	0.268 ± 0.022 (5) **	0.827 ± 0.101 (5) **
SD 73 - 73 Total Ni Lung Burden (ug/lung)	0.001 ± 0.000 (5) **	0.019 ± 0.004 (5) **	0.062 ± 0.006 (5) **	0.368 ± 0.034 (5) **	1.301 ± 0.178 (5) **
SD 73 - 73 Total Test Article Lung Burden (ug/lung)	0.183 ± 0.008 (5) **	3.756 ± 0.772 (5) **	11.915 ± 1.146 (5) **	70.650 ± 6.536 (5) **	250.231 ± 34.236 (5) **
SD 73 - 73 Normalized Total Test Article Lung Burden (ug/lung per mg/m ³)	NR	37.560 ± 7.721 (5)	39.719 ± 3.821 (5)	70.650 ± 6.536 (5)	83.410 ± 11.412 (5)

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Terminal Sacrifice	Treatment Groups (mg/m ³)
	10
SD 73 - 73 Lung Sample Weight (g)	1.5085 ± 0.0371 (5)
SD 73 - 73 Sample Ni Concentration (ug/g)	2.147 ± 0.065 (5) **
SD 73 - 73 Total Ni Lung Burden (ug/lung)	3.240 ± 0.139 (5) **
SD 73 - 73 Total Test Article Lung Burden (ug/lung)	623.096 ± 26.823 (5) **
SD 73 - 73 Normalized Total Test Article Lung Burden (ug/lung per mg/m ³)	62.309 ± 2.682 (5)

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Female: Female Post Dose 126

Terminal Sacrifice		Treatment Groups (mg/m ³)				
		0.1	0.3	1	3	10
SD 157 - 157	Lung Sample Weight (g)	1.4571 ± 0.0711 (5)	1.4683 ± 0.0816 (5)	1.3969 ± 0.0877 (5)	1.6650 ± 0.1522 (5)	1.7149 ± 0.0530 (5)
SD 157 - 157	Sample Ni Concentration (ug/g)	0.005 ± 0.000 (5)	0.014 ± 0.002 (5)	0.105 ± 0.015 (5)	0.489 ± 0.083 (5)	1.776 ± 0.138 (5)
SD 157 - 157	Total Ni Lung Burden (ug/lung)	0.007 ± 0.000 (5)	0.020 ± 0.002 (5)	0.149 ± 0.029 (5)	0.774 ± 0.094 (5)	3.062 ± 0.291 (5)
SD 157 - 157	Total Test Article Lung Burden (ug/lung)	1.320 ± 0.084 (5)	3.894 ± 0.429 (5)	28.589 ± 5.605 (5)	148.808 ± 18.099 (5)	588.827 ± 55.898 (5)
SD 157 - 157	Normalized Total Test Article Lung Burden (ug/lung per mg/m ³)	13.200 ± 0.842 (5)	12.982 ± 1.430 (5)	28.589 ± 5.605 (5)	49.603 ± 6.033 (5)	58.883 ± 5.590 (5)

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LEGEND

Data are displayed as mean \pm SEM (N)

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

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

Statistical significance for the control group indicates a significant trend test

* Statistically significant at $P \leq 0.05$

** Statistically significant at $P \leq 0.01$

If 80% or more of the observations within a group are below the limit of detection, then the group is not included in the analysis. When this is the control group, a 1-sample test against zero is used for the treated groups. If fewer than 80% of the observations within a group are below the limit of detection, then the Sample Ni Concentration is calculated using one half of the limit of detection for all values in that group.

SD – Study Day; GD – Gestation Day; LD – Lactation Day; PND – Postnatal Day, adults post-weaning

NR – not recorded

NR not recorded

**** END OF REPORT ****