

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS

2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

F1_RE

NTP Study Number: C20725
Lock Date: 10/11/2012
Cage Range: ALL
Date Range: ALL
Reasons For Removal: ALL
Removal Date Range: ALL
Treatment Groups: Include ALL
Study Gender: Both
TDMSE Version: 3.0.2.3_002
PWG Approval Date: 01/15/2016

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SUMMARY OF STATISTICALLY SIGNIFICANT ($P \leq .05$) RESULTS IN THE ANALYSIS OF 2,3-BUTANEDIONE

MALE RATS

Organ

Adrenal Cortex: Zona Fasciculata
Bone Marrow: Myeloid Cell
Eye: Anterior Chamber
Eye: Cornea

Eye: Cornea, Epithelium

Eye: Iris
Eye: Lens
Eye: Unilateral
Heart
Islets, Pancreatic
Kidney

Larynx
Larynx: Respiratory Epithelium
Larynx: Squamous Epithelium

Liver

Lung
Lung: Alveolar Epithelium
Lung: Alveolus
Lung: Bronchiole, Epithelium
Lung: Bronchus, Epithelium

Lung: Interstitium
Lung: Peribronchial

Morphology

Hypertrophy
Hyperplasia
Inflammation
Inflammation Chronic
Necrosis
Hyperplasia
Ulcer
Inflammation Acute
Cataract
Phthisis Bulbi
Cardiomyopathy
Hyperplasia
Calculus Micro Observation Only
Nephropathy
Inflammation Chronic
Metaplasia
Hyperplasia
Ulcer Focal
Angiectasis
Basophilic Focus
Clear Cell Focus
Infiltration Cellular Mixed Cell
Inflammation
Hyperplasia
Infiltration Cellular Histiocyte
Hyperplasia
Atrophy
Hyperplasia
Metaplasia
Regeneration
Fibrosis
Inflammation Chronic

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SUMMARY OF STATISTICALLY SIGNIFICANT (P<=.05) RESULTS IN THE ANALYSIS OF 2,3-BUTANEDIONE

Lung: Pleura
Lung: Submucosa, Bronchus
Lymph Node, Mandibular
Lymph Node: Iliac
Lymph Node: Popliteal
Nose
Nose: Lamina Propria
Nose: Olfactory Epithelium

Nose: Respiratory Epithelium

Nose: Turbinate
Pancreas
Pituitary Gland: Pars Distalis
Prostate
Skin
Skin: Foot

Spleen: Lymphoid Follicle
Testes
Thyroid Gland: C-Cell
Trachea
Trachea: Epithelium

Trachea: Submucosa

FEMALE RATS

Organ

Fibrosis
Fibrosis
Infiltration Cellular Plasma Cell
Infiltration Cellular Plasma Cell
Infiltration Cellular Plasma Cell
Inflammation
Fibrosis
Accumulation, Hyaline Droplet
Atrophy
Metaplasia Respiratory
Necrosis
Hyperplasia
Metaplasia
Necrosis
Hyperostosis
Atrophy
Hyperplasia
Inflammation
Cyst Epithelial Inclusion
Inflammation Acute
Inflammation Chronic
Ulcer
Atrophy
Edema
Hyperplasia
Inflammation Chronic
Atrophy
Hyperplasia
Metaplasia
Necrosis
Regeneration
Fibrosis

Morphology

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Adrenal Cortex: Zona Fasciculata	Hypertrophy Focal
Bone Marrow: Myeloid Cell	Hyperplasia
Eye: Anterior Chamber	Inflammation
Eye: Cornea	Inflammation Chronic
Eye: Cornea, Epithelium	Hyperplasia
	Ulcer
Eye: Iris	Inflammation Acute
Eye: Lens	Cataract
Eye: Unilateral	Phthisis Bulbi
Heart	Cardiomyopathy
Islets, Pancreatic	Hyperplasia
Kidney	Calculus Micro Observation Only
Larynx	Inflammation Chronic
Larynx: Respiratory Epithelium	Hyperplasia
	Metaplasia
	Regeneration
Larynx: Squamous Epithelium	Hyperplasia
	Ulcer Focal
Liver	Hepatodiaphragmatic Nodule
Liver: Bile Duct	Hyperplasia
Lung	Inflammation
	Inflammation Chronic
	Inflammation Granulomatous
Lung: Alveolus	Infiltration Cellular Histiocyte
Lung: Bronchiole, Epithelium	Hyperplasia
Lung: Bronchus, Epithelium	Atrophy
	Hyperplasia
	Fibrosis
Lung: Interstitium	Inflammation Chronic
Lung: Peribronchial	Atrophy
Lymph Node, Mesenteric	Inflammation
Nose	Fibrosis
Nose: Lamina Propria	Accumulation, Hyaline Droplet
Nose: Olfactory Epithelium	Atrophy
	Metaplasia Respiratory
	Necrosis

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Nose: Respiratory Epithelium

Nose: Turbinate
Skin: Foot

Thymus
Trachea
Trachea: Epithelium

Trachea: Submucosa
Uterus
Uterus: Endometrium

Hyperplasia
Metaplasia
Necrosis
Hyperostosis
Inflammation Chronic
Ulcer Focal
Atrophy
Inflammation Chronic
Atrophy
Hyperplasia
Metaplasia
Regeneration
Fibrosis
Adenomyosis Focal
Hyperplasia Cystic
Hyperplasia Focal
Metaplasia

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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Adrenal Cortex				
Angiectasis				
<hr/>				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	0/39.40
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	---	---	---	---
<hr/>				
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

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 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Adrenal Cortex Degeneration Cystic				
LESION RATES				
OVERALL (a)	2/50 (4%)	2/50 (4%)	2/50 (4%)	2/50 (4%)
POLY-3 RATE (b)	2/44.56	2/45.28	2/43.54	2/40.24
POLY-3 PERCENT (g)	4.5%	4.4%	4.6%	5%
TERMINAL (d)	1/36 (3%)	1/37 (3%)	1/33 (3%)	0/22 (0%)
FIRST INCIDENCE	695	701	582	569
STATISTICAL TESTS				
POLY 3	P=0.545	P=0.688N	P=0.686	P=0.657
POLY 1.5	P=0.571	P=0.690N	P=0.686	P=0.676
POLY 6	P=0.506	P=0.689N	P=0.684	P=0.624
COCH-ARM / FISHERS	P=0.597	P=0.691N	P=0.691N	P=0.691N
MAX-ISO-POLY-3	P=0.699	P=0.493N	P=0.490	P=0.460

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 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Adrenal Cortex				
Hematopoietic Cell Proliferation				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	2/50 (4%)	0/50 (0%)
POLY-3 RATE (b)	0/44.43	0/45.17	2/43.21	0/39.40
POLY-3 PERCENT (g)	0%	0%	4.6%	0%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	---	---	694	---
STATISTICAL TESTS				
POLY 3	P=0.529	(e)	P=0.231	(e)
POLY 1.5	P=0.566	(e)	P=0.232	(e)
POLY 6	P=0.466	(e)	P=0.230	(e)
COCH-ARM / FISHERS	P=0.599	(e)	P=0.247	(e)
MAX-ISO-POLY-3	P=0.269	(e)	P=0.076	(e)

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 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Adrenal Cortex: Zona Fasciculata Hyperplasia				
LESION RATES				
OVERALL (a)	2/50 (4%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	2/44.43	0/45.17	0/43.05	0/39.40
POLY-3 PERCENT (g)	4.5%	0%	0%	0%
TERMINAL (d)	2/36 (6%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	---	---	---
STATISTICAL TESTS				
POLY 3	P=0.109N	P=0.233N	P=0.244N	P=0.265N
POLY 1.5	P=0.110N	P=0.235N	P=0.243N	P=0.251N
POLY 6	P=0.103N	P=0.233N	P=0.246N	P=0.290N
COCH-ARM / FISHERS	P=0.112N	P=0.247N	P=0.247N	P=0.247N
MAX-ISO-POLY-3	P=0.056N	P=0.076N	P=0.082N	P=0.102N

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 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Adrenal Cortex: Zona Fasciculata Hyperplasia Focal				
LESION RATES				
OVERALL (a)	4/50 (8%)	6/50 (12%)	4/50 (8%)	6/50 (12%)
POLY-3 RATE (b)	4/45.39	6/45.17	4/43.05	6/39.68
POLY-3 PERCENT (g)	8.8%	13.3%	9.3%	15.1%
TERMINAL (d)	2/36 (6%)	6/37 (16%)	4/33 (12%)	4/22 (18%)
FIRST INCIDENCE	530	729 (T)	729 (T)	674
STATISTICAL TESTS				
POLY 3	P=0.283	P=0.366	P=0.614	P=0.287
POLY 1.5	P=0.324	P=0.368	P=0.622	P=0.327
POLY 6	P=0.227	P=0.358	P=0.603	P=0.230
COCH-ARM / FISHERS	P=0.372	P=0.370	P=0.643N	P=0.370
MAX-ISO-POLY-3	P=0.324	P=0.251	P=0.469	P=0.200

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 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Adrenal Cortex: Zona Fasciculata Hypertrophy				
LESION RATES				
OVERALL (a)	3/50 (6%)	2/50 (4%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	3/44.43	2/45.17	0/43.05	0/39.40
POLY-3 PERCENT (g)	6.8%	4.4%	0%	0%
TERMINAL (d)	3/36 (8%)	2/37 (5%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	729 (T)	---	---
STATISTICAL TESTS				
POLY 3	P=0.043N*	P=0.492N	P=0.124N	P=0.141N
POLY 1.5	P=0.041N*	P=0.496N	P=0.123N	P=0.130N
POLY 6	P=0.046N*	P=0.493N	P=0.126N	P=0.163N
COCH-ARM / FISHERS	P=0.039N*	P=0.500N	P=0.121N	P=0.121N
MAX-ISO-POLY-3	P=0.067N	P=0.318N	P=0.042N*	P=0.058N

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TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm

Adrenal Cortex: Zona Fasciculata
Hypertrophy Focal

LESION RATES

OVERALL (a)	26/50 (52%)	21/50 (42%)	29/50 (58%)	17/50 (34%)
POLY-3 RATE (b)	26/45.41	21/45.93	29/45.31	17/40.78
POLY-3 PERCENT (g)	57.3%	45.7%	64%	41.7%
TERMINAL (d)	21/36 (58%)	19/37 (51%)	22/33 (67%)	13/22 (59%)
FIRST INCIDENCE	633	611	527	549

STATISTICAL TESTS

POLY 3	P=0.177N	P=0.182N	P=0.326	P=0.101N
POLY 1.5	P=0.114N	P=0.193N	P=0.317	P=0.069N
POLY 6	P=0.320N	P=0.185N	P=0.331	P=0.194N
COCH-ARM / FISHERS	P=0.077N	P=0.212N	P=0.344	P=0.053N
MAX-ISO-POLY-3	P=0.127N	P=0.132N	P=0.252	P=0.077N

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TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Adrenal Medulla Hyperplasia				
LESION RATES				
OVERALL (a)	1/50 (2%)	2/50 (4%)	0/50 (0%)	1/50 (2%)
POLY-3 RATE (b)	1/44.43	2/45.17	0/43.05	1/39.40
POLY-3 PERCENT (g)	2.3%	4.4%	0%	2.5%
TERMINAL (d)	1/36 (3%)	2/37 (5%)	0/33 (0%)	1/22 (5%)
FIRST INCIDENCE	729 (T)	729 (T)	---	729 (T)
STATISTICAL TESTS				
POLY 3	P=0.525N	P=0.506	P=0.506N	P=0.733
POLY 1.5	P=0.517N	P=0.503	P=0.505N	P=0.747
POLY 6	P=0.536N	P=0.505	P=0.508N	P=0.709
COCH-ARM / FISHERS	P=0.505N	P=0.500	P=0.500N	P=0.753N
MAX-ISO-POLY-3	P=0.441N	P=0.287	P=0.166N	P=0.467

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 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Blood Vessel Inflammation				
LESION RATES				
OVERALL (a)	1/50 (2%)	0/50 (0%)	0/50 (0%)	2/50 (4%)
POLY-3 RATE (b)	1/44.43	0/45.17	0/43.05	2/39.40
POLY-3 PERCENT (g)	2.3%	0%	0%	5.1%
TERMINAL (d)	1/36 (3%)	0/37 (0%)	0/33 (0%)	2/22 (9%)
FIRST INCIDENCE	729 (T)	---	---	729 (T)
STATISTICAL TESTS				
POLY 3	P=0.233	P=0.497N	P=0.506N	P=0.458
POLY 1.5	P=0.240	P=0.498N	P=0.505N	P=0.479
POLY 6	P=0.225	P=0.497N	P=0.508N	P=0.423
COCH-ARM / FISHERS	P=0.249	P=0.500N	P=0.500N	P=0.500
MAX-ISO-POLY-3	P=0.126	P=0.158N	P=0.166N	P=0.258

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 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Bone Marrow: Myeloid Cell Hyperplasia				
LESION RATES				
OVERALL (a)	15/50 (30%)	12/50 (24%)	16/50 (32%)	32/50 (64%)
POLY-3 RATE (b)	15/46.57	12/47.59	16/44.78	32/47.46
POLY-3 PERCENT (g)	32.2%	25.2%	35.7%	67.4%
TERMINAL (d)	7/36 (19%)	7/37 (19%)	9/33 (27%)	10/22 (46%)
FIRST INCIDENCE	432	171	25	499
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.301N	P=0.447	P<0.001**
POLY 1.5	P<0.001**	P=0.306N	P=0.470	P<0.001**
POLY 6	P<0.001**	P=0.307N	P=0.416	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.326N	P=0.500	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.230N	P=0.363	P<0.001**

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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Anterior Chamber Inflammation				
LESION RATES				
OVERALL (a)	0/50 (0%)	1/50 (2%)	6/49 (12%)	3/49 (6%)
POLY-3 RATE (b)	0/44.43	1/45.17	6/42.52	3/40.20
POLY-3 PERCENT (g)	0%	2.2%	14.1%	7.5%
TERMINAL (d)	0/36 (0%)	1/37 (3%)	5/32 (16%)	0/22 (0%)
FIRST INCIDENCE	---	729 (T)	592	569
STATISTICAL TESTS				
POLY 3	P=0.050*	P=0.503	P=0.013*	P=0.101
POLY 1.5	P=0.060	P=0.502	P=0.013*	P=0.108
POLY 6	P=0.036*	P=0.503	P=0.013*	P=0.090
COCH-ARM / FISHERS	P=0.074	P=0.500	P=0.012*	P=0.117
MAX-ISO-POLY-3	P=0.030*	P=0.163	P=0.004**	P=0.037*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Cornea				
Inflammation Chronic				
LESION RATES				
OVERALL (a)	1/50 (2%)	6/50 (12%)	16/49 (33%)	28/49 (57%)
POLY-3 RATE (b)	1/44.43	6/45.17	16/42.84	28/43.63
POLY-3 PERCENT (g)	2.3%	13.3%	37.3%	64.2%
TERMINAL (d)	1/36 (3%)	6/37 (16%)	12/32 (38%)	13/22 (59%)
FIRST INCIDENCE	729 (T)	729 (T)	592	541
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.058	P<0.001**	P<0.001**
POLY 1.5	P<0.001**	P=0.057	P<0.001**	P<0.001**
POLY 6	P<0.001**	P=0.058	P<0.001**	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.056	P<0.001**	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.025*	P<0.001**	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Cornea Mineralization				
LESION RATES				
OVERALL (a)	1/50 (2%)	4/50 (8%)	1/49 (2%)	0/49 (0%)
POLY-3 RATE (b)	1/44.43	4/45.35	1/42.05	0/38.88
POLY-3 PERCENT (g)	2.3%	8.8%	2.4%	0%
TERMINAL (d)	1/36 (3%)	3/37 (8%)	1/32 (3%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	682	729 (T)	---
STATISTICAL TESTS				
POLY 3	P=0.205N	P=0.185	P=0.748	P=0.527N
POLY 1.5	P=0.189N	P=0.182	P=0.750	P=0.515N
POLY 6	P=0.234N	P=0.185	P=0.746	P=0.545N
COCH-ARM / FISHERS	P=0.175N	P=0.181	P=0.747	P=0.505N
MAX-ISO-POLY-3	P=0.157N	P=0.090	P=0.484	P=0.189N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Cornea				
Necrosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/49 (0%)	2/49 (4%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/42.05	2/38.95
POLY-3 PERCENT (g)	0%	0%	0%	5.1%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/32 (0%)	1/22 (5%)
FIRST INCIDENCE	---	---	---	712
STATISTICAL TESTS				
POLY 3	P=0.040*	(e)	(e)	P=0.209
POLY 1.5	P=0.042*	(e)	(e)	P=0.221
POLY 6	P=0.037*	(e)	(e)	P=0.190
COCH-ARM / FISHERS	P=0.045*	(e)	(e)	P=0.242
MAX-ISO-POLY-3	P=0.031*	(e)	(e)	P=0.074

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Cornea, Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	2/50 (4%)	3/49 (6%)	6/49 (12%)
POLY-3 RATE (b)	0/44.43	2/45.17	3/42.05	6/39.31
POLY-3 PERCENT (g)	0%	4.4%	7.1%	15.3%
TERMINAL (d)	0/36 (0%)	2/37 (5%)	3/32 (9%)	4/22 (18%)
FIRST INCIDENCE	---	729 (T)	729 (T)	628
STATISTICAL TESTS				
POLY 3	P=0.004**	P=0.241	P=0.109	P=0.010**
POLY 1.5	P=0.004**	P=0.239	P=0.110	P=0.012*
POLY 6	P=0.002**	P=0.240	P=0.107	P=0.007**
COCH-ARM / FISHERS	P=0.006**	P=0.247	P=0.117	P=0.012*
MAX-ISO-POLY-3	P=0.005**	P=0.080	P=0.037*	P=0.004**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Cornea, Epithelium Ulcer				
LESION RATES				
OVERALL (a)	0/50 (0%)	1/50 (2%)	4/49 (8%)	6/49 (12%)
POLY-3 RATE (b)	0/44.43	1/45.17	4/42.05	6/39.56
POLY-3 PERCENT (g)	0%	2.2%	9.5%	15.2%
TERMINAL (d)	0/36 (0%)	1/37 (3%)	4/32 (13%)	2/22 (9%)
FIRST INCIDENCE	---	729 (T)	729 (T)	628
STATISTICAL TESTS				
POLY 3	P=0.002**	P=0.503	P=0.053	P=0.010**
POLY 1.5	P=0.002**	P=0.502	P=0.054	P=0.012*
POLY 6	P<0.001**	P=0.503	P=0.052	P=0.007**
COCH-ARM / FISHERS	P=0.003**	P=0.500	P=0.056	P=0.012*
MAX-ISO-POLY-3	P=0.003**	P=0.163	P=0.018*	P=0.004**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Iris				
Inflammation Acute				
LESION RATES				
OVERALL (a)	0/50 (0%)	1/50 (2%)	3/49 (6%)	1/49 (2%)
POLY-3 RATE (b)	0/44.43	1/45.17	3/42.52	1/38.88
POLY-3 PERCENT (g)	0%	2.2%	7.1%	2.6%
TERMINAL (d)	0/36 (0%)	1/37 (3%)	2/32 (6%)	1/22 (5%)
FIRST INCIDENCE	---	729 (T)	592	729 (T)
STATISTICAL TESTS				
POLY 3	P=0.279	P=0.503	P=0.111	P=0.473
POLY 1.5	P=0.312	P=0.502	P=0.111	P=0.485
POLY 6	P=0.230	P=0.503	P=0.110	P=0.455
COCH-ARM / FISHERS	P=0.344	P=0.500	P=0.117	P=0.495
MAX-ISO-POLY-3	P=0.172	P=0.163	P=0.037*	P=0.157

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Lens				
Cataract				
LESION RATES				
OVERALL (a)	1/50 (2%)	5/50 (10%)	6/49 (12%)	3/49 (6%)
POLY-3 RATE (b)	1/44.45	5/45.17	6/42.07	3/39.83
POLY-3 PERCENT (g)	2.3%	11.1%	14.3%	7.5%
TERMINAL (d)	0/36 (0%)	5/37 (14%)	5/32 (16%)	1/22 (5%)
FIRST INCIDENCE	724	729 (T)	724	545
STATISTICAL TESTS				
POLY 3	P=0.283	P=0.105	P=0.047*	P=0.267
POLY 1.5	P=0.321	P=0.104	P=0.048*	P=0.283
POLY 6	P=0.227	P=0.104	P=0.045*	P=0.241
COCH-ARM / FISHERS	P=0.358	P=0.102	P=0.053	P=0.301
MAX-ISO-POLY-3	P=0.140	P=0.047*	P=0.021*	P=0.139

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Retina Degeneration				
LESION RATES				
OVERALL (a)	8/50 (16%)	11/50 (22%)	11/49 (22%)	6/49 (12%)
POLY-3 RATE (b)	8/45.85	11/45.75	11/42.54	6/40.49
POLY-3 PERCENT (g)	17.5%	24.1%	25.9%	14.8%
TERMINAL (d)	6/36 (17%)	8/37 (22%)	9/32 (28%)	3/22 (14%)
FIRST INCIDENCE	432	640	592	499
STATISTICAL TESTS				
POLY 3	P=0.399N	P=0.301	P=0.241	P=0.485N
POLY 1.5	P=0.343N	P=0.301	P=0.253	P=0.444N
POLY 6	P=0.488N	P=0.299	P=0.229	P=0.550N
COCH-ARM / FISHERS	P=0.288N	P=0.306	P=0.288	P=0.403N
MAX-ISO-POLY-3	P=0.335N	P=0.219	P=0.176	P=0.376N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Unilateral Phthisis Bulbi				
LESION RATES				
OVERALL (a)	0/50 (0%)	1/50 (2%)	3/49 (6%)	1/49 (2%)
POLY-3 RATE (b)	0/44.43	1/45.17	3/42.21	1/38.88
POLY-3 PERCENT (g)	0%	2.2%	7.1%	2.6%
TERMINAL (d)	0/36 (0%)	1/37 (3%)	1/32 (3%)	1/22 (5%)
FIRST INCIDENCE	---	729 (T)	694	729 (T)
STATISTICAL TESTS				
POLY 3	P=0.279	P=0.503	P=0.109	P=0.473
POLY 1.5	P=0.312	P=0.502	P=0.111	P=0.485
POLY 6	P=0.230	P=0.503	P=0.108	P=0.455
COCH-ARM / FISHERS	P=0.344	P=0.500	P=0.117	P=0.495
MAX-ISO-POLY-3	P=0.171	P=0.163	P=0.037*	P=0.157

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Harderian Gland Hyperplasia				
LESION RATES				
OVERALL (a)	1/50 (2%)	0/50 (0%)	1/50 (2%)	3/50 (6%)
POLY-3 RATE (b)	1/44.43	0/45.17	1/43.11	3/40.71
POLY-3 PERCENT (g)	2.3%	0%	2.3%	7.4%
TERMINAL (d)	1/36 (3%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	---	715	549
STATISTICAL TESTS				
POLY 3	P=0.086	P=0.497N	P=0.754	P=0.274
POLY 1.5	P=0.092	P=0.498N	P=0.755	P=0.290
POLY 6	P=0.078	P=0.497N	P=0.752	P=0.249
COCH-ARM / FISHERS	P=0.098	P=0.500N	P=0.753N	P=0.309
MAX-ISO-POLY-3	P=0.079	P=0.158N	P=0.491	P=0.143

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Heart				
Cardiomyopathy				
LESION RATES				
OVERALL (a)	31/50 (62%)	38/50 (76%)	28/50 (56%)	25/50 (50%)
POLY-3 RATE (b)	31/47.23	38/47.81	28/45.00	25/43.78
POLY-3 PERCENT (g)	65.6%	79.5%	62.2%	57.1%
TERMINAL (d)	23/36 (64%)	31/37 (84%)	23/33 (70%)	14/22 (64%)
FIRST INCIDENCE	486	171	325	499
STATISTICAL TESTS				
POLY 3	P=0.084N	P=0.092	P=0.449N	P=0.261N
POLY 1.5	P=0.053N	P=0.099	P=0.411N	P=0.197N
POLY 6	P=0.179N	P=0.074	P=0.518N	P=0.404N
COCH-ARM / FISHERS	P=0.037N*	P=0.097	P=0.342N	P=0.157N
MAX-ISO-POLY-3	P=0.090N	P=0.060	P=0.366N	P=0.203N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Intestine Large, Rectum Metaplasia				
LESION RATES				
OVERALL (a)	1/50 (2%)	2/50 (4%)	3/50 (6%)	1/50 (2%)
POLY-3 RATE (b)	1/44.43	2/45.35	3/43.07	1/39.57
POLY-3 PERCENT (g)	2.3%	4.4%	7%	2.5%
TERMINAL (d)	1/36 (3%)	1/37 (3%)	2/33 (6%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	682	724	685
STATISTICAL TESTS				
POLY 3	P=0.555	P=0.507	P=0.294	P=0.734
POLY 1.5	P=0.591	P=0.504	P=0.296	P=0.748
POLY 6	P=0.496	P=0.508	P=0.291	P=0.711
COCH-ARM / FISHERS	P=0.579N	P=0.500	P=0.309	P=0.753N
MAX-ISO-POLY-3	P=0.463	P=0.289	P=0.149	P=0.468

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Islets, Pancreatic Hyperplasia				
LESION RATES				
OVERALL (a)	5/50 (10%)	1/50 (2%)	5/50 (10%)	2/50 (4%)
POLY-3 RATE (b)	5/45.48	1/45.17	5/44.11	2/39.88
POLY-3 PERCENT (g)	11%	2.2%	11.3%	5%
TERMINAL (d)	3/36 (8%)	1/37 (3%)	3/33 (9%)	1/22 (5%)
FIRST INCIDENCE	486	729 (T)	543	586
STATISTICAL TESTS				
POLY 3	P=0.353N	P=0.103N	P=0.611	P=0.272N
POLY 1.5	P=0.322N	P=0.103N	P=0.614	P=0.244N
POLY 6	P=0.399N	P=0.105N	P=0.607	P=0.321N
COCH-ARM / FISHERS	P=0.290N	P=0.102N	P=0.630N	P=0.218N
MAX-ISO-POLY-3	P=0.265N	P=0.046N*	P=0.479	P=0.174N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Kidney				
Accumulation, Hyaline Droplet				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	0/39.40
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Kidney				
Calculus Micro Observation Only				
LESION RATES				
OVERALL (a)	4/50 (8%)	10/50 (20%)	2/50 (4%)	7/50 (14%)
POLY-3 RATE (b)	4/44.45	10/45.87	2/43.05	7/40.45
POLY-3 PERCENT (g)	9%	21.8%	4.7%	17.3%
TERMINAL (d)	3/36 (8%)	7/37 (19%)	2/33 (6%)	5/22 (23%)
FIRST INCIDENCE	724	600	729 (T)	569
STATISTICAL TESTS				
POLY 3	P=0.373	P=0.080	P=0.352N	P=0.207
POLY 1.5	P=0.407	P=0.077	P=0.349N	P=0.235
POLY 6	P=0.319	P=0.083	P=0.356N	P=0.166
COCH-ARM / FISHERS	P=0.445	P=0.074	P=0.339N	P=0.262
MAX-ISO-POLY-3	P=0.226	P=0.047*	P=0.215N	P=0.138

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Kidney Infarct				
LESION RATES				
OVERALL (a)	1/50 (2%)	1/50 (2%)	1/50 (2%)	0/50 (0%)
POLY-3 RATE (b)	1/44.43	1/46.16	1/43.05	0/39.40
POLY-3 PERCENT (g)	2.3%	2.2%	2.3%	0%
TERMINAL (d)	1/36 (3%)	0/37 (0%)	1/33 (3%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	171	729 (T)	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Kidney Nephropathy				
LESION RATES				
OVERALL (a)	33/50 (66%)	40/50 (80%)	41/50 (82%)	30/50 (60%)
POLY-3 RATE (b)	33/46.21	40/46.50	41/45.90	30/44.82
POLY-3 PERCENT (g)	71.4%	86%	89.3%	66.9%
TERMINAL (d)	27/36 (75%)	35/37 (95%)	31/33 (94%)	15/22 (68%)
FIRST INCIDENCE	486	586	527	499
STATISTICAL TESTS				
POLY 3	P=0.212N	P=0.058	P=0.020*	P=0.403N
POLY 1.5	P=0.173N	P=0.066	P=0.024*	P=0.358N
POLY 6	P=0.316N	P=0.042*	P=0.017*	P=0.500N
COCH-ARM / FISHERS	P=0.172N	P=0.088	P=0.055	P=0.339N
MAX-ISO-POLY-3	P=0.042N*	P=0.033*	P=0.010**	P=0.317N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Kidney: Cortex Cyst				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	2/50 (4%)	1/50 (2%)
POLY-3 RATE (b)	0/44.43	0/45.17	2/43.67	1/39.40
POLY-3 PERCENT (g)	0%	0%	4.6%	2.5%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	1/33 (3%)	1/22 (5%)
FIRST INCIDENCE	---	---	527	729 (T)
STATISTICAL TESTS				
POLY 3	P=0.201	(e)	P=0.233	P=0.476
POLY 1.5	P=0.225	(e)	P=0.233	P=0.488
POLY 6	P=0.168	(e)	P=0.233	P=0.456
COCH-ARM / FISHERS	P=0.249	(e)	P=0.247	P=0.500
MAX-ISO-POLY-3	P=0.192	(e)	P=0.076	P=0.158

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Kidney: Pelvis Dilatation				
LESION RATES				
OVERALL (a)	1/50 (2%)	3/50 (6%)	2/50 (4%)	1/50 (2%)
POLY-3 RATE (b)	1/44.43	3/46.16	2/44.52	1/39.40
POLY-3 PERCENT (g)	2.3%	6.5%	4.5%	2.5%
TERMINAL (d)	1/36 (3%)	2/37 (5%)	0/33 (0%)	1/22 (5%)
FIRST INCIDENCE	729 (T)	171	25	729 (T)
STATISTICAL TESTS				
POLY 3	P=0.533N	P=0.319	P=0.501	P=0.733
POLY 1.5	P=0.507N	P=0.316	P=0.501	P=0.747
POLY 6	P=0.573N	P=0.319	P=0.500	P=0.709
COCH-ARM / FISHERS	P=0.479N	P=0.309	P=0.500	P=0.753N
MAX-ISO-POLY-3	P=0.490	P=0.168	P=0.281	P=0.467

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Kidney: Pelvis Inflammation				
LESION RATES				
OVERALL (a)	10/50 (20%)	11/50 (22%)	8/50 (16%)	14/50 (28%)
POLY-3 RATE (b)	10/45.08	11/46.84	8/45.35	14/42.35
POLY-3 PERCENT (g)	22.2%	23.5%	17.6%	33.1%
TERMINAL (d)	8/36 (22%)	7/37 (19%)	4/33 (12%)	8/22 (36%)
FIRST INCIDENCE	523	171	25	541
STATISTICAL TESTS				
POLY 3	P=0.160	P=0.540	P=0.391N	P=0.182
POLY 1.5	P=0.186	P=0.528	P=0.393N	P=0.212
POLY 6	P=0.127	P=0.545	P=0.389N	P=0.137
COCH-ARM / FISHERS	P=0.215	P=0.500	P=0.398N	P=0.241
MAX-ISO-POLY-3	P=0.165	P=0.441	P=0.296N	P=0.132

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Larynx				
Foreign Body				
LESION RATES				
OVERALL (a)	2/50 (4%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	2/44.43	0/45.17	0/43.05	0/39.40
POLY-3 PERCENT (g)	4.5%	0%	0%	0%
TERMINAL (d)	2/36 (6%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	---	---	---
STATISTICAL TESTS				
POLY 3	P=0.109N	P=0.233N	P=0.244N	P=0.265N
POLY 1.5	P=0.110N	P=0.235N	P=0.243N	P=0.251N
POLY 6	P=0.103N	P=0.233N	P=0.246N	P=0.290N
COCH-ARM / FISHERS	P=0.112N	P=0.247N	P=0.247N	P=0.247N
MAX-ISO-POLY-3	P=0.056N	P=0.076N	P=0.082N	P=0.102N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Larynx				
Inflammation Chronic				
LESION RATES				
OVERALL (a)	14/50 (28%)	7/50 (14%)	7/50 (14%)	33/50 (66%)
POLY-3 RATE (b)	14/44.91	7/45.52	7/43.98	33/45.93
POLY-3 PERCENT (g)	31.2%	15.4%	15.9%	71.8%
TERMINAL (d)	12/36 (33%)	6/37 (16%)	5/33 (15%)	15/22 (68%)
FIRST INCIDENCE	633	633	592	541
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.061N	P=0.072N	P<0.001**
POLY 1.5	P<0.001**	P=0.064N	P=0.073N	P<0.001**
POLY 6	P<0.001**	P=0.060N	P=0.072N	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.070N	P=0.070N	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.037N*	P=0.045N*	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Larynx: Respiratory Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	0/39.40
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Larynx: Respiratory Epithelium Metaplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	1/50 (2%)	0/50 (0%)	45/50 (90%)
POLY-3 RATE (b)	0/44.43	1/45.17	0/43.05	45/48.19
POLY-3 PERCENT (g)	0%	2.2%	0%	93.4%
TERMINAL (d)	0/36 (0%)	1/37 (3%)	0/33 (0%)	21/22 (96%)
FIRST INCIDENCE	---	729 (T)	---	541
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.503	(e)	P<0.001**
POLY 1.5	P<0.001**	P=0.502	(e)	P<0.001**
POLY 6	P<0.001**	P=0.503	(e)	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.500	(e)	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.163	(e)	P<0.001**

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Larynx: Respiratory Epithelium Regeneration				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	0/39.40
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Larynx: Squamous Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	2/50 (4%)	2/50 (4%)	8/50 (16%)	46/50 (92%)
POLY-3 RATE (b)	2/44.71	2/46.16	8/44.56	46/50.00
POLY-3 PERCENT (g)	4.5%	4.3%	18%	92%
TERMINAL (d)	1/36 (3%)	1/37 (3%)	5/33 (15%)	18/22 (82%)
FIRST INCIDENCE	654	171	25	499
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.682N	P=0.044*	P<0.001**
POLY 1.5	P<0.001**	P=0.685N	P=0.045*	P<0.001**
POLY 6	P<0.001**	P=0.684N	P=0.043*	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.691N	P=0.046*	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.487N	P=0.021*	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Larynx: Squamous Epithelium				
Ulcer Focal				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	18/50 (36%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	18/46.16
POLY-3 PERCENT (g)	0%	0%	0%	39%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	2/22 (9%)
FIRST INCIDENCE	---	---	---	541
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P<0.001**
POLY 1.5	P<0.001**	(e)	(e)	P<0.001**
POLY 6	P<0.001**	(e)	(e)	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Angiectasis				
LESION RATES				
OVERALL (a)	1/50 (2%)	2/50 (4%)	6/50 (12%)	1/50 (2%)
POLY-3 RATE (b)	1/44.77	2/45.17	6/43.07	1/39.40
POLY-3 PERCENT (g)	2.2%	4.4%	13.9%	2.5%
TERMINAL (d)	0/36 (0%)	2/37 (5%)	5/33 (15%)	1/22 (5%)
FIRST INCIDENCE	633	729 (T)	724	729 (T)
STATISTICAL TESTS				
POLY 3	P=0.436	P=0.503	P=0.049*	P=0.732
POLY 1.5	P=0.491	P=0.502	P=0.051	P=0.746
POLY 6	P=0.348	P=0.501	P=0.047*	P=0.705
COCH-ARM / FISHERS	P=0.546	P=0.500	P=0.056	P=0.753N
MAX-ISO-POLY-3	P=0.201	P=0.284	P=0.022*	P=0.465

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Basophilic Focus				
LESION RATES				
OVERALL (a)	12/50 (24%)	16/50 (32%)	18/50 (36%)	4/50 (8%)
POLY-3 RATE (b)	12/44.79	16/45.17	18/43.16	4/39.42
POLY-3 PERCENT (g)	26.8%	35.4%	41.7%	10.2%
TERMINAL (d)	10/36 (28%)	16/37 (43%)	15/33 (46%)	3/22 (14%)
FIRST INCIDENCE	633	729 (T)	715	725
STATISTICAL TESTS				
POLY 3	P=0.052N	P=0.255	P=0.102	P=0.045N*
POLY 1.5	P=0.031N*	P=0.254	P=0.111	P=0.034N*
POLY 6	P=0.112N	P=0.244	P=0.092	P=0.073N
COCH-ARM / FISHERS	P=0.021N*	P=0.252	P=0.138	P=0.027N*
MAX-ISO-POLY-3	P=0.014N*	P=0.188	P=0.070	P=0.031N*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Clear Cell Focus				
LESION RATES				
OVERALL (a)	27/50 (54%)	21/50 (42%)	27/50 (54%)	12/50 (24%)
POLY-3 RATE (b)	27/45.14	21/45.17	27/43.16	12/40.41
POLY-3 PERCENT (g)	59.8%	46.5%	62.6%	29.7%
TERMINAL (d)	24/36 (67%)	21/37 (57%)	24/33 (73%)	9/22 (41%)
FIRST INCIDENCE	633	729 (T)	715	562
STATISTICAL TESTS				
POLY 3	P=0.008N**	P=0.139N	P=0.481	P=0.003N**
POLY 1.5	P=0.004N**	P=0.145N	P=0.510	P=0.002N**
POLY 6	P=0.023N*	P=0.146N	P=0.434	P=0.008N**
COCH-ARM / FISHERS	P=0.003N**	P=0.158N	P=0.579N	P=0.002N**
MAX-ISO-POLY-3	P=0.005N**	P=0.096N	P=0.393	P=0.002N**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Degeneration Cystic				
LESION RATES				
OVERALL (a)	1/50 (2%)	0/50 (0%)	2/50 (4%)	0/50 (0%)
POLY-3 RATE (b)	1/44.77	0/45.17	2/43.05	0/39.40
POLY-3 PERCENT (g)	2.2%	0%	4.7%	0%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	2/33 (6%)	0/22 (0%)
FIRST INCIDENCE	633	---	729 (T)	---
STATISTICAL TESTS				
POLY 3	P=0.498N	P=0.498N	P=0.486	P=0.525N
POLY 1.5	P=0.477N	P=0.499N	P=0.490	P=0.513N
POLY 6	P=0.529N	P=0.500N	P=0.481	P=0.546N
COCH-ARM / FISHERS	P=0.456N	P=0.500N	P=0.500	P=0.500N
MAX-ISO-POLY-3	P=0.375N	P=0.158N	P=0.273	P=0.189N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Eosinophilic Focus				
LESION RATES				
OVERALL (a)	1/50 (2%)	1/50 (2%)	3/50 (6%)	1/50 (2%)
POLY-3 RATE (b)	1/44.43	1/45.17	3/43.05	1/39.40
POLY-3 PERCENT (g)	2.3%	2.2%	7%	2.5%
TERMINAL (d)	1/36 (3%)	1/37 (3%)	3/33 (9%)	1/22 (5%)
FIRST INCIDENCE	729 (T)	729 (T)	729 (T)	729 (T)
STATISTICAL TESTS				
POLY 3	P=0.486	P=0.757N	P=0.294	P=0.733
POLY 1.5	P=0.522	P=0.758N	P=0.296	P=0.747
POLY 6	P=0.428	P=0.757N	P=0.290	P=0.709
COCH-ARM / FISHERS	P=0.558	P=0.753N	P=0.309	P=0.753N
MAX-ISO-POLY-3	P=0.438	P=0.495N	P=0.149	P=0.467

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Fatty Change Diffuse				
LESION RATES				
OVERALL (a)	1/50 (2%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	1/44.56	0/45.17	0/43.05	0/39.40
POLY-3 PERCENT (g)	2.2%	0%	0%	0%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	695	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Fatty Change Focal				
LESION RATES				
OVERALL (a)	2/50 (4%)	0/50 (0%)	1/50 (2%)	0/50 (0%)
POLY-3 RATE (b)	2/44.43	0/45.17	1/43.53	0/39.40
POLY-3 PERCENT (g)	4.5%	0%	2.3%	0%
TERMINAL (d)	2/36 (6%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	---	589	---
STATISTICAL TESTS				
POLY 3	P=0.197N	P=0.233N	P=0.507N	P=0.265N
POLY 1.5	P=0.191N	P=0.235N	P=0.507N	P=0.251N
POLY 6	P=0.204N	P=0.233N	P=0.508N	P=0.290N
COCH-ARM / FISHERS	P=0.184N	P=0.247N	P=0.500N	P=0.247N
MAX-ISO-POLY-3	P=0.112N	P=0.076N	P=0.288N	P=0.102N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Hematopoietic Cell Proliferation				
LESION RATES				
OVERALL (a)	2/50 (4%)	0/50 (0%)	1/50 (2%)	1/50 (2%)
POLY-3 RATE (b)	2/45.84	0/45.17	1/43.19	1/39.42
POLY-3 PERCENT (g)	4.4%	0%	2.3%	2.5%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	432	---	694	725
STATISTICAL TESTS				
POLY 3	P=0.515N	P=0.240N	P=0.521N	P=0.552N
POLY 1.5	P=0.506N	P=0.240N	P=0.515N	P=0.527N
POLY 6	P=0.523N	P=0.243N	P=0.527N	P=0.590N
COCH-ARM / FISHERS	P=0.495N	P=0.247N	P=0.500N	P=0.500N
MAX-ISO-POLY-3	P=0.349N	P=0.079N	P=0.303N	P=0.336N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Hepatodiaphragmatic Nodule				
LESION RATES				
OVERALL (a)	1/50 (2%)	0/50 (0%)	3/50 (6%)	3/50 (6%)
POLY-3 RATE (b)	1/44.43	0/45.17	3/43.05	3/39.48
POLY-3 PERCENT (g)	2.3%	0%	7%	7.6%
TERMINAL (d)	1/36 (3%)	0/37 (0%)	3/33 (9%)	2/22 (9%)
FIRST INCIDENCE	729 (T)	---	729 (T)	710
STATISTICAL TESTS				
POLY 3	P=0.083	P=0.497N	P=0.294	P=0.264
POLY 1.5	P=0.096	P=0.498N	P=0.296	P=0.285
POLY 6	P=0.067	P=0.497N	P=0.290	P=0.232
COCH-ARM / FISHERS	P=0.111	P=0.500N	P=0.309	P=0.309
MAX-ISO-POLY-3	P=0.127	P=0.158N	P=0.149	P=0.140

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Infiltration Cellular Mixed Cell				
LESION RATES				
OVERALL (a)	5/50 (10%)	0/50 (0%)	5/50 (10%)	4/50 (8%)
POLY-3 RATE (b)	5/45.39	0/45.17	5/43.54	4/40.19
POLY-3 PERCENT (g)	11%	0%	11.5%	10%
TERMINAL (d)	3/36 (8%)	0/37 (0%)	3/33 (9%)	0/22 (0%)
FIRST INCIDENCE	530	---	592	619
STATISTICAL TESTS				
POLY 3	P=0.403	P=0.031N*	P=0.604	P=0.576N
POLY 1.5	P=0.436	P=0.031N*	P=0.610	P=0.538N
POLY 6	P=0.357	P=0.032N*	P=0.596	P=0.634N
COCH-ARM / FISHERS	P=0.473	P=0.028N*	P=0.630N	P=0.500N
MAX-ISO-POLY-3	P=0.327	P=0.010N**	P=0.472	P=0.439N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Mixed Cell Focus				
LESION RATES				
OVERALL (a)	2/50 (4%)	4/50 (8%)	1/50 (2%)	0/50 (0%)
POLY-3 RATE (b)	2/44.43	4/45.17	1/43.11	0/39.40
POLY-3 PERCENT (g)	4.5%	8.9%	2.3%	0%
TERMINAL (d)	2/36 (6%)	4/37 (11%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	729 (T)	715	---
STATISTICAL TESTS				
POLY 3	P=0.109N	P=0.345	P=0.511N	P=0.265N
POLY 1.5	P=0.098N	P=0.342	P=0.509N	P=0.251N
POLY 6	P=0.127N	P=0.344	P=0.513N	P=0.290N
COCH-ARM / FISHERS	P=0.089N	P=0.339	P=0.500N	P=0.247N
MAX-ISO-POLY-3	P=0.116N	P=0.208	P=0.292N	P=0.102N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Necrosis Focal				
LESION RATES				
OVERALL (a)	1/50 (2%)	1/50 (2%)	1/50 (2%)	0/50 (0%)
POLY-3 RATE (b)	1/44.43	1/45.17	1/43.19	0/39.40
POLY-3 PERCENT (g)	2.3%	2.2%	2.3%	0%
TERMINAL (d)	1/36 (3%)	1/37 (3%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	729 (T)	694	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Liver: Bile Duct Cyst				
LESION RATES				
OVERALL (a)	0/50 (0%)	2/50 (4%)	0/50 (0%)	1/50 (2%)
POLY-3 RATE (b)	0/44.43	2/45.17	0/43.05	1/39.40
POLY-3 PERCENT (g)	0%	4.4%	0%	2.5%
TERMINAL (d)	0/36 (0%)	2/37 (5%)	0/33 (0%)	1/22 (5%)
FIRST INCIDENCE	---	729 (T)	---	729 (T)
STATISTICAL TESTS				
POLY 3	P=0.491	P=0.241	(e)	P=0.476
POLY 1.5	P=0.511	P=0.239	(e)	P=0.488
POLY 6	P=0.458	P=0.240	(e)	P=0.456
COCH-ARM / FISHERS	P=0.531	P=0.247	(e)	P=0.500
MAX-ISO-POLY-3	P=0.332	P=0.080	(e)	P=0.158

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Liver: Bile Duct Hyperplasia				
LESION RATES				
OVERALL (a)	5/50 (10%)	3/50 (6%)	4/50 (8%)	1/50 (2%)
POLY-3 RATE (b)	5/44.84	3/46.08	4/43.05	1/39.84
POLY-3 PERCENT (g)	11.2%	6.5%	9.3%	2.5%
TERMINAL (d)	3/36 (8%)	1/37 (3%)	4/33 (12%)	0/22 (0%)
FIRST INCIDENCE	654	586	729 (T)	601
STATISTICAL TESTS				
POLY 3	P=0.128N	P=0.341N	P=0.526N	P=0.130N
POLY 1.5	P=0.111N	P=0.348N	P=0.519N	P=0.115N
POLY 6	P=0.158N	P=0.339N	P=0.536N	P=0.160N
COCH-ARM / FISHERS	P=0.094N	P=0.357N	P=0.500N	P=0.102N
MAX-ISO-POLY-3	P=0.126N	P=0.222N	P=0.388N	P=0.071N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lung Inflammation				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/49 (0%)	1/50 (2%)	15/50 (30%)
POLY-3 RATE (b)	0/44.43	0/44.17	1/43.52	15/45.16
POLY-3 PERCENT (g)	0%	0%	2.3%	33.2%
TERMINAL (d)	0/36 (0%)	0/36 (0%)	0/33 (0%)	1/22 (5%)
FIRST INCIDENCE	---	---	592	541
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	P=0.496	P<0.001**
POLY 1.5	P<0.001**	(e)	P=0.496	P<0.001**
POLY 6	P<0.001**	(e)	P=0.495	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	P=0.500	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	P=0.158	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lung Inflammation Chronic				
LESION RATES				
OVERALL (a)	1/50 (2%)	2/49 (4%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	1/44.43	2/45.16	0/43.05	0/39.40
POLY-3 PERCENT (g)	2.3%	4.4%	0%	0%
TERMINAL (d)	1/36 (3%)	1/36 (3%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	171	---	---
STATISTICAL TESTS				
POLY 3	P=0.205N	P=0.506	P=0.506N	P=0.524N
POLY 1.5	P=0.199N	P=0.502	P=0.505N	P=0.512N
POLY 6	P=0.215N	P=0.505	P=0.508N	P=0.544N
COCH-ARM / FISHERS	P=0.192N	P=0.492	P=0.500N	P=0.500N
MAX-ISO-POLY-3	P=0.223N	P=0.288	P=0.166N	P=0.188N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lung				
Inflammation Granulomatous				
LESION RATES				
OVERALL (a)	4/50 (8%)	3/49 (6%)	1/50 (2%)	4/50 (8%)
POLY-3 RATE (b)	4/45.04	3/44.17	1/43.05	4/39.92
POLY-3 PERCENT (g)	8.9%	6.8%	2.3%	10%
TERMINAL (d)	3/36 (8%)	3/36 (8%)	1/33 (3%)	3/22 (14%)
FIRST INCIDENCE	530	729 (T)	729 (T)	570
STATISTICAL TESTS				
POLY 3	P=0.533	P=0.511N	P=0.192N	P=0.576
POLY 1.5	P=0.556	P=0.511N	P=0.189N	P=0.610
POLY 6	P=0.499	P=0.515N	P=0.197N	P=0.519
COCH-ARM / FISHERS	P=0.576N	P=0.511N	P=0.181N	P=0.643N
MAX-ISO-POLY-3	P=0.406	P=0.357N	P=0.097N	P=0.431

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Alveolar Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	1/50 (2%)	4/49 (8%)	2/50 (4%)	8/50 (16%)
POLY-3 RATE (b)	1/44.43	4/44.65	2/43.99	8/40.40
POLY-3 PERCENT (g)	2.3%	9%	4.6%	19.8%
TERMINAL (d)	1/36 (3%)	3/36 (8%)	0/33 (0%)	4/22 (18%)
FIRST INCIDENCE	729 (T)	586	325	570
STATISTICAL TESTS				
POLY 3	P=0.006**	P=0.180	P=0.497	P=0.010**
POLY 1.5	P=0.008**	P=0.177	P=0.497	P=0.013*
POLY 6	P=0.005**	P=0.181	P=0.495	P=0.006**
COCH-ARM / FISHERS	P=0.010**	P=0.175	P=0.500	P=0.015*
MAX-ISO-POLY-3	P=0.005**	P=0.086	P=0.279	P=0.005**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Alveolar Epithelium Hyperplasia Focal				
LESION RATES				
OVERALL (a)	3/50 (6%)	3/49 (6%)	5/50 (10%)	1/50 (2%)
POLY-3 RATE (b)	3/44.43	3/44.17	5/43.05	1/39.61
POLY-3 PERCENT (g)	6.8%	6.8%	11.6%	2.5%
TERMINAL (d)	3/36 (8%)	3/36 (8%)	5/33 (15%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	729 (T)	729 (T)	674
STATISTICAL TESTS				
POLY 3	P=0.339N	P=0.660	P=0.339	P=0.347N
POLY 1.5	P=0.304N	P=0.657	P=0.342	P=0.326N
POLY 6	P=0.396N	P=0.659	P=0.333	P=0.384N
COCH-ARM / FISHERS	P=0.270N	P=0.651	P=0.357	P=0.309N
MAX-ISO-POLY-3	P=0.265N	P=0.496	P=0.220	P=0.197N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Alveolus Infiltration Cellular Histiocyte				
LESION RATES				
OVERALL (a)	10/50 (20%)	14/49 (29%)	16/50 (32%)	34/50 (68%)
POLY-3 RATE (b)	10/45.08	14/45.13	16/44.52	34/44.44
POLY-3 PERCENT (g)	22.2%	31%	35.9%	76.5%
TERMINAL (d)	8/36 (22%)	11/36 (31%)	12/33 (36%)	19/22 (86%)
FIRST INCIDENCE	523	586	325	545
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.238	P=0.112	P<0.001**
POLY 1.5	P<0.001**	P=0.231	P=0.115	P<0.001**
POLY 6	P<0.001**	P=0.241	P=0.108	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.224	P=0.127	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.172	P=0.074	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Bronchiole, Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/49 (0%)	0/50 (0%)	33/50 (66%)
POLY-3 RATE (b)	0/44.43	0/44.17	0/43.05	33/46.08
POLY-3 PERCENT (g)	0%	0%	0%	71.6%
TERMINAL (d)	0/36 (0%)	0/36 (0%)	0/33 (0%)	14/22 (64%)
FIRST INCIDENCE	---	---	---	541
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P<0.001**
POLY 1.5	P<0.001**	(e)	(e)	P<0.001**
POLY 6	P<0.001**	(e)	(e)	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Bronchus, Epithelium Atrophy				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/49 (0%)	1/50 (2%)	23/50 (46%)
POLY-3 RATE (b)	0/44.43	0/44.17	1/43.52	23/43.66
POLY-3 PERCENT (g)	0%	0%	2.3%	52.7%
TERMINAL (d)	0/36 (0%)	0/36 (0%)	0/33 (0%)	11/22 (50%)
FIRST INCIDENCE	---	---	592	499
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	P=0.496	P<0.001**
POLY 1.5	P<0.001**	(e)	P=0.496	P<0.001**
POLY 6	P<0.001**	(e)	P=0.495	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	P=0.500	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	P=0.158	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Bronchus, Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/49 (0%)	2/50 (4%)	47/50 (94%)
POLY-3 RATE (b)	0/44.43	0/44.17	2/43.52	47/48.28
POLY-3 PERCENT (g)	0%	0%	4.6%	97.3%
TERMINAL (d)	0/36 (0%)	0/36 (0%)	1/33 (3%)	22/22 (100%)
FIRST INCIDENCE	---	---	592	545
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	P=0.232	P<0.001**
POLY 1.5	P<0.001**	(e)	P=0.233	P<0.001**
POLY 6	P<0.001**	(e)	P=0.232	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	P=0.247	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	P=0.076	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Bronchus, Epithelium Metaplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/49 (0%)	0/50 (0%)	2/50 (4%)
POLY-3 RATE (b)	0/44.43	0/44.17	0/43.05	2/39.40
POLY-3 PERCENT (g)	0%	0%	0%	5.1%
TERMINAL (d)	0/36 (0%)	0/36 (0%)	0/33 (0%)	2/22 (9%)
FIRST INCIDENCE	---	---	---	729 (T)
STATISTICAL TESTS				
POLY 3	P=0.041*	(e)	(e)	P=0.211
POLY 1.5	P=0.044*	(e)	(e)	P=0.224
POLY 6	P=0.039*	(e)	(e)	P=0.191
COCH-ARM / FISHERS	P=0.047*	(e)	(e)	P=0.247
MAX-ISO-POLY-3	P=0.032*	(e)	(e)	P=0.075

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Bronchus, Epithelium Regeneration				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/49 (0%)	4/50 (8%)	9/50 (18%)
POLY-3 RATE (b)	0/44.43	0/44.17	4/43.05	9/41.93
POLY-3 PERCENT (g)	0%	0%	9.3%	21.5%
TERMINAL (d)	0/36 (0%)	0/36 (0%)	4/33 (12%)	4/22 (18%)
FIRST INCIDENCE	---	---	729 (T)	499
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	P=0.056	P<0.001**
POLY 1.5	P<0.001**	(e)	P=0.057	P<0.001**
POLY 6	P<0.001**	(e)	P=0.055	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	P=0.059	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	P=0.019*	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Interstitium Fibrosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	1/49 (2%)	1/50 (2%)	11/50 (22%)
POLY-3 RATE (b)	0/44.43	1/44.65	1/43.96	11/40.60
POLY-3 PERCENT (g)	0%	2.2%	2.3%	27.1%
TERMINAL (d)	0/36 (0%)	0/36 (0%)	0/33 (0%)	5/22 (23%)
FIRST INCIDENCE	---	586	325	586
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.501	P=0.498	P<0.001**
POLY 1.5	P<0.001**	P=0.499	P=0.498	P<0.001**
POLY 6	P<0.001**	P=0.502	P=0.497	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.495	P=0.500	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.161	P=0.158	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Peribronchial Inflammation Chronic				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/49 (0%)	0/50 (0%)	13/50 (26%)
POLY-3 RATE (b)	0/44.43	0/44.17	0/43.05	13/41.00
POLY-3 PERCENT (g)	0%	0%	0%	31.7%
TERMINAL (d)	0/36 (0%)	0/36 (0%)	0/33 (0%)	7/22 (32%)
FIRST INCIDENCE	---	---	---	570
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P<0.001**
POLY 1.5	P<0.001**	(e)	(e)	P<0.001**
POLY 6	P<0.001**	(e)	(e)	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Pleura Fibrosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/49 (0%)	0/50 (0%)	2/50 (4%)
POLY-3 RATE (b)	0/44.43	0/44.17	0/43.05	2/39.42
POLY-3 PERCENT (g)	0%	0%	0%	5.1%
TERMINAL (d)	0/36 (0%)	0/36 (0%)	0/33 (0%)	1/22 (5%)
FIRST INCIDENCE	---	---	---	724
STATISTICAL TESTS				
POLY 3	P=0.041*	(e)	(e)	P=0.211
POLY 1.5	P=0.044*	(e)	(e)	P=0.224
POLY 6	P=0.039*	(e)	(e)	P=0.192
COCH-ARM / FISHERS	P=0.047*	(e)	(e)	P=0.247
MAX-ISO-POLY-3	P=0.032*	(e)	(e)	P=0.075

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Submucosa, Bronchus Fibrosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/49 (0%)	0/50 (0%)	5/50 (10%)
POLY-3 RATE (b)	0/44.43	0/44.17	0/43.05	5/39.77
POLY-3 PERCENT (g)	0%	0%	0%	12.6%
TERMINAL (d)	0/36 (0%)	0/36 (0%)	0/33 (0%)	4/22 (18%)
FIRST INCIDENCE	---	---	---	626
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P=0.022*
POLY 1.5	P<0.001**	(e)	(e)	P=0.026*
POLY 6	P<0.001**	(e)	(e)	P=0.017*
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P=0.028*
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P=0.009**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node, Bronchial Atrophy				
LESION RATES				
OVERALL (a)	0/41 (0%)	1/46 (2%)	2/43 (5%)	1/42 (2%)
POLY-3 RATE (b)	0/35.93	1/42.42	2/39.28	1/34.65
POLY-3 PERCENT (g)	0%	2.4%	5.1%	2.9%
TERMINAL (d)	0/30 (0%)	0/35 (0%)	0/31 (0%)	0/21 (0%)
FIRST INCIDENCE	---	606	25	628
STATISTICAL TESTS				
POLY 3	P=0.327	P=0.533	P=0.257	P=0.493
POLY 1.5	P=0.346	P=0.529	P=0.253	P=0.500
POLY 6	P=0.293	P=0.536	P=0.260	P=0.479
COCH-ARM / FISHERS	P=0.361	P=0.529	P=0.259	P=0.506
MAX-ISO-POLY-3	P=0.250	P=0.192	P=0.092	P=0.160

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node, Mandibular Infiltration Cellular Plasma Cell				
LESION RATES				
OVERALL (a)	0/48 (0%)	0/44 (0%)	0/49 (0%)	5/48 (10%)
POLY-3 RATE (b)	0/42.43	0/40.22	0/42.07	5/39.02
POLY-3 PERCENT (g)	0%	0%	0%	12.8%
TERMINAL (d)	0/34 (0%)	0/34 (0%)	0/33 (0%)	3/22 (14%)
FIRST INCIDENCE	---	---	---	586
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P=0.023*
POLY 1.5	P<0.001**	(e)	(e)	P=0.027*
POLY 6	P<0.001**	(e)	(e)	P=0.018*
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P=0.028*
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P=0.009**

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node, Mesenteric Atrophy				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	0/39.40
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node: Deep Cervical Infiltration Cellular Plasma Cell				
LESION RATES				
OVERALL (a)	0/6 (0%)	0/4 (0%)	0/9 (0%)	1/7 (14%)
POLY-3 RATE (b)	0/5.63	0/4.00	0/8.84	1/5.93
POLY-3 PERCENT (g)	0%	0%	0%	16.9%
TERMINAL (d)	0/4 (0%)	0/4 (0%)	0/7 (0%)	1/2 (50%)
FIRST INCIDENCE	---	---	---	729 (T)
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node: Iliac Infiltration Cellular Plasma Cell				
LESION RATES				
OVERALL (a)	0/6 (0%)	0/4 (0%)	0/9 (0%)	2/7 (29%)
POLY-3 RATE (b)	0/5.63	0/4.00	0/8.84	2/6.00
POLY-3 PERCENT (g)	0%	0%	0%	33.3%
TERMINAL (d)	0/4 (0%)	0/4 (0%)	0/7 (0%)	1/2 (50%)
FIRST INCIDENCE	---	---	---	712
STATISTICAL TESTS				
POLY 3	P=0.042*	(e)	(e)	P=0.228
POLY 1.5	P=0.045*	(e)	(e)	P=0.240
POLY 6	P=0.040*	(e)	(e)	P=0.213
COCH-ARM / FISHERS	P=0.057	(e)	(e)	P=0.269
MAX-ISO-POLY-3	P=0.025*	(e)	(e)	P=0.063

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node: Lumbar Infiltration Cellular Plasma Cell				
LESION RATES				
OVERALL (a)	5/6 (83%)	3/4 (75%)	6/9 (67%)	3/7 (43%)
POLY-3 RATE (b)	5/6.00	3/4.00	6/8.86	3/6.47
POLY-3 PERCENT (g)	83.3%	75%	67.7%	46.4%
TERMINAL (d)	3/4 (75%)	3/4 (75%)	5/7 (71%)	1/2 (50%)
FIRST INCIDENCE	633	729 (T)	724	570
STATISTICAL TESTS				
POLY 3	P=0.131N	P=0.668N	P=0.473N	P=0.215N
POLY 1.5	P=0.116N	P=0.668N	P=0.464N	P=0.196N
POLY 6	P=0.157N	P=0.668N	P=0.489N	P=0.250N
COCH-ARM / FISHERS	P=0.094N	P=0.667N	P=0.462N	P=0.179N
MAX-ISO-POLY-3	P=0.140N	P=0.393N	P=0.277N	P=0.082N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node: Popliteal Hyperplasia Lymphoid				
LESION RATES				
OVERALL (a)	1/6 (17%)	0/4 (0%)	2/9 (22%)	0/7 (0%)
POLY-3 RATE (b)	1/5.98	0/4.00	2/8.84	0/5.93
POLY-3 PERCENT (g)	16.7%	0%	22.6%	0%
TERMINAL (d)	0/4 (0%)	0/4 (0%)	2/7 (29%)	0/2 (0%)
FIRST INCIDENCE	633	---	729 (T)	---
STATISTICAL TESTS				
POLY 3	P=0.421N	P=0.579N	P=0.640	P=0.502N
POLY 1.5	P=0.400N	P=0.579N	P=0.642	P=0.487N
POLY 6	P=0.448N	P=0.578N	P=0.636	P=0.522N
COCH-ARM / FISHERS	P=0.370N	P=0.600N	P=0.659	P=0.462N
MAX-ISO-POLY-3	P=0.340N	P=0.232N	P=0.404	P=0.168N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node: Popliteal Infiltration Cellular Plasma Cell				
LESION RATES				
OVERALL (a)	0/6 (0%)	0/4 (0%)	4/9 (44%)	2/7 (29%)
POLY-3 RATE (b)	0/5.63	0/4.00	4/8.84	2/6.02
POLY-3 PERCENT (g)	0%	0%	45.2%	33.2%
TERMINAL (d)	0/4 (0%)	0/4 (0%)	4/7 (57%)	0/2 (0%)
FIRST INCIDENCE	---	---	729 (T)	712
STATISTICAL TESTS				
POLY 3	P=0.090	(e)	P=0.088	P=0.229
POLY 1.5	P=0.106	(e)	P=0.084	P=0.241
POLY 6	P=0.073	(e)	P=0.092	P=0.215
COCH-ARM / FISHERS	P=0.138	(e)	P=0.092	P=0.269
MAX-ISO-POLY-3	P=0.080	(e)	P=0.037*	P=0.063

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node: Renal Infiltration Cellular Plasma Cell				
LESION RATES				
OVERALL (a)	2/6 (33%)	1/4 (25%)	1/9 (11%)	4/7 (57%)
POLY-3 RATE (b)	2/6.00	1/4.00	1/8.84	4/6.93
POLY-3 PERCENT (g)	33.3%	25%	11.3%	57.7%
TERMINAL (d)	0/4 (0%)	1/4 (25%)	1/7 (14%)	0/2 (0%)
FIRST INCIDENCE	633	729 (T)	729 (T)	570
STATISTICAL TESTS				
POLY 3	P=0.220	P=0.648N	P=0.357N	P=0.381
POLY 1.5	P=0.222	P=0.648N	P=0.354N	P=0.385
POLY 6	P=0.217	P=0.648N	P=0.362N	P=0.375
COCH-ARM / FISHERS	P=0.224	P=0.667N	P=0.341N	P=0.383
MAX-ISO-POLY-3	P=0.134	P=0.407N	P=0.178N	P=0.210

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Mammary Gland				
Galactocele				
LESION RATES				
OVERALL (a)	0/12 (0%)	0/9 (0%)	1/14 (7%)	1/22 (5%)
POLY-3 RATE (b)	0/10.24	0/8.59	1/12.33	1/16.12
POLY-3 PERCENT (g)	0%	0%	8.1%	6.2%
TERMINAL (d)	0/8 (0%)	0/8 (0%)	1/10 (10%)	0/5 (0%)
FIRST INCIDENCE	---	---	729 (T)	570
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Mammary Gland Hyperplasia				
LESION RATES				
OVERALL (a)	0/12 (0%)	0/9 (0%)	0/14 (0%)	0/22 (0%)
POLY-3 RATE (b)	0/10.24	0/8.59	0/12.33	0/15.60
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/8 (0%)	0/8 (0%)	0/10 (0%)	0/5 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Mesentery: Fat Necrosis				
LESION RATES				
OVERALL (a)	3/5 (60%)	2/4 (50%)	2/3 (67%)	2/2 (100%)
POLY-3 RATE (b)	3/4.87	2/3.52	2/2.54	2/2.00
POLY-3 PERCENT (g)	61.7%	56.8%	78.9%	100%
TERMINAL (d)	2/3 (67%)	2/3 (67%)	1/1 (100%)	1/1 (100%)
FIRST INCIDENCE	486	729 (T)	715	571
STATISTICAL TESTS				
POLY 3	P=0.280	P=0.698N	P=0.625	P=0.469
POLY 1.5	P=0.287	P=0.669N	P=0.655	P=0.460
POLY 6	P=0.279	P=0.733N	P=0.581	P=0.486
COCH-ARM / FISHERS	P=0.278	P=0.643N	P=0.714	P=0.476
MAX-ISO-POLY-3	P=0.309	P=0.453N	P=0.355	P=0.206

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Nose				
Foreign Body				
LESION RATES				
OVERALL (a)	1/50 (2%)	1/50 (2%)	2/50 (4%)	0/50 (0%)
POLY-3 RATE (b)	1/44.43	1/45.17	2/43.05	0/39.40
POLY-3 PERCENT (g)	2.3%	2.2%	4.7%	0%
TERMINAL (d)	1/36 (3%)	1/37 (3%)	2/33 (6%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	729 (T)	729 (T)	---
STATISTICAL TESTS				
POLY 3	P=0.411N	P=0.757N	P=0.489	P=0.524N
POLY 1.5	P=0.389N	P=0.758N	P=0.491	P=0.512N
POLY 6	P=0.447N	P=0.757N	P=0.486	P=0.544N
COCH-ARM / FISHERS	P=0.366N	P=0.753N	P=0.500	P=0.500N
MAX-ISO-POLY-3	P=0.321N	P=0.495N	P=0.274	P=0.188N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Nose Inflammation				
LESION RATES				
OVERALL (a)	3/50 (6%)	4/50 (8%)	35/50 (70%)	50/50 (100%)
POLY-3 RATE (b)	3/44.43	4/46.16	35/46.30	50/50.00
POLY-3 PERCENT (g)	6.8%	8.7%	75.6%	100%
TERMINAL (d)	3/36 (8%)	3/37 (8%)	25/33 (76%)	22/22 (100%)
FIRST INCIDENCE	729 (T)	171	537	499
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.521	P<0.001**	P<0.001**
POLY 1.5	P<0.001**	P=0.515	P<0.001**	P<0.001**
POLY 6	P<0.001**	P=0.521	P<0.001**	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.500	P<0.001**	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.369	P<0.001**	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
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 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Nose				
Inflammation Chronic				
LESION RATES				
OVERALL (a)	1/50 (2%)	0/50 (0%)	2/50 (4%)	0/50 (0%)
POLY-3 RATE (b)	1/44.43	0/45.17	2/44.02	0/39.40
POLY-3 PERCENT (g)	2.3%	0%	4.5%	0%
TERMINAL (d)	1/36 (3%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	---	325	---
STATISTICAL TESTS				
POLY 3	P=0.497N	P=0.497N	P=0.497	P=0.524N
POLY 1.5	P=0.477N	P=0.498N	P=0.497	P=0.512N
POLY 6	P=0.527N	P=0.497N	P=0.495	P=0.544N
COCH-ARM / FISHERS	P=0.456N	P=0.500N	P=0.500	P=0.500N
MAX-ISO-POLY-3	P=0.376N	P=0.158N	P=0.279	P=0.188N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
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 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Lamina Propria Fibrosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	28/50 (56%)	38/50 (76%)
POLY-3 RATE (b)	0/44.43	0/45.17	28/45.84	38/49.20
POLY-3 PERCENT (g)	0%	0%	61.1%	77.2%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	19/33 (58%)	12/22 (55%)
FIRST INCIDENCE	---	---	527	499
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	P<0.001**	P<0.001**
POLY 1.5	P<0.001**	(e)	P<0.001**	P<0.001**
POLY 6	P<0.001**	(e)	P<0.001**	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	P<0.001**	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	P<0.001**	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Olfactory Epithelium Accumulation, Hyaline Droplet				
LESION RATES				
OVERALL (a)	10/50 (20%)	6/50 (12%)	4/50 (8%)	4/50 (8%)
POLY-3 RATE (b)	10/45.14	6/45.17	4/43.45	4/39.85
POLY-3 PERCENT (g)	22.2%	13.3%	9.2%	10%
TERMINAL (d)	7/36 (19%)	6/37 (16%)	3/33 (9%)	3/22 (14%)
FIRST INCIDENCE	633	729 (T)	617	599
STATISTICAL TESTS				
POLY 3	P=0.074N	P=0.203N	P=0.082N	P=0.112N
POLY 1.5	P=0.062N	P=0.205N	P=0.080N	P=0.090N
POLY 6	P=0.093N	P=0.210N	P=0.086N	P=0.157N
COCH-ARM / FISHERS	P=0.052N	P=0.207N	P=0.074N	P=0.074N
MAX-ISO-POLY-3	P=0.091N	P=0.134N	P=0.049N*	P=0.077N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
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 Species/Strain: RATS/Wistar Han

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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Olfactory Epithelium Atrophy				
LESION RATES				
OVERALL (a)	0/50 (0%)	5/50 (10%)	27/50 (54%)	22/50 (44%)
POLY-3 RATE (b)	0/44.43	5/45.17	27/46.92	22/42.10
POLY-3 PERCENT (g)	0%	11.1%	57.6%	52.3%
TERMINAL (d)	0/36 (0%)	5/37 (14%)	16/33 (49%)	12/22 (55%)
FIRST INCIDENCE	---	729 (T)	325	562
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.032*	P<0.001**	P<0.001**
POLY 1.5	P<0.001**	P=0.031*	P<0.001**	P<0.001**
POLY 6	P<0.001**	P=0.031*	P<0.001**	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.028*	P<0.001**	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.011*	P<0.001**	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Olfactory Epithelium Metaplasia Respiratory				
LESION RATES				
OVERALL (a)	1/50 (2%)	3/50 (6%)	6/50 (12%)	50/50 (100%)
POLY-3 RATE (b)	1/44.43	3/46.08	6/44.47	50/50.00
POLY-3 PERCENT (g)	2.3%	6.5%	13.5%	100%
TERMINAL (d)	1/36 (3%)	1/37 (3%)	2/33 (6%)	22/22 (100%)
FIRST INCIDENCE	729 (T)	586	582	499
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.318	P=0.056	P<0.001**
POLY 1.5	P<0.001**	P=0.313	P=0.055	P<0.001**
POLY 6	P<0.001**	P=0.322	P=0.057	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.309	P=0.056	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.168	P=0.023*	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Olfactory Epithelium Necrosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	6/50 (12%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	6/42.15
POLY-3 PERCENT (g)	0%	0%	0%	14.2%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	---	---	---	541
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P=0.012*
POLY 1.5	P<0.001**	(e)	(e)	P=0.014*
POLY 6	P<0.001**	(e)	(e)	P=0.010**
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P=0.013*
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P=0.004**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Respiratory Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	2/50 (4%)	5/50 (10%)	50/50 (100%)
POLY-3 RATE (b)	0/44.43	2/45.17	5/44.01	50/50.00
POLY-3 PERCENT (g)	0%	4.4%	11.4%	100%
TERMINAL (d)	0/36 (0%)	2/37 (5%)	2/33 (6%)	22/22 (100%)
FIRST INCIDENCE	---	729 (T)	592	499
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.241	P=0.030*	P<0.001**
POLY 1.5	P<0.001**	P=0.239	P=0.029*	P<0.001**
POLY 6	P<0.001**	P=0.240	P=0.030*	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.247	P=0.028*	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.080	P=0.010**	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

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 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Respiratory Epithelium Metaplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	5/50 (10%)	34/50 (68%)
POLY-3 RATE (b)	0/44.43	0/45.17	5/43.07	34/48.06
POLY-3 PERCENT (g)	0%	0%	11.6%	70.8%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	4/33 (12%)	12/22 (55%)
FIRST INCIDENCE	---	---	724	499
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	P=0.028*	P<0.001**
POLY 1.5	P<0.001**	(e)	P=0.028*	P<0.001**
POLY 6	P<0.001**	(e)	P=0.027*	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	P=0.028*	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	P=0.009**	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Respiratory Epithelium Necrosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	2/50 (4%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	2/40.46
POLY-3 PERCENT (g)	0%	0%	0%	4.9%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	---	---	---	545
STATISTICAL TESTS				
POLY 3	P=0.042*	(e)	(e)	P=0.217
POLY 1.5	P=0.044*	(e)	(e)	P=0.227
POLY 6	P=0.039*	(e)	(e)	P=0.200
COCH-ARM / FISHERS	P=0.047*	(e)	(e)	P=0.247
MAX-ISO-POLY-3	P=0.032*	(e)	(e)	P=0.075

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Turbinate Hyperostosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	10/50 (20%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	10/40.97
POLY-3 PERCENT (g)	0%	0%	0%	24.4%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	4/22 (18%)
FIRST INCIDENCE	---	---	---	541
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P<0.001**
POLY 1.5	P<0.001**	(e)	(e)	P<0.001**
POLY 6	P<0.001**	(e)	(e)	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P<0.001**

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Pancreas Atrophy				
LESION RATES				
OVERALL (a)	1/50 (2%)	7/50 (14%)	2/50 (4%)	4/50 (8%)
POLY-3 RATE (b)	1/44.43	7/45.52	2/43.08	4/40.30
POLY-3 PERCENT (g)	2.3%	15.4%	4.6%	9.9%
TERMINAL (d)	1/36 (3%)	6/37 (16%)	1/33 (3%)	2/22 (9%)
FIRST INCIDENCE	729 (T)	633	722	562
STATISTICAL TESTS				
POLY 3	P=0.315	P=0.032*	P=0.489	P=0.150
POLY 1.5	P=0.346	P=0.031*	P=0.491	P=0.164
POLY 6	P=0.268	P=0.033*	P=0.486	P=0.128
COCH-ARM / FISHERS	P=0.379	P=0.030*	P=0.500	P=0.181
MAX-ISO-POLY-3	P=0.165	P=0.014*	P=0.274	P=0.076

Experiment Number: 20725 - 03
 Test Type: CHRONIC
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 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Pancreas				
Basophilic Focus				
LESION RATES				
OVERALL (a)	0/50 (0%)	1/50 (2%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/44.43	1/45.17	0/43.05	0/39.40
POLY-3 PERCENT (g)	0%	2.2%	0%	0%
TERMINAL (d)	0/36 (0%)	1/37 (3%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	---	729 (T)	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Pancreas Inflammation				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	1/50 (2%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	1/39.40
POLY-3 PERCENT (g)	0%	0%	0%	2.5%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	1/22 (5%)
FIRST INCIDENCE	---	---	---	729 (T)
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Pituitary Gland: Pars Distalis Hyperplasia				
LESION RATES				
OVERALL (a)	16/50 (32%)	18/50 (36%)	23/50 (46%)	10/50 (20%)
POLY-3 RATE (b)	16/44.77	18/46.00	23/43.30	10/41.77
POLY-3 PERCENT (g)	35.7%	39.1%	53.1%	23.9%
TERMINAL (d)	15/36 (42%)	16/37 (43%)	19/33 (58%)	3/22 (14%)
FIRST INCIDENCE	633	586	694	541
STATISTICAL TESTS				
POLY 3	P=0.172N	P=0.453	P=0.072	P=0.165N
POLY 1.5	P=0.132N	P=0.437	P=0.080	P=0.142N
POLY 6	P=0.257N	P=0.460	P=0.062	P=0.215N
COCH-ARM / FISHERS	P=0.107N	P=0.417	P=0.109	P=0.127N
MAX-ISO-POLY-3	P=0.061N	P=0.369	P=0.049*	P=0.121N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
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 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Pituitary Gland: Pars Intermedia Hyperplasia				
LESION RATES				
OVERALL (a)	1/50 (2%)	3/50 (6%)	1/50 (2%)	0/50 (0%)
POLY-3 RATE (b)	1/44.43	3/45.17	1/43.05	0/39.40
POLY-3 PERCENT (g)	2.3%	6.6%	2.3%	0%
TERMINAL (d)	1/36 (3%)	3/37 (8%)	1/33 (3%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	729 (T)	729 (T)	---
STATISTICAL TESTS				
POLY 3	P=0.238N	P=0.311	P=0.754	P=0.524N
POLY 1.5	P=0.221N	P=0.309	P=0.755	P=0.512N
POLY 6	P=0.266N	P=0.310	P=0.752	P=0.544N
COCH-ARM / FISHERS	P=0.205N	P=0.309	P=0.753N	P=0.500N
MAX-ISO-POLY-3	P=0.208N	P=0.160	P=0.490	P=0.188N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
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 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Prostate Inflammation				
LESION RATES				
OVERALL (a)	21/50 (42%)	18/50 (36%)	18/50 (36%)	12/50 (24%)
POLY-3 RATE (b)	21/46.63	18/47.67	18/46.85	12/41.92
POLY-3 PERCENT (g)	45%	37.8%	38.4%	28.6%
TERMINAL (d)	15/36 (42%)	13/37 (35%)	10/33 (30%)	6/22 (27%)
FIRST INCIDENCE	379	171	25	549
STATISTICAL TESTS				
POLY 3	P=0.079N	P=0.305N	P=0.330N	P=0.080N
POLY 1.5	P=0.056N	P=0.316N	P=0.337N	P=0.059N
POLY 6	P=0.125N	P=0.300N	P=0.319N	P=0.129N
COCH-ARM / FISHERS	P=0.037N*	P=0.341N	P=0.341N	P=0.044N*
MAX-ISO-POLY-3	P=0.104N	P=0.239N	P=0.258N	P=0.060N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
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 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Prostate: Epithelium, Ventral Hyperplasia				
LESION RATES				
OVERALL (a)	9/50 (18%)	9/50 (18%)	7/50 (14%)	10/50 (20%)
POLY-3 RATE (b)	9/44.56	9/46.08	7/43.19	10/40.39
POLY-3 PERCENT (g)	20.2%	19.5%	16.2%	24.8%
TERMINAL (d)	8/36 (22%)	7/37 (19%)	6/33 (18%)	6/22 (27%)
FIRST INCIDENCE	695	586	694	599
STATISTICAL TESTS				
POLY 3	P=0.360	P=0.573N	P=0.418N	P=0.404
POLY 1.5	P=0.409	P=0.586N	P=0.414N	P=0.453
POLY 6	P=0.293	P=0.565N	P=0.425N	P=0.325
COCH-ARM / FISHERS	P=0.462	P=0.602N	P=0.393N	P=0.500
MAX-ISO-POLY-3	P=0.412	P=0.468N	P=0.317N	P=0.315

Experiment Number: 20725 - 03
 Test Type: CHRONIC
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 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Skin				
Cyst Epithelial Inclusion				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	2/50 (4%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	2/39.40
POLY-3 PERCENT (g)	0%	0%	0%	5.1%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	2/22 (9%)
FIRST INCIDENCE	---	---	---	729 (T)
STATISTICAL TESTS				
POLY 3	P=0.041*	(e)	(e)	P=0.211
POLY 1.5	P=0.043*	(e)	(e)	P=0.224
POLY 6	P=0.038*	(e)	(e)	P=0.191
COCH-ARM / FISHERS	P=0.047*	(e)	(e)	P=0.247
MAX-ISO-POLY-3	P=0.032*	(e)	(e)	P=0.075

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Skin: Ear				
Inflammation Acute				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	0/39.40
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
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 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Skin: Epidermis Hyperplasia				
LESION RATES				
OVERALL (a)	2/50 (4%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	2/44.91	0/45.17	0/43.05	0/39.40
POLY-3 PERCENT (g)	4.5%	0%	0%	0%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	633	---	---	---
STATISTICAL TESTS				
POLY 3	P=0.108N	P=0.236N	P=0.247N	P=0.267N
POLY 1.5	P=0.110N	P=0.236N	P=0.244N	P=0.252N
POLY 6	P=0.102N	P=0.238N	P=0.251N	P=0.295N
COCH-ARM / FISHERS	P=0.112N	P=0.247N	P=0.247N	P=0.247N
MAX-ISO-POLY-3	P=0.059N	P=0.076N	P=0.085N	P=0.104N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Skin: Foot				
Inflammation Acute				
LESION RATES				
OVERALL (a)	3/50 (6%)	0/50 (0%)	0/50 (0%)	1/50 (2%)
POLY-3 RATE (b)	3/44.45	0/45.17	0/43.05	1/39.72
POLY-3 PERCENT (g)	6.8%	0%	0%	2.5%
TERMINAL (d)	2/36 (6%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	724	---	---	642
STATISTICAL TESTS				
POLY 3	P=0.243N	P=0.116N	P=0.124N	P=0.346N
POLY 1.5	P=0.243N	P=0.117N	P=0.123N	P=0.325N
POLY 6	P=0.237N	P=0.116N	P=0.126N	P=0.383N
COCH-ARM / FISHERS	P=0.242N	P=0.121N	P=0.121N	P=0.309N
MAX-ISO-POLY-3	P=0.068N	P=0.038N*	P=0.042N*	P=0.196N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Skin: Foot				
Inflammation Chronic				
LESION RATES				
OVERALL (a)	11/50 (22%)	7/50 (14%)	17/50 (34%)	23/50 (46%)
POLY-3 RATE (b)	11/45.62	7/45.70	17/44.06	23/45.96
POLY-3 PERCENT (g)	24.1%	15.3%	38.6%	50.1%
TERMINAL (d)	6/36 (17%)	5/37 (14%)	12/33 (36%)	3/22 (14%)
FIRST INCIDENCE	633	633	589	549
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.214N	P=0.103	P=0.007**
POLY 1.5	P<0.001**	P=0.215N	P=0.110	P=0.008**
POLY 6	P<0.001**	P=0.221N	P=0.093	P=0.006**
COCH-ARM / FISHERS	P<0.001**	P=0.218N	P=0.133	P=0.010**
MAX-ISO-POLY-3	P<0.001**	P=0.145N	P=0.071	P=0.004**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Skin: Foot Ulcer				
LESION RATES				
OVERALL (a)	14/50 (28%)	7/50 (14%)	17/50 (34%)	22/50 (44%)
POLY-3 RATE (b)	14/45.64	7/45.70	17/44.06	22/45.66
POLY-3 PERCENT (g)	30.7%	15.3%	38.6%	48.2%
TERMINAL (d)	8/36 (22%)	5/37 (14%)	12/33 (36%)	3/22 (14%)
FIRST INCIDENCE	633	633	589	549
STATISTICAL TESTS				
POLY 3	P=0.006**	P=0.065N	P=0.285	P=0.064
POLY 1.5	P=0.007**	P=0.066N	P=0.297	P=0.069
POLY 6	P=0.005**	P=0.068N	P=0.266	P=0.055
COCH-ARM / FISHERS	P=0.009**	P=0.070N	P=0.333	P=0.072
MAX-ISO-POLY-3	P=0.006**	P=0.039N*	P=0.219	P=0.040*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Skin: Foot				
Ulcer Focal				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	0/39.40
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Skin: Inguinal Inflammation				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	0/39.40
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Spleen				
Hematopoietic Cell Proliferation				
LESION RATES				
OVERALL (a)	41/50 (82%)	41/50 (82%)	36/50 (72%)	37/50 (74%)
POLY-3 RATE (b)	41/46.71	41/47.93	36/44.68	37/45.78
POLY-3 PERCENT (g)	87.8%	85.5%	80.6%	80.8%
TERMINAL (d)	33/36 (92%)	35/37 (95%)	29/33 (88%)	18/22 (82%)
FIRST INCIDENCE	432	171	582	541
STATISTICAL TESTS				
POLY 3	P=0.176N	P=0.492N	P=0.237N	P=0.242N
POLY 1.5	P=0.154N	P=0.522N	P=0.222N	P=0.222N
POLY 6	P=0.234N	P=0.511N	P=0.275N	P=0.314N
COCH-ARM / FISHERS	P=0.146N	P=0.602N	P=0.171N	P=0.235N
MAX-ISO-POLY-3	P=0.256N	P=0.365N	P=0.157N	P=0.157N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Spleen Pigmentation Hemosiderin				
LESION RATES				
OVERALL (a)	18/50 (36%)	22/50 (44%)	20/50 (40%)	20/50 (40%)
POLY-3 RATE (b)	18/46.75	22/48.15	20/46.29	20/42.71
POLY-3 PERCENT (g)	38.5%	45.7%	43.2%	46.8%
TERMINAL (d)	13/36 (36%)	15/37 (41%)	13/33 (39%)	12/22 (55%)
FIRST INCIDENCE	379	171	527	569
STATISTICAL TESTS				
POLY 3	P=0.285	P=0.308	P=0.401	P=0.278
POLY 1.5	P=0.358	P=0.295	P=0.393	P=0.342
POLY 6	P=0.199	P=0.316	P=0.414	P=0.194
COCH-ARM / FISHERS	P=0.458	P=0.270	P=0.418	P=0.418
MAX-ISO-POLY-3	P=0.365	P=0.242	P=0.323	P=0.220

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Spleen: Lymphoid Follicle Atrophy				
LESION RATES				
OVERALL (a)	6/50 (12%)	5/50 (10%)	4/50 (8%)	12/50 (24%)
POLY-3 RATE (b)	6/45.89	5/47.39	4/45.24	12/43.69
POLY-3 PERCENT (g)	13.1%	10.6%	8.8%	27.5%
TERMINAL (d)	2/36 (6%)	1/37 (3%)	0/33 (0%)	2/22 (9%)
FIRST INCIDENCE	486	171	25	499
STATISTICAL TESTS				
POLY 3	P=0.027*	P=0.478N	P=0.379N	P=0.073
POLY 1.5	P=0.031*	P=0.483N	P=0.375N	P=0.084
POLY 6	P=0.022*	P=0.478N	P=0.385N	P=0.057
COCH-ARM / FISHERS	P=0.038*	P=0.500N	P=0.370N	P=0.096
MAX-ISO-POLY-3	P=0.022*	P=0.355N	P=0.262N	P=0.046*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Stomach, Forestomach Inflammation				
LESION RATES				
OVERALL (a)	1/50 (2%)	0/50 (0%)	4/50 (8%)	0/50 (0%)
POLY-3 RATE (b)	1/44.77	0/45.17	4/44.65	0/39.40
POLY-3 PERCENT (g)	2.2%	0%	9%	0%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	1/33 (3%)	0/22 (0%)
FIRST INCIDENCE	633	---	25	---
STATISTICAL TESTS				
POLY 3	P=0.598N	P=0.498N	P=0.178	P=0.525N
POLY 1.5	P=0.562N	P=0.499N	P=0.179	P=0.513N
POLY 6	P=0.555	P=0.500N	P=0.176	P=0.546N
COCH-ARM / FISHERS	P=0.525N	P=0.500N	P=0.181	P=0.500N
MAX-ISO-POLY-3	P=0.275N	P=0.158N	P=0.083	P=0.189N

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Stomach, Forestomach Ulcer				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	1/50 (2%)	0/50 (0%)
POLY-3 RATE (b)	0/44.43	0/45.17	1/43.52	0/39.40
POLY-3 PERCENT (g)	0%	0%	2.3%	0%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	---	---	592	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Stomach, Forestomach: Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	1/50 (2%)	3/50 (6%)	4/50 (8%)	1/50 (2%)
POLY-3 RATE (b)	1/44.77	3/45.24	4/44.61	1/39.66
POLY-3 PERCENT (g)	2.2%	6.6%	9%	2.5%
TERMINAL (d)	0/36 (0%)	2/37 (5%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	633	711	561	659
STATISTICAL TESTS				
POLY 3	P=0.569	P=0.309	P=0.177	P=0.733
POLY 1.5	P=0.564N	P=0.308	P=0.176	P=0.747
POLY 6	P=0.497	P=0.307	P=0.179	P=0.709
COCH-ARM / FISHERS	P=0.526N	P=0.309	P=0.181	P=0.753N
MAX-ISO-POLY-3	P=0.363	P=0.158	P=0.083	P=0.467

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Testes				
Edema				
LESION RATES				
OVERALL (a)	4/50 (8%)	2/50 (4%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	4/44.43	2/45.17	0/43.05	0/39.40
POLY-3 PERCENT (g)	9%	4.4%	0%	0%
TERMINAL (d)	4/36 (11%)	2/37 (5%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	729 (T)	---	---
STATISTICAL TESTS				
POLY 3	P=0.019N*	P=0.329N	P=0.064N	P=0.077N
POLY 1.5	P=0.018N*	P=0.333N	P=0.064N	P=0.068N
POLY 6	P=0.020N*	P=0.329N	P=0.065N	P=0.094N
COCH-ARM / FISHERS	P=0.018N*	P=0.339N	P=0.059N	P=0.059N
MAX-ISO-POLY-3	P=0.026N*	P=0.196N	P=0.023N*	P=0.033N*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Testes: Germinal Epithelium Degeneration				
LESION RATES				
OVERALL (a)	5/50 (10%)	10/50 (20%)	4/50 (8%)	4/50 (8%)
POLY-3 RATE (b)	5/44.43	10/45.87	4/43.91	4/39.94
POLY-3 PERCENT (g)	11.3%	21.8%	9.1%	10%
TERMINAL (d)	5/36 (14%)	7/37 (19%)	2/33 (6%)	3/22 (14%)
FIRST INCIDENCE	729 (T)	611	592	562
STATISTICAL TESTS				
POLY 3	P=0.286N	P=0.143	P=0.507N	P=0.567N
POLY 1.5	P=0.253N	P=0.137	P=0.509N	P=0.532N
POLY 6	P=0.341N	P=0.147	P=0.505N	P=0.623N
COCH-ARM / FISHERS	P=0.222N	P=0.131	P=0.500N	P=0.500N
MAX-ISO-POLY-3	P=0.297N	P=0.092	P=0.370N	P=0.429N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Testes: Interstitial Cell Hyperplasia				
LESION RATES				
OVERALL (a)	4/50 (8%)	1/50 (2%)	3/50 (6%)	1/50 (2%)
POLY-3 RATE (b)	4/44.71	1/45.17	3/43.05	1/39.40
POLY-3 PERCENT (g)	9%	2.2%	7%	2.5%
TERMINAL (d)	3/36 (8%)	1/37 (3%)	3/33 (9%)	1/22 (5%)
FIRST INCIDENCE	654	729 (T)	729 (T)	729 (T)
STATISTICAL TESTS				
POLY 3	P=0.228N	P=0.175N	P=0.521N	P=0.219N
POLY 1.5	P=0.209N	P=0.177N	P=0.516N	P=0.198N
POLY 6	P=0.258N	P=0.177N	P=0.528N	P=0.257N
COCH-ARM / FISHERS	P=0.190N	P=0.181N	P=0.500N	P=0.181N
MAX-ISO-POLY-3	P=0.176N	P=0.082N	P=0.368N	P=0.122N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Thymus Atrophy				
LESION RATES				
OVERALL (a)	46/47 (98%)	47/48 (98%)	45/48 (94%)	47/48 (98%)
POLY-3 RATE (b)	46/46.38	47/48.00	45/46.02	47/47.53
POLY-3 PERCENT (g)	99.2%	97.9%	97.8%	98.9%
TERMINAL (d)	35/35 (100%)	34/35 (97%)	33/33 (100%)	22/22 (100%)
FIRST INCIDENCE	379	171	25	499
STATISTICAL TESTS				
POLY 3	P=0.689N	P=0.648N	P=0.675N	P=0.906N
POLY 1.5	P=0.628N	P=0.707N	P=0.486N	P=0.828N
POLY 6	P=0.675	P=0.567N	P=0.970N	P=0.997N
COCH-ARM / FISHERS	P=0.564N	P=0.747	P=0.316N	P=0.747
MAX-ISO-POLY-3	P=0.510N	P=0.293N	P=0.208N	P=0.419N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Thymus Hyperplasia Lymphoid				
LESION RATES				
OVERALL (a)	1/47 (2%)	2/48 (4%)	1/48 (2%)	0/48 (0%)
POLY-3 RATE (b)	1/42.15	2/43.17	1/42.12	0/38.16
POLY-3 PERCENT (g)	2.4%	4.6%	2.4%	0%
TERMINAL (d)	1/35 (3%)	2/35 (6%)	0/33 (0%)	0/22 (0%)
FIRST INCIDENCE	729 (T)	729 (T)	325	---
STATISTICAL TESTS				
POLY 3	P=0.277N	P=0.508	P=0.761	P=0.520N
POLY 1.5	P=0.263N	P=0.508	P=0.760N	P=0.508N
POLY 6	P=0.300N	P=0.506	P=0.759	P=0.539N
COCH-ARM / FISHERS	P=0.247N	P=0.508	P=0.747N	P=0.495N
MAX-ISO-POLY-3	P=0.274N	P=0.289	P=0.499	P=0.184N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Thyroid Gland: C-Cell Hyperplasia				
LESION RATES				
OVERALL (a)	8/50 (16%)	13/50 (26%)	8/50 (16%)	2/50 (4%)
POLY-3 RATE (b)	8/44.43	13/45.49	8/44.01	2/39.42
POLY-3 PERCENT (g)	18%	28.6%	18.2%	5.1%
TERMINAL (d)	8/36 (22%)	12/37 (32%)	5/33 (15%)	1/22 (5%)
FIRST INCIDENCE	729 (T)	640	592	724
STATISTICAL TESTS				
POLY 3	P=0.031N*	P=0.174	P=0.600	P=0.067N
POLY 1.5	P=0.022N*	P=0.169	P=0.596	P=0.055N
POLY 6	P=0.052N	P=0.175	P=0.605	P=0.092N
COCH-ARM / FISHERS	P=0.017N*	P=0.163	P=0.607N	P=0.046N*
MAX-ISO-POLY-3	P=0.030N*	P=0.120	P=0.491	P=0.040N*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Thyroid Gland: Follicular Cell Hyperplasia				
LESION RATES				
OVERALL (a)	4/50 (8%)	2/50 (4%)	1/50 (2%)	1/50 (2%)
POLY-3 RATE (b)	4/44.77	2/45.72	1/43.45	1/39.40
POLY-3 PERCENT (g)	8.9%	4.4%	2.3%	2.5%
TERMINAL (d)	3/36 (8%)	0/37 (0%)	0/33 (0%)	1/22 (5%)
FIRST INCIDENCE	633	600	617	729 (T)
STATISTICAL TESTS				
POLY 3	P=0.129N	P=0.327N	P=0.188N	P=0.219N
POLY 1.5	P=0.120N	P=0.332N	P=0.186N	P=0.198N
POLY 6	P=0.140N	P=0.326N	P=0.190N	P=0.258N
COCH-ARM / FISHERS	P=0.110N	P=0.339N	P=0.181N	P=0.181N
MAX-ISO-POLY-3	P=0.149N	P=0.196N	P=0.092N	P=0.123N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Thyroid Gland: Follicular Cell Hypertrophy				
LESION RATES				
OVERALL (a)	2/50 (4%)	2/50 (4%)	5/50 (10%)	5/50 (10%)
POLY-3 RATE (b)	2/45.29	2/45.17	5/43.65	5/40.29
POLY-3 PERCENT (g)	4.4%	4.4%	11.5%	12.4%
TERMINAL (d)	1/36 (3%)	2/37 (5%)	3/33 (9%)	3/22 (14%)
FIRST INCIDENCE	379	729 (T)	592	569
STATISTICAL TESTS				
POLY 3	P=0.078	P=0.693	P=0.201	P=0.171
POLY 1.5	P=0.093	P=0.692	P=0.204	P=0.192
POLY 6	P=0.059	P=0.691	P=0.199	P=0.141
COCH-ARM / FISHERS	P=0.113	P=0.691N	P=0.218	P=0.218
MAX-ISO-POLY-3	P=0.122	P=0.498	P=0.113	P=0.101

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Trachea				
Inflammation Chronic				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	1/50 (2%)	8/50 (16%)
POLY-3 RATE (b)	0/44.43	0/45.17	1/43.54	8/40.16
POLY-3 PERCENT (g)	0%	0%	2.3%	19.9%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	6/22 (27%)
FIRST INCIDENCE	---	---	582	601
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	P=0.496	P=0.002**
POLY 1.5	P<0.001**	(e)	P=0.496	P=0.003**
POLY 6	P<0.001**	(e)	P=0.496	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	P=0.500	P=0.003**
MAX-ISO-POLY-3	P<0.001**	(e)	P=0.158	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Trachea: Epithelium Atrophy				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	7/50 (14%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	7/40.52
POLY-3 PERCENT (g)	0%	0%	0%	17.3%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	4/22 (18%)
FIRST INCIDENCE	---	---	---	499
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P=0.005**
POLY 1.5	P<0.001**	(e)	(e)	P=0.006**
POLY 6	P<0.001**	(e)	(e)	P=0.003**
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P=0.006**
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P=0.002**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Trachea: Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	1/50 (2%)	32/50 (64%)
POLY-3 RATE (b)	0/44.43	0/45.17	1/43.05	32/44.01
POLY-3 PERCENT (g)	0%	0%	2.3%	72.7%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	1/33 (3%)	18/22 (82%)
FIRST INCIDENCE	---	---	729 (T)	549
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	P=0.494	P<0.001**
POLY 1.5	P<0.001**	(e)	P=0.495	P<0.001**
POLY 6	P<0.001**	(e)	P=0.492	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	P=0.500	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	P=0.158	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Trachea: Epithelium Metaplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	12/50 (24%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	12/40.76
POLY-3 PERCENT (g)	0%	0%	0%	29.4%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	8/22 (36%)
FIRST INCIDENCE	---	---	---	619
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P<0.001**
POLY 1.5	P<0.001**	(e)	(e)	P<0.001**
POLY 6	P<0.001**	(e)	(e)	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Trachea: Epithelium Necrosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	6/50 (12%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	6/39.72
POLY-3 PERCENT (g)	0%	0%	0%	15.1%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	5/22 (23%)
FIRST INCIDENCE	---	---	---	642
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P=0.010**
POLY 1.5	P<0.001**	(e)	(e)	P=0.012*
POLY 6	P<0.001**	(e)	(e)	P=0.007**
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P=0.013*
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P=0.004**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Trachea: Epithelium Regeneration				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	5/50 (10%)	12/50 (24%)
POLY-3 RATE (b)	0/44.43	0/45.17	5/43.05	12/41.08
POLY-3 PERCENT (g)	0%	0%	11.6%	29.2%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	5/33 (15%)	7/22 (32%)
FIRST INCIDENCE	---	---	729 (T)	499
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	P=0.028*	P<0.001**
POLY 1.5	P<0.001**	(e)	P=0.028*	P<0.001**
POLY 6	P<0.001**	(e)	P=0.027*	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	P=0.028*	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	P=0.009**	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Males			
	Control	12.5 ppm	25 ppm	50 ppm
Trachea: Submucosa Fibrosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	27/50 (54%)
POLY-3 RATE (b)	0/44.43	0/45.17	0/43.05	27/43.50
POLY-3 PERCENT (g)	0%	0%	0%	62.1%
TERMINAL (d)	0/36 (0%)	0/37 (0%)	0/33 (0%)	15/22 (68%)
FIRST INCIDENCE	---	---	---	499
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P<0.001**
POLY 1.5	P<0.001**	(e)	(e)	P<0.001**
POLY 6	P<0.001**	(e)	(e)	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Adrenal Cortex				
Angiectasis				
LESION RATES				
OVERALL (a)	0/50 (0%)	2/50 (4%)	1/50 (2%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	2/44.03	1/40.02	0/43.50
POLY-3 PERCENT (g)	0%	4.5%	2.5%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	1/24 (4%)	0/30 (0%)
FIRST INCIDENCE	---	519	731 (T)	---
STATISTICAL TESTS				
POLY 3	P=0.472N	P=0.239	P=0.483	(e)
POLY 1.5	P=0.469N	P=0.237	P=0.490	(e)
POLY 6	P=0.476N	P=0.242	P=0.476	(e)
COCH-ARM / FISHERS	P=0.469N	P=0.247	P=0.500	(e)
MAX-ISO-POLY-3	P=0.323	P=0.078	P=0.158	(e)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Adrenal Cortex Degeneration Cystic				
LESION RATES				
OVERALL (a)	12/50 (24%)	7/50 (14%)	12/50 (24%)	12/50 (24%)
POLY-3 RATE (b)	12/44.51	7/43.26	12/40.67	12/44.55
POLY-3 PERCENT (g)	27%	16.2%	29.5%	26.9%
TERMINAL (d)	9/34 (27%)	5/31 (16%)	9/24 (38%)	8/30 (27%)
FIRST INCIDENCE	599	687	589	633
STATISTICAL TESTS				
POLY 3	P=0.384	P=0.165N	P=0.492	P=0.593N
POLY 1.5	P=0.389	P=0.163N	P=0.535	P=0.588N
POLY 6	P=0.374	P=0.169N	P=0.445	P=0.588
COCH-ARM / FISHERS	P=0.381	P=0.154N	P=0.592N	P=0.592N
MAX-ISO-POLY-3	P=0.378	P=0.112N	P=0.399	P=0.498N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Adrenal Cortex Hematopoietic Cell Proliferation				
LESION RATES				
OVERALL (a)	1/50 (2%)	2/50 (4%)	3/50 (6%)	1/50 (2%)
POLY-3 RATE (b)	1/43.58	2/43.23	3/41.42	1/44.20
POLY-3 PERCENT (g)	2.3%	4.6%	7.2%	2.3%
TERMINAL (d)	1/34 (3%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	731 (T)	687	516	491
STATISTICAL TESTS				
POLY 3	P=0.572N	P=0.497	P=0.287	P=0.758N
POLY 1.5	P=0.571N	P=0.497	P=0.294	P=0.758N
POLY 6	P=0.575N	P=0.500	P=0.280	P=0.759N
COCH-ARM / FISHERS	P=0.579N	P=0.500	P=0.309	P=0.753N
MAX-ISO-POLY-3	P=0.455N	P=0.279	P=0.147	P=0.495N

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Adrenal Cortex: Zona Fasciculata Hyperplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	0/43.50
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Adrenal Cortex: Zona Fasciculata Hyperplasia Focal				
LESION RATES				
OVERALL (a)	7/50 (14%)	3/50 (6%)	7/50 (14%)	10/50 (20%)
POLY-3 RATE (b)	7/43.99	3/43.03	7/40.05	10/44.61
POLY-3 PERCENT (g)	15.9%	7%	17.5%	22.4%
TERMINAL (d)	6/34 (18%)	3/31 (10%)	6/24 (25%)	6/30 (20%)
FIRST INCIDENCE	614	731 (T)	723	544
STATISTICAL TESTS				
POLY 3	P=0.115	P=0.165N	P=0.540	P=0.306
POLY 1.5	P=0.117	P=0.164N	P=0.571	P=0.306
POLY 6	P=0.113	P=0.166N	P=0.506	P=0.304
COCH-ARM / FISHERS	P=0.114	P=0.159N	P=0.613N	P=0.298
MAX-ISO-POLY-3	P=0.119	P=0.097N	P=0.425	P=0.221

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Adrenal Cortex: Zona Fasciculata Hypertrophy				
LESION RATES				
OVERALL (a)	1/50 (2%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	1/43.58	0/43.03	0/40.02	0/43.50
POLY-3 PERCENT (g)	2.3%	0%	0%	0%
TERMINAL (d)	1/34 (3%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	731 (T)	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Adrenal Cortex: Zona Fasciculata Hypertrophy Focal				
LESION RATES				
OVERALL (a)	22/50 (44%)	12/50 (24%)	15/50 (30%)	18/50 (36%)
POLY-3 RATE (b)	22/45.63	12/43.36	15/42.00	18/45.49
POLY-3 PERCENT (g)	48.2%	27.7%	35.7%	39.6%
TERMINAL (d)	15/34 (44%)	8/31 (26%)	9/24 (38%)	9/30 (30%)
FIRST INCIDENCE	547	687	361	491
STATISTICAL TESTS				
POLY 3	P=0.383N	P=0.034N*	P=0.163N	P=0.265N
POLY 1.5	P=0.381N	P=0.031N*	P=0.133N	P=0.260N
POLY 6	P=0.393N	P=0.039N*	P=0.203N	P=0.279N
COCH-ARM / FISHERS	P=0.402N	P=0.028N*	P=0.107N	P=0.270N
MAX-ISO-POLY-3	P=0.126N	P=0.023N*	P=0.124N	P=0.201N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Adrenal Medulla Hyperplasia				
LESION RATES				
OVERALL (a)	1/50 (2%)	0/50 (0%)	0/49 (0%)	1/50 (2%)
POLY-3 RATE (b)	1/43.58	0/43.03	0/39.02	1/43.85
POLY-3 PERCENT (g)	2.3%	0%	0%	2.3%
TERMINAL (d)	1/34 (3%)	0/31 (0%)	0/23 (0%)	0/30 (0%)
FIRST INCIDENCE	731 (T)	---	---	635
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Blood Vessel Inflammation				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	1/50 (2%)	1/50 (2%)
POLY-3 RATE (b)	0/43.58	0/43.03	1/40.02	1/43.50
POLY-3 PERCENT (g)	0%	0%	2.5%	2.3%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	1/24 (4%)	1/30 (3%)
FIRST INCIDENCE	---	---	731 (T)	731 (T)
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Bone Marrow: Myeloid Cell Hyperplasia				
LESION RATES				
OVERALL (a)	12/50 (24%)	19/50 (38%)	20/50 (40%)	36/50 (72%)
POLY-3 RATE (b)	12/45.59	19/48.36	20/44.71	36/48.70
POLY-3 PERCENT (g)	26.3%	39.3%	44.7%	73.9%
TERMINAL (d)	7/34 (21%)	8/31 (26%)	7/24 (29%)	19/30 (63%)
FIRST INCIDENCE	579	137	442	491
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.131	P=0.050*	P<0.001**
POLY 1.5	P<0.001**	P=0.119	P=0.057	P<0.001**
POLY 6	P<0.001**	P=0.141	P=0.044*	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.097	P=0.066	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.096	P=0.032*	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Clitoral Gland Ectasia				
LESION RATES				
OVERALL (a)	1/49 (2%)	2/50 (4%)	2/50 (4%)	0/49 (0%)
POLY-3 RATE (b)	1/42.92	2/43.09	2/40.16	0/42.53
POLY-3 PERCENT (g)	2.3%	4.6%	5%	0%
TERMINAL (d)	1/34 (3%)	1/31 (3%)	1/24 (4%)	0/30 (0%)
FIRST INCIDENCE	731 (T)	715	695	---
STATISTICAL TESTS				
POLY 3	P=0.304N	P=0.501	P=0.477	P=0.502N
POLY 1.5	P=0.300N	P=0.502	P=0.490	P=0.500N
POLY 6	P=0.311N	P=0.501	P=0.464	P=0.505N
COCH-ARM / FISHERS	P=0.299N	P=0.508	P=0.508	P=0.500N
MAX-ISO-POLY-3	P=0.223N	P=0.282	P=0.268	P=0.161N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Clitoral Gland Inflammation				
LESION RATES				
OVERALL (a)	0/49 (0%)	2/50 (4%)	0/50 (0%)	0/49 (0%)
POLY-3 RATE (b)	0/42.92	2/43.03	0/40.02	0/42.53
POLY-3 PERCENT (g)	0%	4.7%	0%	0%
TERMINAL (d)	0/34 (0%)	2/31 (7%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	731 (T)	---	---
STATISTICAL TESTS				
POLY 3	P=0.426N	P=0.237	(e)	(e)
POLY 1.5	P=0.421N	P=0.238	(e)	(e)
POLY 6	P=0.432N	P=0.237	(e)	(e)
COCH-ARM / FISHERS	P=0.417N	P=0.253	(e)	(e)
MAX-ISO-POLY-3	P=0.253N	P=0.077	(e)	(e)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Anterior Chamber Inflammation				
LESION RATES				
OVERALL (a)	1/50 (2%)	0/50 (0%)	6/50 (12%)	5/50 (10%)
POLY-3 RATE (b)	1/43.76	0/43.03	6/40.71	5/44.43
POLY-3 PERCENT (g)	2.3%	0%	14.7%	11.3%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	3/24 (13%)	3/30 (10%)
FIRST INCIDENCE	683	---	515	537
STATISTICAL TESTS				
POLY 3	P=0.023*	P=0.503N	P=0.044*	P=0.104
POLY 1.5	P=0.023*	P=0.503N	P=0.049*	P=0.104
POLY 6	P=0.022*	P=0.504N	P=0.040*	P=0.103
COCH-ARM / FISHERS	P=0.023*	P=0.500N	P=0.056	P=0.102
MAX-ISO-POLY-3	P=0.020*	P=0.163N	P=0.021*	P=0.047*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Cornea				
Inflammation Chronic				
LESION RATES				
OVERALL (a)	2/50 (4%)	6/50 (12%)	23/50 (46%)	31/50 (62%)
POLY-3 RATE (b)	2/44.51	6/43.03	23/42.24	31/46.17
POLY-3 PERCENT (g)	4.5%	13.9%	54.5%	67.2%
TERMINAL (d)	0/34 (0%)	6/31 (19%)	15/24 (63%)	22/30 (73%)
FIRST INCIDENCE	547	731 (T)	509	537
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.121	P<0.001**	P<0.001**
POLY 1.5	P<0.001**	P=0.125	P<0.001**	P<0.001**
POLY 6	P<0.001**	P=0.117	P<0.001**	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.134	P<0.001**	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.065	P<0.001**	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Cornea Mineralization				
LESION RATES				
OVERALL (a)	0/50 (0%)	1/50 (2%)	0/50 (0%)	2/50 (4%)
POLY-3 RATE (b)	0/43.58	1/43.47	0/40.02	2/43.82
POLY-3 PERCENT (g)	0%	2.3%	0%	4.6%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	1/30 (3%)
FIRST INCIDENCE	---	603	---	642
STATISTICAL TESTS				
POLY 3	P=0.137	P=0.499	(e)	P=0.238
POLY 1.5	P=0.138	P=0.499	(e)	P=0.239
POLY 6	P=0.135	P=0.501	(e)	P=0.237
COCH-ARM / FISHERS	P=0.138	P=0.500	(e)	P=0.247
MAX-ISO-POLY-3	P=0.079	P=0.158	(e)	P=0.077

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
<hr/>				
Eye: Cornea Necrosis				
<hr/>				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	1/50 (2%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	0/43.03	1/40.05	0/43.50
POLY-3 PERCENT (g)	0%	0%	2.5%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	724	---
<hr/>				
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Cornea, Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	3/50 (6%)	8/50 (16%)	5/50 (10%)
POLY-3 RATE (b)	0/43.58	3/43.03	8/40.23	5/43.93
POLY-3 PERCENT (g)	0%	7%	19.9%	11.4%
TERMINAL (d)	0/34 (0%)	3/31 (10%)	6/24 (25%)	3/30 (10%)
FIRST INCIDENCE	---	731 (T)	684	635
STATISTICAL TESTS				
POLY 3	P=0.037*	P=0.116	P=0.002**	P=0.031*
POLY 1.5	P=0.038*	P=0.116	P=0.003**	P=0.031*
POLY 6	P=0.036*	P=0.116	P=0.002**	P=0.030*
COCH-ARM / FISHERS	P=0.039*	P=0.121	P=0.003**	P=0.028*
MAX-ISO-POLY-3	P=0.008**	P=0.038*	P<0.001**	P=0.010**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Cornea, Epithelium Ulcer				
LESION RATES				
OVERALL (a)	0/50 (0%)	1/50 (2%)	2/50 (4%)	13/50 (26%)
POLY-3 RATE (b)	0/43.58	1/43.03	2/40.05	13/45.11
POLY-3 PERCENT (g)	0%	2.3%	5%	28.8%
TERMINAL (d)	0/34 (0%)	1/31 (3%)	1/24 (4%)	9/30 (30%)
FIRST INCIDENCE	---	731 (T)	724	544
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.497	P=0.219	P<0.001**
POLY 1.5	P<0.001**	P=0.498	P=0.226	P<0.001**
POLY 6	P<0.001**	P=0.498	P=0.211	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.500	P=0.247	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.158	P=0.075	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Iris Inflammation Acute				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	5/50 (10%)	4/50 (8%)
POLY-3 RATE (b)	0/43.58	0/43.03	5/40.05	4/43.82
POLY-3 PERCENT (g)	0%	0%	12.5%	9.1%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	4/24 (17%)	3/30 (10%)
FIRST INCIDENCE	---	---	724	642
STATISTICAL TESTS				
POLY 3	P=0.016*	(e)	P=0.024*	P=0.061
POLY 1.5	P=0.016*	(e)	P=0.026*	P=0.061
POLY 6	P=0.015*	(e)	P=0.021*	P=0.060
COCH-ARM / FISHERS	P=0.017*	(e)	P=0.028*	P=0.059
MAX-ISO-POLY-3	P=0.016*	(e)	P=0.009**	P=0.020*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Lens				
Cataract				
LESION RATES				
OVERALL (a)	1/50 (2%)	1/50 (2%)	6/50 (12%)	9/50 (18%)
POLY-3 RATE (b)	1/43.58	1/43.03	6/40.05	9/43.99
POLY-3 PERCENT (g)	2.3%	2.3%	15%	20.5%
TERMINAL (d)	1/34 (3%)	1/31 (3%)	5/24 (21%)	6/30 (20%)
FIRST INCIDENCE	731 (T)	731 (T)	724	625
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.758	P=0.042*	P=0.008**
POLY 1.5	P<0.001**	P=0.758	P=0.048*	P=0.008**
POLY 6	P<0.001**	P=0.759	P=0.037*	P=0.008**
COCH-ARM / FISHERS	P<0.001**	P=0.753N	P=0.056	P=0.008**
MAX-ISO-POLY-3	P<0.001**	P=0.496	P=0.021*	P=0.003**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Retina Degeneration				
LESION RATES				
OVERALL (a)	10/50 (20%)	7/50 (14%)	11/50 (22%)	15/50 (30%)
POLY-3 RATE (b)	10/44.33	7/43.38	11/40.51	15/44.56
POLY-3 PERCENT (g)	22.6%	16.1%	27.2%	33.7%
TERMINAL (d)	8/34 (24%)	5/31 (16%)	7/24 (29%)	10/30 (33%)
FIRST INCIDENCE	547	654	617	537
STATISTICAL TESTS				
POLY 3	P=0.066	P=0.312N	P=0.406	P=0.174
POLY 1.5	P=0.070	P=0.310N	P=0.445	P=0.179
POLY 6	P=0.061	P=0.312N	P=0.367	P=0.167
COCH-ARM / FISHERS	P=0.071	P=0.298N	P=0.500	P=0.178
MAX-ISO-POLY-3	P=0.086	P=0.226N	P=0.319	P=0.121

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Eye: Unilateral Phthisis Bulbi				
LESION RATES				
OVERALL (a)	0/50 (0%)	1/50 (2%)	0/50 (0%)	8/50 (16%)
POLY-3 RATE (b)	0/43.58	1/43.03	0/40.02	8/43.56
POLY-3 PERCENT (g)	0%	2.3%	0%	18.4%
TERMINAL (d)	0/34 (0%)	1/31 (3%)	0/24 (0%)	5/30 (17%)
FIRST INCIDENCE	---	731 (T)	---	724
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.497	(e)	P=0.003**
POLY 1.5	P<0.001**	P=0.498	(e)	P=0.004**
POLY 6	P<0.001**	P=0.498	(e)	P=0.003**
COCH-ARM / FISHERS	P<0.001**	P=0.500	(e)	P=0.003**
MAX-ISO-POLY-3	P<0.001**	P=0.158	(e)	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Harderian Gland Hyperplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	0/43.50
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Heart				
Cardiomyopathy				
LESION RATES				
OVERALL (a)	21/50 (42%)	28/50 (56%)	24/50 (48%)	27/50 (54%)
POLY-3 RATE (b)	21/45.82	28/44.45	24/42.94	27/46.37
POLY-3 PERCENT (g)	45.8%	63%	55.9%	58.2%
TERMINAL (d)	15/34 (44%)	20/31 (65%)	14/24 (58%)	17/30 (57%)
FIRST INCIDENCE	417	571	516	537
STATISTICAL TESTS				
POLY 3	P=0.222	P=0.071	P=0.227	P=0.158
POLY 1.5	P=0.224	P=0.081	P=0.270	P=0.160
POLY 6	P=0.228	P=0.066	P=0.195	P=0.163
COCH-ARM / FISHERS	P=0.218	P=0.115	P=0.344	P=0.158
MAX-ISO-POLY-3	P=0.147	P=0.048*	P=0.175	P=0.113

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Intestine Large, Rectum Metaplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	0/43.50
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Islets, Pancreatic Hyperplasia				
LESION RATES				
OVERALL (a)	4/50 (8%)	2/50 (4%)	1/50 (2%)	0/50 (0%)
POLY-3 RATE (b)	4/44.39	2/43.29	1/40.02	0/43.50
POLY-3 PERCENT (g)	9%	4.6%	2.5%	0%
TERMINAL (d)	3/34 (9%)	1/31 (3%)	1/24 (4%)	0/30 (0%)
FIRST INCIDENCE	417	661	731 (T)	---
STATISTICAL TESTS				
POLY 3	P=0.030N*	P=0.349N	P=0.211N	P=0.063N
POLY 1.5	P=0.029N*	P=0.347N	P=0.198N	P=0.061N
POLY 6	P=0.031N*	P=0.347N	P=0.225N	P=0.064N
COCH-ARM / FISHERS	P=0.029N*	P=0.339N	P=0.181N	P=0.059N
MAX-ISO-POLY-3	P=0.023N*	P=0.212N	P=0.114N	P=0.021N*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Kidney				
Accumulation, Hyaline Droplet				
LESION RATES				
OVERALL (a)	0/50 (0%)	1/50 (2%)	2/50 (4%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	1/43.20	2/40.70	0/43.50
POLY-3 PERCENT (g)	0%	2.3%	4.9%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	687	516	---
STATISTICAL TESTS				
POLY 3	P=0.618N	P=0.498	P=0.222	(e)
POLY 1.5	P=0.616N	P=0.498	P=0.228	(e)
POLY 6	P=0.623N	P=0.499	P=0.216	(e)
COCH-ARM / FISHERS	P=0.618N	P=0.500	P=0.247	(e)
MAX-ISO-POLY-3	P=0.319	P=0.158	P=0.075	(e)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Kidney				
Calculus Micro Observation Only				
LESION RATES				
OVERALL (a)	27/50 (54%)	29/50 (58%)	35/50 (70%)	27/50 (54%)
POLY-3 RATE (b)	27/45.81	29/45.50	35/45.25	27/47.96
POLY-3 PERCENT (g)	58.9%	63.7%	77.4%	56.3%
TERMINAL (d)	19/34 (56%)	19/31 (61%)	19/24 (79%)	13/30 (43%)
FIRST INCIDENCE	547	519	452	491
STATISTICAL TESTS				
POLY 3	P=0.417N	P=0.397	P=0.040*	P=0.480N
POLY 1.5	P=0.462N	P=0.397	P=0.052	P=0.513N
POLY 6	P=0.368N	P=0.403	P=0.031*	P=0.443N
COCH-ARM / FISHERS	P=0.520	P=0.420	P=0.074	P=0.579N
MAX-ISO-POLY-3	P=0.232N	P=0.317	P=0.024*	P=0.397N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Kidney Infarct				
LESION RATES				
OVERALL (a)	1/50 (2%)	0/50 (0%)	2/50 (4%)	0/50 (0%)
POLY-3 RATE (b)	1/43.58	0/43.03	2/40.04	0/43.50
POLY-3 PERCENT (g)	2.3%	0%	5%	0%
TERMINAL (d)	1/34 (3%)	0/31 (0%)	1/24 (4%)	0/30 (0%)
FIRST INCIDENCE	731 (T)	---	727	---
STATISTICAL TESTS				
POLY 3	P=0.454N	P=0.503N	P=0.470	P=0.500N
POLY 1.5	P=0.453N	P=0.502N	P=0.483	P=0.499N
POLY 6	P=0.458N	P=0.502N	P=0.458	P=0.502N
COCH-ARM / FISHERS	P=0.456N	P=0.500N	P=0.500	P=0.500N
MAX-ISO-POLY-3	P=0.320N	P=0.162N	P=0.264	P=0.159N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Kidney Nephropathy				
LESION RATES				
OVERALL (a)	12/50 (24%)	11/50 (22%)	10/50 (20%)	11/50 (22%)
POLY-3 RATE (b)	12/44.84	11/43.58	10/40.62	11/45.51
POLY-3 PERCENT (g)	26.8%	25.2%	24.6%	24.2%
TERMINAL (d)	9/34 (27%)	9/31 (29%)	7/24 (29%)	6/30 (20%)
FIRST INCIDENCE	561	571	617	491
STATISTICAL TESTS				
POLY 3	P=0.438N	P=0.532N	P=0.509N	P=0.484N
POLY 1.5	P=0.438N	P=0.522N	P=0.464N	P=0.485N
POLY 6	P=0.443N	P=0.542N	P=0.556N	P=0.488N
COCH-ARM / FISHERS	P=0.454N	P=0.500N	P=0.405N	P=0.500N
MAX-ISO-POLY-3	P=0.605N	P=0.434N	P=0.413N	P=0.388N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Kidney: Cortex Cyst				
LESION RATES				
OVERALL (a)	1/50 (2%)	0/50 (0%)	2/50 (4%)	0/50 (0%)
POLY-3 RATE (b)	1/43.58	0/43.03	2/40.86	0/43.50
POLY-3 PERCENT (g)	2.3%	0%	4.9%	0%
TERMINAL (d)	1/34 (3%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	731 (T)	---	509	---
STATISTICAL TESTS				
POLY 3	P=0.454N	P=0.503N	P=0.478	P=0.500N
POLY 1.5	P=0.453N	P=0.502N	P=0.487	P=0.499N
POLY 6	P=0.458N	P=0.502N	P=0.469	P=0.502N
COCH-ARM / FISHERS	P=0.456N	P=0.500N	P=0.500	P=0.500N
MAX-ISO-POLY-3	P=0.322N	P=0.162N	P=0.268	P=0.159N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Kidney: Pelvis Dilatation				
LESION RATES				
OVERALL (a)	0/50 (0%)	2/50 (4%)	0/50 (0%)	2/50 (4%)
POLY-3 RATE (b)	0/43.58	2/43.26	0/40.02	2/44.20
POLY-3 PERCENT (g)	0%	4.6%	0%	4.5%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	687	---	633
STATISTICAL TESTS				
POLY 3	P=0.242	P=0.235	(e)	P=0.240
POLY 1.5	P=0.243	P=0.235	(e)	P=0.240
POLY 6	P=0.241	P=0.237	(e)	P=0.240
COCH-ARM / FISHERS	P=0.242	P=0.247	(e)	P=0.247
MAX-ISO-POLY-3	P=0.124	P=0.076	(e)	P=0.079

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Kidney: Pelvis Inflammation				
LESION RATES				
OVERALL (a)	5/50 (10%)	8/50 (16%)	6/50 (12%)	6/50 (12%)
POLY-3 RATE (b)	5/45.29	8/44.55	6/41.31	6/44.16
POLY-3 PERCENT (g)	11%	18%	14.5%	13.6%
TERMINAL (d)	1/34 (3%)	5/31 (16%)	4/24 (17%)	4/30 (13%)
FIRST INCIDENCE	417	409	516	571
STATISTICAL TESTS				
POLY 3	P=0.512	P=0.264	P=0.436	P=0.482
POLY 1.5	P=0.527	P=0.267	P=0.462	P=0.492
POLY 6	P=0.492	P=0.262	P=0.407	P=0.469
COCH-ARM / FISHERS	P=0.539	P=0.277	P=0.500	P=0.500
MAX-ISO-POLY-3	P=0.449	P=0.178	P=0.321	P=0.358

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Larynx				
Foreign Body				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	1/50 (2%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	0/43.03	1/40.02	0/43.50
POLY-3 PERCENT (g)	0%	0%	2.5%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	1/24 (4%)	0/30 (0%)
FIRST INCIDENCE	---	---	731 (T)	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Larynx				
Inflammation Chronic				
LESION RATES				
OVERALL (a)	4/50 (8%)	2/50 (4%)	4/50 (8%)	25/50 (50%)
POLY-3 RATE (b)	4/44.16	2/43.08	4/40.05	25/46.77
POLY-3 PERCENT (g)	9.1%	4.6%	10%	53.5%
TERMINAL (d)	3/34 (9%)	1/31 (3%)	3/24 (13%)	12/30 (40%)
FIRST INCIDENCE	547	718	723	571
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.348N	P=0.589	P<0.001**
POLY 1.5	P<0.001**	P=0.346N	P=0.612	P<0.001**
POLY 6	P<0.001**	P=0.349N	P=0.565	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.339N	P=0.643N	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.212N	P=0.444	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Larynx: Respiratory Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	2/50 (4%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	2/43.94
POLY-3 PERCENT (g)	0%	0%	0%	4.6%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	---	629
STATISTICAL TESTS				
POLY 3	P=0.046*	(e)	(e)	P=0.239
POLY 1.5	P=0.046*	(e)	(e)	P=0.239
POLY 6	P=0.045*	(e)	(e)	P=0.238
COCH-ARM / FISHERS	P=0.047*	(e)	(e)	P=0.247
MAX-ISO-POLY-3	P=0.034*	(e)	(e)	P=0.078

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Larynx: Respiratory Epithelium Metaplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	35/50 (70%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	35/46.12
POLY-3 PERCENT (g)	0%	0%	0%	75.9%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	24/30 (80%)
FIRST INCIDENCE	---	---	---	625
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P<0.001**
POLY 1.5	P<0.001**	(e)	(e)	P<0.001**
POLY 6	P<0.001**	(e)	(e)	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Larynx: Respiratory Epithelium Regeneration				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	2/50 (4%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	2/43.93
POLY-3 PERCENT (g)	0%	0%	0%	4.6%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	---	633
STATISTICAL TESTS				
POLY 3	P=0.046*	(e)	(e)	P=0.239
POLY 1.5	P=0.046*	(e)	(e)	P=0.239
POLY 6	P=0.045*	(e)	(e)	P=0.238
COCH-ARM / FISHERS	P=0.047*	(e)	(e)	P=0.247
MAX-ISO-POLY-3	P=0.034*	(e)	(e)	P=0.077

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Larynx: Squamous Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	1/50 (2%)	1/50 (2%)	6/50 (12%)	48/50 (96%)
POLY-3 RATE (b)	1/43.58	1/43.08	6/40.64	48/49.40
POLY-3 PERCENT (g)	2.3%	2.3%	14.8%	97.2%
TERMINAL (d)	1/34 (3%)	0/31 (0%)	5/24 (21%)	29/30 (97%)
FIRST INCIDENCE	731 (T)	718	528	435
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.758	P=0.045*	P<0.001**
POLY 1.5	P<0.001**	P=0.758	P=0.049*	P<0.001**
POLY 6	P<0.001**	P=0.759	P=0.040*	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.753N	P=0.056	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.496	P=0.021*	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Larynx: Squamous Epithelium				
Ulcer Focal				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	6/50 (12%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	6/44.23
POLY-3 PERCENT (g)	0%	0%	0%	13.6%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	3/30 (10%)
FIRST INCIDENCE	---	---	---	629
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P=0.016*
POLY 1.5	P<0.001**	(e)	(e)	P=0.016*
POLY 6	P<0.001**	(e)	(e)	P=0.016*
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P=0.013*
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P=0.005**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Angiectasis				
LESION RATES				
OVERALL (a)	1/50 (2%)	3/50 (6%)	2/50 (4%)	1/50 (2%)
POLY-3 RATE (b)	1/43.75	3/43.08	2/40.20	1/43.50
POLY-3 PERCENT (g)	2.3%	7%	5%	2.3%
TERMINAL (d)	0/34 (0%)	2/31 (7%)	1/24 (4%)	1/30 (3%)
FIRST INCIDENCE	687	718	684	731 (T)
STATISTICAL TESTS				
POLY 3	P=0.485N	P=0.299	P=0.470	P=0.760
POLY 1.5	P=0.480N	P=0.300	P=0.483	P=0.760N
POLY 6	P=0.493N	P=0.299	P=0.458	P=0.757
COCH-ARM / FISHERS	P=0.479N	P=0.309	P=0.500	P=0.753N
MAX-ISO-POLY-3	P=0.452	P=0.151	P=0.264	P=0.498

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Basophilic Focus				
LESION RATES				
OVERALL (a)	34/50 (68%)	30/50 (60%)	29/50 (58%)	26/50 (52%)
POLY-3 RATE (b)	34/46.98	30/44.74	29/42.27	26/45.88
POLY-3 PERCENT (g)	72.4%	67.1%	68.6%	56.7%
TERMINAL (d)	26/34 (77%)	23/31 (74%)	19/24 (79%)	18/30 (60%)
FIRST INCIDENCE	417	519	515	537
STATISTICAL TESTS				
POLY 3	P=0.059N	P=0.367N	P=0.434N	P=0.078N
POLY 1.5	P=0.057N	P=0.333N	P=0.323N	P=0.073N
POLY 6	P=0.067N	P=0.402N	P=0.562N	P=0.088N
COCH-ARM / FISHERS	P=0.068N	P=0.266N	P=0.204N	P=0.076N
MAX-ISO-POLY-3	P=0.072N	P=0.288N	P=0.348N	P=0.052N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Clear Cell Focus				
LESION RATES				
OVERALL (a)	6/50 (12%)	8/50 (16%)	5/50 (10%)	2/50 (4%)
POLY-3 RATE (b)	6/43.58	8/43.03	5/40.83	2/43.53
POLY-3 PERCENT (g)	13.8%	18.6%	12.3%	4.6%
TERMINAL (d)	6/34 (18%)	8/31 (26%)	3/24 (13%)	1/30 (3%)
FIRST INCIDENCE	731 (T)	731 (T)	442	725
STATISTICAL TESTS				
POLY 3	P=0.064N	P=0.375	P=0.546N	P=0.132N
POLY 1.5	P=0.063N	P=0.377	P=0.526N	P=0.131N
POLY 6	P=0.066N	P=0.376	P=0.567N	P=0.134N
COCH-ARM / FISHERS	P=0.066N	P=0.387	P=0.500N	P=0.134N
MAX-ISO-POLY-3	P=0.074N	P=0.273	P=0.419N	P=0.068N

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
<hr/>				
Liver Degeneration Cystic				
<hr/>				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	0/43.50
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	---	---
<hr/>				
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Eosinophilic Focus				
LESION RATES				
OVERALL (a)	3/50 (6%)	5/50 (10%)	7/50 (14%)	4/50 (8%)
POLY-3 RATE (b)	3/43.58	5/43.31	7/40.71	4/43.50
POLY-3 PERCENT (g)	6.9%	11.5%	17.2%	9.2%
TERMINAL (d)	3/34 (9%)	2/31 (7%)	4/24 (17%)	4/30 (13%)
FIRST INCIDENCE	731 (T)	687	520	731 (T)
STATISTICAL TESTS				
POLY 3	P=0.448	P=0.352	P=0.129	P=0.499
POLY 1.5	P=0.454	P=0.352	P=0.141	P=0.502
POLY 6	P=0.435	P=0.357	P=0.118	P=0.493
COCH-ARM / FISHERS	P=0.451	P=0.357	P=0.159	P=0.500
MAX-ISO-POLY-3	P=0.286	P=0.228	P=0.077	P=0.346

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Fatty Change Diffuse				
LESION RATES				
OVERALL (a)	1/50 (2%)	1/50 (2%)	2/50 (4%)	0/50 (0%)
POLY-3 RATE (b)	1/43.89	1/43.07	2/41.56	0/43.50
POLY-3 PERCENT (g)	2.3%	2.3%	4.8%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	647	721	361	---
STATISTICAL TESTS				
POLY 3	P=0.368N	P=0.757	P=0.481	P=0.502N
POLY 1.5	P=0.365N	P=0.757	P=0.490	P=0.500N
POLY 6	P=0.374N	P=0.756	P=0.471	P=0.505N
COCH-ARM / FISHERS	P=0.366N	P=0.753N	P=0.500	P=0.500N
MAX-ISO-POLY-3	P=0.269N	P=0.494	P=0.270	P=0.161N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Fatty Change Focal				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	0/43.50
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Hematopoietic Cell Proliferation				
LESION RATES				
OVERALL (a)	2/50 (4%)	2/50 (4%)	3/50 (6%)	1/50 (2%)
POLY-3 RATE (b)	2/43.92	2/43.23	3/41.42	1/44.20
POLY-3 PERCENT (g)	4.6%	4.6%	7.2%	2.3%
TERMINAL (d)	1/34 (3%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	635	687	516	491
STATISTICAL TESTS				
POLY 3	P=0.400N	P=0.688	P=0.473	P=0.498N
POLY 1.5	P=0.398N	P=0.689	P=0.484	P=0.497N
POLY 6	P=0.406N	P=0.689	P=0.462	P=0.501N
COCH-ARM / FISHERS	P=0.403N	P=0.691N	P=0.500	P=0.500N
MAX-ISO-POLY-3	P=0.385N	P=0.493	P=0.305	P=0.279N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Hepatodiaphragmatic Nodule				
LESION RATES				
OVERALL (a)	3/50 (6%)	0/50 (0%)	0/50 (0%)	2/50 (4%)
POLY-3 RATE (b)	3/44.85	0/43.03	0/40.02	2/43.50
POLY-3 PERCENT (g)	6.7%	0%	0%	4.6%
TERMINAL (d)	1/34 (3%)	0/31 (0%)	0/24 (0%)	2/30 (7%)
FIRST INCIDENCE	253	---	---	731 (T)
STATISTICAL TESTS				
POLY 3	P=0.527N	P=0.126N	P=0.140N	P=0.514N
POLY 1.5	P=0.524N	P=0.125N	P=0.132N	P=0.508N
POLY 6	P=0.531N	P=0.127N	P=0.149N	P=0.522N
COCH-ARM / FISHERS	P=0.525N	P=0.121N	P=0.121N	P=0.500N
MAX-ISO-POLY-3	P=0.119N	P=0.044N*	P=0.056N	P=0.338N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Infiltration Cellular Mixed Cell				
LESION RATES				
OVERALL (a)	6/50 (12%)	6/50 (12%)	3/50 (6%)	3/50 (6%)
POLY-3 RATE (b)	6/43.58	6/43.75	3/40.42	3/43.90
POLY-3 PERCENT (g)	13.8%	13.7%	7.4%	6.8%
TERMINAL (d)	6/34 (18%)	4/31 (13%)	2/24 (8%)	1/30 (3%)
FIRST INCIDENCE	731 (T)	603	617	642
STATISTICAL TESTS				
POLY 3	P=0.140N	P=0.619N	P=0.279N	P=0.237N
POLY 1.5	P=0.139N	P=0.619	P=0.264N	P=0.238N
POLY 6	P=0.143N	P=0.609N	P=0.294N	P=0.237N
COCH-ARM / FISHERS	P=0.140N	P=0.620N	P=0.243N	P=0.243N
MAX-ISO-POLY-3	P=0.225N	P=0.496N	P=0.183N	P=0.144N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Mixed Cell Focus				
LESION RATES				
OVERALL (a)	0/50 (0%)	2/50 (4%)	0/50 (0%)	1/50 (2%)
POLY-3 RATE (b)	0/43.58	2/43.03	0/40.02	1/43.50
POLY-3 PERCENT (g)	0%	4.7%	0%	2.3%
TERMINAL (d)	0/34 (0%)	2/31 (7%)	0/24 (0%)	1/30 (3%)
FIRST INCIDENCE	---	731 (T)	---	731 (T)
STATISTICAL TESTS				
POLY 3	P=0.527	P=0.234	(e)	P=0.500
POLY 1.5	P=0.530	P=0.234	(e)	P=0.501
POLY 6	P=0.522	P=0.234	(e)	P=0.498
COCH-ARM / FISHERS	P=0.531	P=0.247	(e)	P=0.500
MAX-ISO-POLY-3	P=0.320	P=0.076	(e)	P=0.158

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Liver				
Necrosis Focal				
LESION RATES				
OVERALL (a)	0/50 (0%)	1/50 (2%)	2/50 (4%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	1/43.09	2/40.67	0/43.50
POLY-3 PERCENT (g)	0%	2.3%	4.9%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	1/24 (4%)	0/30 (0%)
FIRST INCIDENCE	---	715	516	---
STATISTICAL TESTS				
POLY 3	P=0.618N	P=0.498	P=0.222	(e)
POLY 1.5	P=0.616N	P=0.498	P=0.228	(e)
POLY 6	P=0.623N	P=0.499	P=0.215	(e)
COCH-ARM / FISHERS	P=0.618N	P=0.500	P=0.247	(e)
MAX-ISO-POLY-3	P=0.318	P=0.158	P=0.075	(e)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Liver: Bile Duct Cyst				
LESION RATES				
OVERALL (a)	2/50 (4%)	1/50 (2%)	0/50 (0%)	1/50 (2%)
POLY-3 RATE (b)	2/43.99	1/43.03	0/40.02	1/43.50
POLY-3 PERCENT (g)	4.6%	2.3%	0%	2.3%
TERMINAL (d)	1/34 (3%)	1/31 (3%)	0/24 (0%)	1/30 (3%)
FIRST INCIDENCE	614	731 (T)	---	731 (T)
STATISTICAL TESTS				
POLY 3	P=0.372N	P=0.508N	P=0.259N	P=0.504N
POLY 1.5	P=0.369N	P=0.506N	P=0.249N	P=0.500N
POLY 6	P=0.377N	P=0.509N	P=0.269N	P=0.510N
COCH-ARM / FISHERS	P=0.366N	P=0.500N	P=0.247N	P=0.500N
MAX-ISO-POLY-3	P=0.241N	P=0.289N	P=0.096N	P=0.284N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Liver: Bile Duct Hyperplasia				
LESION RATES				
OVERALL (a)	8/50 (16%)	12/50 (24%)	15/50 (30%)	10/50 (20%)
POLY-3 RATE (b)	8/44.13	12/43.03	15/40.76	10/43.86
POLY-3 PERCENT (g)	18.1%	27.9%	36.8%	22.8%
TERMINAL (d)	6/34 (18%)	12/31 (39%)	12/24 (50%)	6/30 (20%)
FIRST INCIDENCE	647	731 (T)	520	687
STATISTICAL TESTS				
POLY 3	P=0.387	P=0.202	P=0.042*	P=0.390
POLY 1.5	P=0.399	P=0.210	P=0.054	P=0.398
POLY 6	P=0.368	P=0.194	P=0.031*	P=0.378
COCH-ARM / FISHERS	P=0.397	P=0.227	P=0.077	P=0.398
MAX-ISO-POLY-3	P=0.169	P=0.141	P=0.028*	P=0.294

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lung Inflammation				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	3/50 (6%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	3/44.58
POLY-3 PERCENT (g)	0%	0%	0%	6.7%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	---	625
STATISTICAL TESTS				
POLY 3	P=0.011*	(e)	(e)	P=0.123
POLY 1.5	P=0.011*	(e)	(e)	P=0.122
POLY 6	P=0.011*	(e)	(e)	P=0.124
COCH-ARM / FISHERS	P=0.012*	(e)	(e)	P=0.121
MAX-ISO-POLY-3	P=0.011*	(e)	(e)	P=0.041*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lung Inflammation Chronic				
LESION RATES				
OVERALL (a)	2/50 (4%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	2/43.58	0/43.03	0/40.02	0/43.50
POLY-3 PERCENT (g)	4.6%	0%	0%	0%
TERMINAL (d)	2/34 (6%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	731 (T)	---	---	---
STATISTICAL TESTS				
POLY 3	P=0.112N	P=0.240N	P=0.256N	P=0.237N
POLY 1.5	P=0.111N	P=0.240N	P=0.248N	P=0.236N
POLY 6	P=0.113N	P=0.239N	P=0.265N	P=0.239N
COCH-ARM / FISHERS	P=0.112N	P=0.247N	P=0.247N	P=0.247N
MAX-ISO-POLY-3	P=0.033N*	P=0.078N	P=0.094N	P=0.076N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lung				
Inflammation Granulomatous				
LESION RATES				
OVERALL (a)	2/50 (4%)	1/50 (2%)	3/50 (6%)	13/50 (26%)
POLY-3 RATE (b)	2/43.92	1/43.55	3/40.83	13/44.28
POLY-3 PERCENT (g)	4.6%	2.3%	7.4%	29.4%
TERMINAL (d)	1/34 (3%)	0/31 (0%)	1/24 (4%)	10/30 (33%)
FIRST INCIDENCE	635	571	614	633
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.503N	P=0.467	P=0.002**
POLY 1.5	P<0.001**	P=0.503N	P=0.480	P=0.002**
POLY 6	P<0.001**	P=0.502N	P=0.454	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.500N	P=0.500	P=0.002**
MAX-ISO-POLY-3	P<0.001**	P=0.284N	P=0.301	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Alveolar Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	1/50 (2%)	1/50 (2%)	1/50 (2%)	3/50 (6%)
POLY-3 RATE (b)	1/43.58	1/43.03	1/40.02	3/43.51
POLY-3 PERCENT (g)	2.3%	2.3%	2.5%	6.9%
TERMINAL (d)	1/34 (3%)	1/31 (3%)	1/24 (4%)	2/30 (7%)
FIRST INCIDENCE	731 (T)	731 (T)	731 (T)	729
STATISTICAL TESTS				
POLY 3	P=0.163	P=0.758	P=0.742	P=0.304
POLY 1.5	P=0.165	P=0.758	P=0.750	P=0.307
POLY 6	P=0.159	P=0.759	P=0.733	P=0.300
COCH-ARM / FISHERS	P=0.164	P=0.753N	P=0.753N	P=0.309
MAX-ISO-POLY-3	P=0.192	P=0.496	P=0.476	P=0.153

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Alveolar Epithelium Hyperplasia Focal				
LESION RATES				
OVERALL (a)	1/50 (2%)	1/50 (2%)	0/50 (0%)	1/50 (2%)
POLY-3 RATE (b)	1/43.58	1/43.31	0/40.02	1/43.50
POLY-3 PERCENT (g)	2.3%	2.3%	0%	2.3%
TERMINAL (d)	1/34 (3%)	0/31 (0%)	0/24 (0%)	1/30 (3%)
FIRST INCIDENCE	731 (T)	654	---	731 (T)
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Alveolus Infiltration Cellular Histiocyte				
LESION RATES				
OVERALL (a)	13/50 (26%)	11/50 (22%)	10/50 (20%)	32/50 (64%)
POLY-3 RATE (b)	13/44.61	11/44.21	10/41.25	32/44.55
POLY-3 PERCENT (g)	29.1%	24.9%	24.2%	71.8%
TERMINAL (d)	11/34 (32%)	8/31 (26%)	6/24 (25%)	24/30 (80%)
FIRST INCIDENCE	547	519	528	633
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.416N	P=0.394N	P<0.001**
POLY 1.5	P<0.001**	P=0.417N	P=0.362N	P<0.001**
POLY 6	P<0.001**	P=0.411N	P=0.425N	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.408N	P=0.318N	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.326N	P=0.310N	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Bronchiole, Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	8/50 (16%)	39/50 (78%)
POLY-3 RATE (b)	0/43.58	0/43.03	8/40.04	39/47.34
POLY-3 PERCENT (g)	0%	0%	20%	82.4%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	7/24 (29%)	26/30 (87%)
FIRST INCIDENCE	---	---	727	491
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	P=0.002**	P<0.001**
POLY 1.5	P<0.001**	(e)	P=0.003**	P<0.001**
POLY 6	P<0.001**	(e)	P=0.002**	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	P=0.003**	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	P<0.001**	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Bronchus, Epithelium Atrophy				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	7/50 (14%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	7/44.30
POLY-3 PERCENT (g)	0%	0%	0%	15.8%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	4/30 (13%)
FIRST INCIDENCE	---	---	---	537
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P=0.008**
POLY 1.5	P<0.001**	(e)	(e)	P=0.008**
POLY 6	P<0.001**	(e)	(e)	P=0.008**
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P=0.006**
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P=0.002**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Bronchus, Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	46/50 (92%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	46/48.78
POLY-3 PERCENT (g)	0%	0%	0%	94.3%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	30/30 (100%)
FIRST INCIDENCE	---	---	---	435
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P<0.001**
POLY 1.5	P<0.001**	(e)	(e)	P<0.001**
POLY 6	P<0.001**	(e)	(e)	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Bronchus, Epithelium Metaplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	1/50 (2%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	1/43.50
POLY-3 PERCENT (g)	0%	0%	0%	2.3%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	1/30 (3%)
FIRST INCIDENCE	---	---	---	731 (T)
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Bronchus, Epithelium Regeneration				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	1/50 (2%)	2/50 (4%)
POLY-3 RATE (b)	0/43.58	0/43.03	1/40.05	2/43.85
POLY-3 PERCENT (g)	0%	0%	2.5%	4.6%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	1/30 (3%)
FIRST INCIDENCE	---	---	723	633
STATISTICAL TESTS				
POLY 3	P=0.072	(e)	P=0.483	P=0.238
POLY 1.5	P=0.072	(e)	P=0.490	P=0.239
POLY 6	P=0.071	(e)	P=0.476	P=0.237
COCH-ARM / FISHERS	P=0.071	(e)	P=0.500	P=0.247
MAX-ISO-POLY-3	P=0.079	(e)	P=0.158	P=0.077

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Interstitium Fibrosis				
LESION RATES				
OVERALL (a)	1/50 (2%)	1/50 (2%)	1/50 (2%)	9/50 (18%)
POLY-3 RATE (b)	1/43.58	1/43.03	1/40.02	9/43.53
POLY-3 PERCENT (g)	2.3%	2.3%	2.5%	20.7%
TERMINAL (d)	1/34 (3%)	1/31 (3%)	1/24 (4%)	8/30 (27%)
FIRST INCIDENCE	731 (T)	731 (T)	731 (T)	724
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.758	P=0.742	P=0.007**
POLY 1.5	P<0.001**	P=0.758	P=0.750	P=0.008**
POLY 6	P<0.001**	P=0.759	P=0.733	P=0.007**
COCH-ARM / FISHERS	P<0.001**	P=0.753N	P=0.753N	P=0.008**
MAX-ISO-POLY-3	P<0.001**	P=0.496	P=0.476	P=0.003**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Peribronchial Inflammation Chronic				
LESION RATES				
OVERALL (a)	1/50 (2%)	2/50 (4%)	0/50 (0%)	27/50 (54%)
POLY-3 RATE (b)	1/43.58	2/43.03	0/40.02	27/45.14
POLY-3 PERCENT (g)	2.3%	4.7%	0%	59.8%
TERMINAL (d)	1/34 (3%)	2/31 (7%)	0/24 (0%)	19/30 (63%)
FIRST INCIDENCE	731 (T)	731 (T)	---	629
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.496	P=0.517N	P<0.001**
POLY 1.5	P<0.001**	P=0.496	P=0.510N	P<0.001**
POLY 6	P<0.001**	P=0.496	P=0.524N	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.500	P=0.500N	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.278	P=0.179N	P<0.001**

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Pleura Fibrosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	1/50 (2%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	1/43.50
POLY-3 PERCENT (g)	0%	0%	0%	2.3%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	1/30 (3%)
FIRST INCIDENCE	---	---	---	731 (T)
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lung: Submucosa, Bronchus Fibrosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	0/43.50
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node, Bronchial Atrophy				
LESION RATES				
OVERALL (a)	0/43 (0%)	0/44 (0%)	0/43 (0%)	0/42 (0%)
POLY-3 RATE (b)	0/37.16	0/39.24	0/35.19	0/36.01
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/30 (0%)	0/31 (0%)	0/23 (0%)	0/24 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node, Mandibular Infiltration Cellular Plasma Cell				
LESION RATES				
OVERALL (a)	0/46 (0%)	1/48 (2%)	0/45 (0%)	2/48 (4%)
POLY-3 RATE (b)	0/40.89	1/42.16	0/35.57	2/42.36
POLY-3 PERCENT (g)	0%	2.4%	0%	4.7%
TERMINAL (d)	0/33 (0%)	0/31 (0%)	0/23 (0%)	1/30 (3%)
FIRST INCIDENCE	---	687	---	729
STATISTICAL TESTS				
POLY 3	P=0.140	P=0.506	(e)	P=0.245
POLY 1.5	P=0.142	P=0.506	(e)	P=0.246
POLY 6	P=0.137	P=0.508	(e)	P=0.242
COCH-ARM / FISHERS	P=0.143	P=0.511	(e)	P=0.258
MAX-ISO-POLY-3	P=0.085	P=0.164	(e)	P=0.081

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node, Mesenteric Atrophy				
LESION RATES				
OVERALL (a)	0/50 (0%)	2/50 (4%)	2/50 (4%)	5/50 (10%)
POLY-3 RATE (b)	0/43.58	2/43.03	2/41.01	5/43.89
POLY-3 PERCENT (g)	0%	4.7%	4.9%	11.4%
TERMINAL (d)	0/34 (0%)	2/31 (7%)	0/24 (0%)	3/30 (10%)
FIRST INCIDENCE	---	731 (T)	528	625
STATISTICAL TESTS				
POLY 3	P=0.016*	P=0.234	P=0.224	P=0.031*
POLY 1.5	P=0.016*	P=0.234	P=0.229	P=0.031*
POLY 6	P=0.015*	P=0.234	P=0.219	P=0.030*
COCH-ARM / FISHERS	P=0.016*	P=0.247	P=0.247	P=0.028*
MAX-ISO-POLY-3	P=0.012*	P=0.076	P=0.075	P=0.010**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node: Deep Cervical Infiltration Cellular Plasma Cell				
LESION RATES				
OVERALL (a)	0/1 (0%)	0/3 (0%)	0/2 (0%)	2/5 (40%)
POLY-3 RATE (b)	0/1.00	0/2.83	0/0.73	2/4.64
POLY-3 PERCENT (g)	0%	0%	0%	43.1%
TERMINAL (d)	0/1 (0%)	0/2 (0%)	0/0 (0%)	2/4 (50%)
FIRST INCIDENCE	---	---	---	731 (T)
STATISTICAL TESTS				
POLY 3	P=0.143	(e)	(e)	P=0.619
POLY 1.5	P=0.150	(e)	(e)	P=0.624
POLY 6	P=0.132	(e)	(e)	P=0.609
COCH-ARM / FISHERS	P=0.139	(e)	(e)	P=0.667
MAX-ISO-POLY-3	P=0.229	(e)	(e)	P=0.282

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node: Iliac Infiltration Cellular Plasma Cell				
LESION RATES				
OVERALL (a)	0/1 (0%)	0/3 (0%)	1/2 (50%)	0/5 (0%)
POLY-3 RATE (b)	0/1.00	0/2.83	1/1.38	0/4.64
POLY-3 PERCENT (g)	0%	0%	72.6%	0%
TERMINAL (d)	0/1 (0%)	0/2 (0%)	0/0 (0%)	0/4 (0%)
FIRST INCIDENCE	---	---	516	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node: Lumbar Infiltration Cellular Plasma Cell				
LESION RATES				
OVERALL (a)	0/1 (0%)	0/3 (0%)	1/2 (50%)	1/5 (20%)
POLY-3 RATE (b)	0/1.00	0/2.83	1/1.35	1/4.64
POLY-3 PERCENT (g)	0%	0%	74%	21.6%
TERMINAL (d)	0/1 (0%)	0/2 (0%)	0/0 (0%)	1/4 (25%)
FIRST INCIDENCE	---	---	528	731 (T)
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node: Popliteal Hyperplasia Lymphoid				
LESION RATES				
OVERALL (a)	0/1 (0%)	0/3 (0%)	0/2 (0%)	0/5 (0%)
POLY-3 RATE (b)	0/1.00	0/2.83	0/0.73	0/4.64
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/1 (0%)	0/2 (0%)	0/0 (0%)	0/4 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

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Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node: Popliteal Infiltration Cellular Plasma Cell				
LESION RATES				
OVERALL (a)	0/1 (0%)	0/3 (0%)	0/2 (0%)	0/5 (0%)
POLY-3 RATE (b)	0/1.00	0/2.83	0/0.73	0/4.64
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/1 (0%)	0/2 (0%)	0/0 (0%)	0/4 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Lymph Node: Renal Infiltration Cellular Plasma Cell				
LESION RATES				
OVERALL (a)	0/1 (0%)	0/3 (0%)	0/2 (0%)	1/5 (20%)
POLY-3 RATE (b)	0/1.00	0/2.83	0/0.73	1/4.64
POLY-3 PERCENT (g)	0%	0%	0%	21.6%
TERMINAL (d)	0/1 (0%)	0/2 (0%)	0/0 (0%)	1/4 (25%)
FIRST INCIDENCE	---	---	---	731 (T)
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Mammary Gland Galactocele				
LESION RATES				
OVERALL (a)	4/50 (8%)	4/50 (8%)	2/50 (4%)	1/50 (2%)
POLY-3 RATE (b)	4/44.44	4/44.16	2/40.02	1/43.50
POLY-3 PERCENT (g)	9%	9.1%	5%	2.3%
TERMINAL (d)	2/34 (6%)	1/31 (3%)	2/24 (8%)	1/30 (3%)
FIRST INCIDENCE	599	418	731 (T)	731 (T)
STATISTICAL TESTS				
POLY 3	P=0.103N	P=0.640	P=0.386N	P=0.185N
POLY 1.5	P=0.099N	P=0.640	P=0.365N	P=0.181N
POLY 6	P=0.109N	P=0.641	P=0.410N	P=0.192N
COCH-ARM / FISHERS	P=0.096N	P=0.643N	P=0.339N	P=0.181N
MAX-ISO-POLY-3	P=0.156N	P=0.496	P=0.250N	P=0.090N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
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 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Mammary Gland Hyperplasia				
LESION RATES				
OVERALL (a)	1/50 (2%)	2/50 (4%)	2/50 (4%)	1/50 (2%)
POLY-3 RATE (b)	1/43.58	2/43.03	2/40.02	1/43.50
POLY-3 PERCENT (g)	2.3%	4.7%	5%	2.3%
TERMINAL (d)	1/34 (3%)	2/31 (7%)	2/24 (8%)	1/30 (3%)
FIRST INCIDENCE	731 (T)	731 (T)	731 (T)	731 (T)
STATISTICAL TESTS				
POLY 3	P=0.561N	P=0.496	P=0.470	P=0.760
POLY 1.5	P=0.557N	P=0.496	P=0.483	P=0.760N
POLY 6	P=0.567N	P=0.496	P=0.457	P=0.758
COCH-ARM / FISHERS	P=0.558N	P=0.500	P=0.500	P=0.753N
MAX-ISO-POLY-3	P=0.534	P=0.278	P=0.264	P=0.499

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Mesentery: Fat Necrosis				
LESION RATES				
OVERALL (a)	8/8 (100%)	8/10 (80%)	4/4 (100%)	3/4 (75%)
POLY-3 RATE (b)	8/8.00	8/9.19	4/4.00	3/3.83
POLY-3 PERCENT (g)	100%	87.1%	100%	78.3%
TERMINAL (d)	5/5 (100%)	5/6 (83%)	1/1 (100%)	1/1 (100%)
FIRST INCIDENCE	561	715	509	642
STATISTICAL TESTS				
POLY 3	P=0.293N	P=0.458N	(e)	P=0.435N
POLY 1.5	P=0.282N	P=0.383N	(e)	P=0.393N
POLY 6	P=0.344N	P=0.511N	(e)	P=0.536N
COCH-ARM / FISHERS	P=0.303N	P=0.294N	(e)	P=0.333N
MAX-ISO-POLY-3	P=0.201N	P=0.138N	(e)	P=0.101N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Nose				
Foreign Body				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	1/50 (2%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	1/43.58
POLY-3 PERCENT (g)	0%	0%	0%	2.3%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	---	711
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Nose Inflammation				
LESION RATES				
OVERALL (a)	4/50 (8%)	3/50 (6%)	11/50 (22%)	49/50 (98%)
POLY-3 RATE (b)	4/45.46	3/43.20	11/40.59	49/49.66
POLY-3 PERCENT (g)	8.8%	6.9%	27.1%	98.7%
TERMINAL (d)	1/34 (3%)	2/31 (7%)	7/24 (29%)	30/30 (100%)
FIRST INCIDENCE	253	687	589	435
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.528N	P=0.023*	P<0.001**
POLY 1.5	P<0.001**	P=0.521N	P=0.030*	P<0.001**
POLY 6	P<0.001**	P=0.533N	P=0.018*	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.500N	P=0.045*	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.376N	P=0.015*	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Nose				
Inflammation Chronic				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	0/43.50
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Lamina Propria Fibrosis				
LESION RATES				
OVERALL (a)	1/50 (2%)	1/50 (2%)	17/50 (34%)	46/50 (92%)
POLY-3 RATE (b)	1/43.92	1/43.03	17/42.05	46/49.66
POLY-3 PERCENT (g)	2.3%	2.3%	40.4%	92.6%
TERMINAL (d)	0/34 (0%)	1/31 (3%)	9/24 (38%)	27/30 (90%)
FIRST INCIDENCE	635	731 (T)	589	435
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.756	P<0.001**	P<0.001**
POLY 1.5	P<0.001**	P=0.757	P<0.001**	P<0.001**
POLY 6	P<0.001**	P=0.756	P<0.001**	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.753N	P<0.001**	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.493	P<0.001**	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Olfactory Epithelium Accumulation, Hyaline Droplet				
LESION RATES				
OVERALL (a)	5/50 (10%)	10/50 (20%)	3/50 (6%)	1/50 (2%)
POLY-3 RATE (b)	5/44.10	10/43.20	3/40.42	1/43.50
POLY-3 PERCENT (g)	11.3%	23.2%	7.4%	2.3%
TERMINAL (d)	3/34 (9%)	7/31 (23%)	1/24 (4%)	1/30 (3%)
FIRST INCIDENCE	614	715	628	731 (T)
STATISTICAL TESTS				
POLY 3	P=0.024N*	P=0.118	P=0.405N	P=0.104N
POLY 1.5	P=0.023N*	P=0.121	P=0.385N	P=0.102N
POLY 6	P=0.026N*	P=0.115	P=0.426N	P=0.108N
COCH-ARM / FISHERS	P=0.024N*	P=0.131	P=0.357N	P=0.102N
MAX-ISO-POLY-3	P=0.017N*	P=0.072	P=0.280N	P=0.047N*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Olfactory Epithelium Atrophy				
LESION RATES				
OVERALL (a)	1/50 (2%)	1/50 (2%)	14/50 (28%)	24/50 (48%)
POLY-3 RATE (b)	1/43.82	1/43.03	14/40.45	24/47.29
POLY-3 PERCENT (g)	2.3%	2.3%	34.6%	50.8%
TERMINAL (d)	0/34 (0%)	1/31 (3%)	12/24 (50%)	11/30 (37%)
FIRST INCIDENCE	667	731 (T)	617	537
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.757	P<0.001**	P<0.001**
POLY 1.5	P<0.001**	P=0.757	P<0.001**	P<0.001**
POLY 6	P<0.001**	P=0.756	P<0.001**	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.753N	P<0.001**	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.494	P<0.001**	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Olfactory Epithelium Metaplasia Respiratory				
LESION RATES				
OVERALL (a)	1/50 (2%)	0/50 (0%)	18/50 (36%)	46/50 (92%)
POLY-3 RATE (b)	1/43.92	0/43.03	18/45.89	46/48.97
POLY-3 PERCENT (g)	2.3%	0%	39.2%	93.9%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	2/24 (8%)	29/30 (97%)
FIRST INCIDENCE	635	---	361	435
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.504N	P<0.001**	P<0.001**
POLY 1.5	P<0.001**	P=0.503N	P<0.001**	P<0.001**
POLY 6	P<0.001**	P=0.505N	P<0.001**	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.500N	P<0.001**	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.164N	P<0.001**	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Olfactory Epithelium Necrosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	4/50 (8%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	4/44.58
POLY-3 PERCENT (g)	0%	0%	0%	9%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	1/30 (3%)
FIRST INCIDENCE	---	---	---	625
STATISTICAL TESTS				
POLY 3	P=0.003**	(e)	(e)	P=0.063
POLY 1.5	P=0.003**	(e)	(e)	P=0.062
POLY 6	P=0.003**	(e)	(e)	P=0.064
COCH-ARM / FISHERS	P=0.003**	(e)	(e)	P=0.059
MAX-ISO-POLY-3	P=0.003**	(e)	(e)	P=0.022*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Respiratory Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	1/50 (2%)	0/50 (0%)	2/50 (4%)	44/50 (88%)
POLY-3 RATE (b)	1/43.92	0/43.03	2/40.40	44/46.91
POLY-3 PERCENT (g)	2.3%	0%	5%	93.8%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	30/30 (100%)
FIRST INCIDENCE	635	---	628	537
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.504N	P=0.471	P<0.001**
POLY 1.5	P<0.001**	P=0.503N	P=0.483	P<0.001**
POLY 6	P<0.001**	P=0.505N	P=0.459	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.500N	P=0.500	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.164N	P=0.264	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Respiratory Epithelium Metaplasia				
LESION RATES				
OVERALL (a)	1/50 (2%)	0/50 (0%)	1/50 (2%)	44/50 (88%)
POLY-3 RATE (b)	1/43.92	0/43.03	1/40.02	44/49.08
POLY-3 PERCENT (g)	2.3%	0%	2.5%	89.6%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	1/24 (4%)	28/30 (93%)
FIRST INCIDENCE	635	---	731 (T)	435
STATISTICAL TESTS				
POLY 3	P<0.001**	P=0.504N	P=0.740	P<0.001**
POLY 1.5	P<0.001**	P=0.503N	P=0.749	P<0.001**
POLY 6	P<0.001**	P=0.505N	P=0.730	P<0.001**
COCH-ARM / FISHERS	P<0.001**	P=0.500N	P=0.753N	P<0.001**
MAX-ISO-POLY-3	P<0.001**	P=0.164N	P=0.474	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Respiratory Epithelium Necrosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	3/50 (6%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	3/44.58
POLY-3 PERCENT (g)	0%	0%	0%	6.7%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	---	625
STATISTICAL TESTS				
POLY 3	P=0.011*	(e)	(e)	P=0.123
POLY 1.5	P=0.011*	(e)	(e)	P=0.122
POLY 6	P=0.011*	(e)	(e)	P=0.124
COCH-ARM / FISHERS	P=0.012*	(e)	(e)	P=0.121
MAX-ISO-POLY-3	P=0.011*	(e)	(e)	P=0.041*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Nose: Turbinate Hyperostosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	8/50 (16%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	8/44.65
POLY-3 PERCENT (g)	0%	0%	0%	17.9%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	3/30 (10%)
FIRST INCIDENCE	---	---	---	571
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P=0.004**
POLY 1.5	P<0.001**	(e)	(e)	P=0.004**
POLY 6	P<0.001**	(e)	(e)	P=0.004**
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P=0.003**
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P<0.001**

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Ovary Atrophy				
LESION RATES				
OVERALL (a)	27/50 (54%)	22/50 (44%)	25/50 (50%)	27/50 (54%)
POLY-3 RATE (b)	27/45.49	22/47.15	25/43.38	27/46.86
POLY-3 PERCENT (g)	59.4%	46.7%	57.6%	57.6%
TERMINAL (d)	20/34 (59%)	9/31 (29%)	16/24 (67%)	16/30 (53%)
FIRST INCIDENCE	579	418	452	435
STATISTICAL TESTS				
POLY 3	P=0.440	P=0.152N	P=0.521N	P=0.517N
POLY 1.5	P=0.447	P=0.179N	P=0.474N	P=0.531N
POLY 6	P=0.417	P=0.123N	P=0.572N	P=0.514N
COCH-ARM / FISHERS	P=0.419	P=0.212N	P=0.421N	P=0.579N
MAX-ISO-POLY-3	P=0.474N	P=0.111N	P=0.433N	P=0.431N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Ovary Cyst				
LESION RATES				
OVERALL (a)	18/50 (36%)	16/50 (32%)	20/50 (40%)	23/50 (46%)
POLY-3 RATE (b)	18/44.65	16/45.26	20/42.01	23/46.95
POLY-3 PERCENT (g)	40.3%	35.4%	47.6%	49%
TERMINAL (d)	15/34 (44%)	9/31 (29%)	13/24 (54%)	13/30 (43%)
FIRST INCIDENCE	547	571	520	435
STATISTICAL TESTS				
POLY 3	P=0.141	P=0.394N	P=0.317	P=0.264
POLY 1.5	P=0.136	P=0.412N	P=0.358	P=0.246
POLY 6	P=0.145	P=0.363N	P=0.282	P=0.283
COCH-ARM / FISHERS	P=0.116	P=0.417N	P=0.418	P=0.208
MAX-ISO-POLY-3	P=0.224	P=0.314N	P=0.250	P=0.205

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Pancreas Atrophy				
LESION RATES				
OVERALL (a)	1/50 (2%)	2/50 (4%)	3/50 (6%)	2/50 (4%)
POLY-3 RATE (b)	1/43.58	2/43.09	3/40.73	2/43.50
POLY-3 PERCENT (g)	2.3%	4.6%	7.4%	4.6%
TERMINAL (d)	1/34 (3%)	1/31 (3%)	1/24 (4%)	2/30 (7%)
FIRST INCIDENCE	731 (T)	715	528	731 (T)
STATISTICAL TESTS				
POLY 3	P=0.403	P=0.496	P=0.281	P=0.499
POLY 1.5	P=0.407	P=0.496	P=0.291	P=0.501
POLY 6	P=0.396	P=0.497	P=0.271	P=0.496
COCH-ARM / FISHERS	P=0.403	P=0.500	P=0.309	P=0.500
MAX-ISO-POLY-3	P=0.339	P=0.278	P=0.145	P=0.280

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Pancreas				
Basophilic Focus				
LESION RATES				
OVERALL (a)	0/50 (0%)	2/50 (4%)	1/50 (2%)	2/50 (4%)
POLY-3 RATE (b)	0/43.58	2/43.03	1/40.20	2/43.50
POLY-3 PERCENT (g)	0%	4.7%	2.5%	4.6%
TERMINAL (d)	0/34 (0%)	2/31 (7%)	0/24 (0%)	2/30 (7%)
FIRST INCIDENCE	---	731 (T)	684	731 (T)
STATISTICAL TESTS				
POLY 3	P=0.240	P=0.234	P=0.484	P=0.237
POLY 1.5	P=0.243	P=0.234	P=0.491	P=0.238
POLY 6	P=0.235	P=0.234	P=0.477	P=0.234
COCH-ARM / FISHERS	P=0.242	P=0.247	P=0.500	P=0.247
MAX-ISO-POLY-3	P=0.159	P=0.076	P=0.158	P=0.076

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Pancreas Inflammation				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	2/50 (4%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	0/43.03	2/40.73	0/43.50
POLY-3 PERCENT (g)	0%	0%	4.9%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	528	---
STATISTICAL TESTS				
POLY 3	P=0.605	(e)	P=0.222	(e)
POLY 1.5	P=0.606	(e)	P=0.228	(e)
POLY 6	P=0.601	(e)	P=0.216	(e)
COCH-ARM / FISHERS	P=0.599	(e)	P=0.247	(e)
MAX-ISO-POLY-3	P=0.238	(e)	P=0.075	(e)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Pituitary Gland: Pars Distalis Hyperplasia				
LESION RATES				
OVERALL (a)	18/50 (36%)	16/50 (32%)	24/50 (48%)	18/50 (36%)
POLY-3 RATE (b)	18/44.38	16/43.39	24/43.17	18/44.99
POLY-3 PERCENT (g)	40.6%	36.9%	55.6%	40%
TERMINAL (d)	15/34 (44%)	15/31 (48%)	14/24 (58%)	15/30 (50%)
FIRST INCIDENCE	614	630	442	435
STATISTICAL TESTS				
POLY 3	P=0.459	P=0.446N	P=0.110	P=0.565N
POLY 1.5	P=0.459	P=0.439N	P=0.127	P=0.563N
POLY 6	P=0.447	P=0.453N	P=0.095	P=0.578N
COCH-ARM / FISHERS	P=0.426	P=0.417N	P=0.156	P=0.582N
MAX-ISO-POLY-3	P=0.309	P=0.361N	P=0.076	P=0.478N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Pituitary Gland: Pars Intermedia Hyperplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	1/50 (2%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	0/43.03	1/40.02	0/43.50
POLY-3 PERCENT (g)	0%	0%	2.5%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	1/24 (4%)	0/30 (0%)
FIRST INCIDENCE	---	---	731 (T)	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Skin				
Cyst Epithelial Inclusion				
LESION RATES				
OVERALL (a)	1/50 (2%)	1/50 (2%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	1/43.75	1/43.45	0/40.02	0/43.50
POLY-3 PERCENT (g)	2.3%	2.3%	0%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	687	610	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Skin: Ear				
Inflammation Acute				
LESION RATES				
OVERALL (a)	1/50 (2%)	2/50 (4%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	1/44.03	2/43.45	0/40.02	0/43.50
POLY-3 PERCENT (g)	2.3%	4.6%	0%	0%
TERMINAL (d)	0/34 (0%)	1/31 (3%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	599	610	---	---
STATISTICAL TESTS				
POLY 3	P=0.199N	P=0.495	P=0.519N	P=0.502N
POLY 1.5	P=0.196N	P=0.496	P=0.511N	P=0.500N
POLY 6	P=0.203N	P=0.496	P=0.528N	P=0.506N
COCH-ARM / FISHERS	P=0.193N	P=0.500	P=0.500N	P=0.500N
MAX-ISO-POLY-3	P=0.174N	P=0.278	P=0.182N	P=0.162N

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Skin: Epidermis Hyperplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	1/50 (2%)	0/50 (0%)	1/50 (2%)
POLY-3 RATE (b)	0/43.58	1/43.03	0/40.02	1/43.50
POLY-3 PERCENT (g)	0%	2.3%	0%	2.3%
TERMINAL (d)	0/34 (0%)	1/31 (3%)	0/24 (0%)	1/30 (3%)
FIRST INCIDENCE	---	731 (T)	---	731 (T)
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Skin: Foot				
Inflammation Acute				
<hr/>				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	0/43.50
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	---	---
<hr/>				
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Skin: Foot				
Inflammation Chronic				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	4/50 (8%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	4/44.20
POLY-3 PERCENT (g)	0%	0%	0%	9.1%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	1/30 (3%)
FIRST INCIDENCE	---	---	---	633
STATISTICAL TESTS				
POLY 3	P=0.003**	(e)	(e)	P=0.062
POLY 1.5	P=0.003**	(e)	(e)	P=0.062
POLY 6	P=0.003**	(e)	(e)	P=0.062
COCH-ARM / FISHERS	P=0.003**	(e)	(e)	P=0.059
MAX-ISO-POLY-3	P=0.003**	(e)	(e)	P=0.021*

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
Time Report Requested: 16:27:54
First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Skin: Foot Ulcer				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	0/43.50
POLY-3 PERCENT (g)	0%	0%	0%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	---	---
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Skin: Foot				
Ulcer Focal				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	4/50 (8%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	4/44.20
POLY-3 PERCENT (g)	0%	0%	0%	9.1%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	1/30 (3%)
FIRST INCIDENCE	---	---	---	633
STATISTICAL TESTS				
POLY 3	P=0.003**	(e)	(e)	P=0.062
POLY 1.5	P=0.003**	(e)	(e)	P=0.062
POLY 6	P=0.003**	(e)	(e)	P=0.062
COCH-ARM / FISHERS	P=0.003**	(e)	(e)	P=0.059
MAX-ISO-POLY-3	P=0.003**	(e)	(e)	P=0.021*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Skin: Inguinal Inflammation				
LESION RATES				
OVERALL (a)	0/50 (0%)	1/50 (2%)	0/50 (0%)	2/50 (4%)
POLY-3 RATE (b)	0/43.58	1/43.03	0/40.02	2/43.50
POLY-3 PERCENT (g)	0%	2.3%	0%	4.6%
TERMINAL (d)	0/34 (0%)	1/31 (3%)	0/24 (0%)	2/30 (7%)
FIRST INCIDENCE	---	731 (T)	---	731 (T)
STATISTICAL TESTS				
POLY 3	P=0.136	P=0.497	(e)	P=0.237
POLY 1.5	P=0.138	P=0.498	(e)	P=0.238
POLY 6	P=0.133	P=0.498	(e)	P=0.234
COCH-ARM / FISHERS	P=0.138	P=0.500	(e)	P=0.247
MAX-ISO-POLY-3	P=0.077	P=0.158	(e)	P=0.076

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Spleen				
Hematopoietic Cell Proliferation				
LESION RATES				
OVERALL (a)	37/50 (74%)	40/50 (80%)	38/50 (76%)	39/50 (78%)
POLY-3 RATE (b)	37/46.72	40/46.68	38/46.02	39/47.29
POLY-3 PERCENT (g)	79.2%	85.7%	82.6%	82.5%
TERMINAL (d)	30/34 (88%)	30/31 (97%)	22/24 (92%)	28/30 (93%)
FIRST INCIDENCE	547	409	442	435
STATISTICAL TESTS				
POLY 3	P=0.466	P=0.277	P=0.436	P=0.440
POLY 1.5	P=0.478	P=0.290	P=0.476	P=0.448
POLY 6	P=0.426	P=0.252	P=0.384	P=0.407
COCH-ARM / FISHERS	P=0.429	P=0.318	P=0.500	P=0.408
MAX-ISO-POLY-3	P=0.440	P=0.189	P=0.330	P=0.334

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Spleen				
Pigmentation Hemosiderin				
LESION RATES				
OVERALL (a)	42/50 (84%)	39/50 (78%)	38/50 (76%)	39/50 (78%)
POLY-3 RATE (b)	42/48.70	39/48.63	38/47.19	39/47.79
POLY-3 PERCENT (g)	86.2%	80.2%	80.5%	81.6%
TERMINAL (d)	29/34 (85%)	24/31 (77%)	22/24 (92%)	24/30 (80%)
FIRST INCIDENCE	253	137	361	537
STATISTICAL TESTS				
POLY 3	P=0.365N	P=0.295N	P=0.309N	P=0.361N
POLY 1.5	P=0.340N	P=0.305N	P=0.276N	P=0.343N
POLY 6	P=0.384N	P=0.274N	P=0.341N	P=0.370N
COCH-ARM / FISHERS	P=0.297N	P=0.306N	P=0.227N	P=0.306N
MAX-ISO-POLY-3	P=0.382N	P=0.207N	P=0.220N	P=0.262N

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm

Spleen: Lymphoid Follicle Atrophy

LESION RATES				
OVERALL (a)	12/50 (24%)	6/50 (12%)	5/50 (10%)	7/50 (14%)
POLY-3 RATE (b)	12/47.13	6/45.09	5/42.09	7/45.27
POLY-3 PERCENT (g)	25.5%	13.3%	11.9%	15.5%
TERMINAL (d)	2/34 (6%)	2/31 (7%)	1/24 (4%)	1/30 (3%)
FIRST INCIDENCE	253	418	361	571

STATISTICAL TESTS				
POLY 3	P=0.168N	P=0.112N	P=0.085N	P=0.175N
POLY 1.5	P=0.160N	P=0.107N	P=0.071N	P=0.166N
POLY 6	P=0.180N	P=0.120N	P=0.107N	P=0.191N
COCH-ARM / FISHERS	P=0.155N	P=0.096N	P=0.054N	P=0.154N
MAX-ISO-POLY-3	P=0.099N	P=0.074N	P=0.059N	P=0.122N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Stomach, Forestomach Inflammation				
LESION RATES				
OVERALL (a)	3/50 (6%)	5/50 (10%)	3/50 (6%)	1/50 (2%)
POLY-3 RATE (b)	3/44.17	5/44.64	3/41.73	1/43.85
POLY-3 PERCENT (g)	6.8%	11.2%	7.2%	2.3%
TERMINAL (d)	1/34 (3%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	579	519	509	635
STATISTICAL TESTS				
POLY 3	P=0.165N	P=0.362	P=0.636	P=0.308N
POLY 1.5	P=0.161N	P=0.357	P=0.647	P=0.305N
POLY 6	P=0.171N	P=0.370	P=0.626	P=0.312N
COCH-ARM / FISHERS	P=0.160N	P=0.357	P=0.661N	P=0.309N
MAX-ISO-POLY-3	P=0.168N	P=0.237	P=0.471	P=0.157N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Stomach, Forestomach Ulcer				
LESION RATES				
OVERALL (a)	2/50 (4%)	1/50 (2%)	2/50 (4%)	1/50 (2%)
POLY-3 RATE (b)	2/44.17	1/43.67	2/41.33	1/43.85
POLY-3 PERCENT (g)	4.5%	2.3%	4.8%	2.3%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	579	519	509	635
STATISTICAL TESTS				
POLY 3	P=0.445N	P=0.504N	P=0.670	P=0.503N
POLY 1.5	P=0.442N	P=0.504N	P=0.680	P=0.500N
POLY 6	P=0.451N	P=0.504N	P=0.659	P=0.507N
COCH-ARM / FISHERS	P=0.442N	P=0.500N	P=0.691N	P=0.500N
MAX-ISO-POLY-3	P=0.454N	P=0.285N	P=0.473	P=0.283N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Stomach, Forestomach: Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	3/50 (6%)	6/50 (12%)	3/50 (6%)	2/50 (4%)
POLY-3 RATE (b)	3/43.78	6/44.71	3/41.73	2/43.50
POLY-3 PERCENT (g)	6.9%	13.4%	7.2%	4.6%
TERMINAL (d)	1/34 (3%)	0/31 (0%)	0/24 (0%)	2/30 (7%)
FIRST INCIDENCE	702	519	509	731 (T)
STATISTICAL TESTS				
POLY 3	P=0.268N	P=0.252	P=0.640	P=0.503N
POLY 1.5	P=0.262N	P=0.246	P=0.649	P=0.499N
POLY 6	P=0.278N	P=0.262	P=0.632	P=0.510N
COCH-ARM / FISHERS	P=0.261N	P=0.243	P=0.661N	P=0.500N
MAX-ISO-POLY-3	P=0.274N	P=0.156	P=0.475	P=0.327N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Thymus Atrophy				
LESION RATES				
OVERALL (a)	45/49 (92%)	42/50 (84%)	45/49 (92%)	49/50 (98%)
POLY-3 RATE (b)	45/48.92	42/48.12	45/48.25	49/49.21
POLY-3 PERCENT (g)	92%	87.3%	93.3%	99.6%
TERMINAL (d)	31/34 (91%)	26/31 (84%)	22/23 (96%)	30/30 (100%)
FIRST INCIDENCE	253	418	361	491
STATISTICAL TESTS				
POLY 3	P=0.036*	P=0.333N	P=0.561	P=0.078
POLY 1.5	P=0.046*	P=0.302N	P=0.600	P=0.101
POLY 6	P=0.029*	P=0.347N	P=0.500	P=0.067
COCH-ARM / FISHERS	P=0.067	P=0.188N	P=0.643N	P=0.175
MAX-ISO-POLY-3	P=0.033*	P=0.225N	P=0.402	P=0.026*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Thymus Hyperplasia Lymphoid				
LESION RATES				
OVERALL (a)	0/49 (0%)	2/50 (4%)	0/49 (0%)	0/50 (0%)
POLY-3 RATE (b)	0/42.69	2/43.03	0/39.02	0/43.50
POLY-3 PERCENT (g)	0%	4.7%	0%	0%
TERMINAL (d)	0/34 (0%)	2/31 (7%)	0/23 (0%)	0/30 (0%)
FIRST INCIDENCE	---	731 (T)	---	---
STATISTICAL TESTS				
POLY 3	P=0.420N	P=0.239	(e)	(e)
POLY 1.5	P=0.417N	P=0.239	(e)	(e)
POLY 6	P=0.425N	P=0.239	(e)	(e)
COCH-ARM / FISHERS	P=0.413N	P=0.253	(e)	(e)
MAX-ISO-POLY-3	P=0.250N	P=0.077	(e)	(e)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Thyroid Gland: C-Cell Hyperplasia				
LESION RATES				
OVERALL (a)	20/50 (40%)	27/50 (54%)	22/50 (44%)	16/50 (32%)
POLY-3 RATE (b)	20/45.11	27/44.79	22/43.46	16/44.74
POLY-3 PERCENT (g)	44.3%	60.3%	50.6%	35.8%
TERMINAL (d)	17/34 (50%)	21/31 (68%)	12/24 (50%)	10/30 (33%)
FIRST INCIDENCE	417	519	452	633
STATISTICAL TESTS				
POLY 3	P=0.104N	P=0.090	P=0.350	P=0.267N
POLY 1.5	P=0.103N	P=0.093	P=0.376	P=0.264N
POLY 6	P=0.105N	P=0.093	P=0.335	P=0.268N
COCH-ARM / FISHERS	P=0.112N	P=0.115	P=0.420	P=0.266N
MAX-ISO-POLY-3	P=0.082N	P=0.060	P=0.277	P=0.202N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Thyroid Gland: Follicular Cell Hyperplasia				
LESION RATES				
OVERALL (a)	2/50 (4%)	4/50 (8%)	1/50 (2%)	2/50 (4%)
POLY-3 RATE (b)	2/43.58	4/43.08	1/40.05	2/43.93
POLY-3 PERCENT (g)	4.6%	9.3%	2.5%	4.6%
TERMINAL (d)	2/34 (6%)	3/31 (10%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	731 (T)	718	724	635
STATISTICAL TESTS				
POLY 3	P=0.441N	P=0.331	P=0.529N	P=0.691N
POLY 1.5	P=0.438N	P=0.332	P=0.517N	P=0.691N
POLY 6	P=0.444N	P=0.333	P=0.542N	P=0.692N
COCH-ARM / FISHERS	P=0.437N	P=0.339	P=0.500N	P=0.691N
MAX-ISO-POLY-3	P=0.388N	P=0.197	P=0.312N	P=0.496N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Thyroid Gland: Follicular Cell Hypertrophy				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	2/50 (4%)	0/50 (0%)
POLY-3 RATE (b)	0/43.58	0/43.03	2/40.83	0/43.50
POLY-3 PERCENT (g)	0%	0%	4.9%	0%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	442	---
STATISTICAL TESTS				
POLY 3	P=0.605	(e)	P=0.223	(e)
POLY 1.5	P=0.606	(e)	P=0.229	(e)
POLY 6	P=0.601	(e)	P=0.216	(e)
COCH-ARM / FISHERS	P=0.599	(e)	P=0.247	(e)
MAX-ISO-POLY-3	P=0.238	(e)	P=0.075	(e)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Trachea				
Inflammation Chronic				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	20/50 (40%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	20/45.79
POLY-3 PERCENT (g)	0%	0%	0%	43.7%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	12/30 (40%)
FIRST INCIDENCE	---	---	---	571
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P<0.001**
POLY 1.5	P<0.001**	(e)	(e)	P<0.001**
POLY 6	P<0.001**	(e)	(e)	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Trachea: Epithelium Atrophy				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	4/50 (8%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	4/44.02
POLY-3 PERCENT (g)	0%	0%	0%	9.1%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	2/30 (7%)
FIRST INCIDENCE	---	---	---	633
STATISTICAL TESTS				
POLY 3	P=0.003**	(e)	(e)	P=0.061
POLY 1.5	P=0.003**	(e)	(e)	P=0.061
POLY 6	P=0.003**	(e)	(e)	P=0.061
COCH-ARM / FISHERS	P=0.003**	(e)	(e)	P=0.059
MAX-ISO-POLY-3	P=0.003**	(e)	(e)	P=0.020*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Trachea: Epithelium Hyperplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	30/50 (60%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	30/46.52
POLY-3 PERCENT (g)	0%	0%	0%	64.5%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	19/30 (63%)
FIRST INCIDENCE	---	---	---	435
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P<0.001**
POLY 1.5	P<0.001**	(e)	(e)	P<0.001**
POLY 6	P<0.001**	(e)	(e)	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Trachea: Epithelium Metaplasia				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	3/50 (6%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	3/43.85
POLY-3 PERCENT (g)	0%	0%	0%	6.8%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	2/30 (7%)
FIRST INCIDENCE	---	---	---	635
STATISTICAL TESTS				
POLY 3	P=0.011*	(e)	(e)	P=0.119
POLY 1.5	P=0.011*	(e)	(e)	P=0.120
POLY 6	P=0.011*	(e)	(e)	P=0.118
COCH-ARM / FISHERS	P=0.012*	(e)	(e)	P=0.121
MAX-ISO-POLY-3	P=0.009**	(e)	(e)	P=0.039*

Experiment Number: 20725 - 03
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
2,3-Butanedione
CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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First Dose M/F: 08/17/09 / 08/17/09
Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Trachea: Epithelium Necrosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	1/50 (2%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	1/43.88
POLY-3 PERCENT (g)	0%	0%	0%	2.3%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	---	---	---	625
STATISTICAL TESTS				
POLY 3	(n)	(n)	(n)	(n)
POLY 1.5	(n)	(n)	(n)	(n)
POLY 6	(n)	(n)	(n)	(n)
COCH-ARM / FISHERS	(n)	(n)	(n)	(n)
MAX-ISO-POLY-3	(n)	(n)	(n)	(n)

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
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 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Trachea: Epithelium Regeneration				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	3/50 (6%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	3/43.67
POLY-3 PERCENT (g)	0%	0%	0%	6.9%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	2/30 (7%)
FIRST INCIDENCE	---	---	---	687
STATISTICAL TESTS				
POLY 3	P=0.011*	(e)	(e)	P=0.119
POLY 1.5	P=0.011*	(e)	(e)	P=0.120
POLY 6	P=0.011*	(e)	(e)	P=0.117
COCH-ARM / FISHERS	P=0.012*	(e)	(e)	P=0.121
MAX-ISO-POLY-3	P=0.009**	(e)	(e)	P=0.038*

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Trachea: Submucosa Fibrosis				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	0/50 (0%)	19/50 (38%)
POLY-3 RATE (b)	0/43.58	0/43.03	0/40.02	19/45.25
POLY-3 PERCENT (g)	0%	0%	0%	42%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	0/24 (0%)	11/30 (37%)
FIRST INCIDENCE	---	---	---	633
STATISTICAL TESTS				
POLY 3	P<0.001**	(e)	(e)	P<0.001**
POLY 1.5	P<0.001**	(e)	(e)	P<0.001**
POLY 6	P<0.001**	(e)	(e)	P<0.001**
COCH-ARM / FISHERS	P<0.001**	(e)	(e)	P<0.001**
MAX-ISO-POLY-3	P<0.001**	(e)	(e)	P<0.001**

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
 2,3-Butanedione
 CAS Number: 431-03-8

Date Report Requested: 04/12/2016
 Time Report Requested: 16:27:54
 First Dose M/F: 08/17/09 / 08/17/09
 Lab: BNW

**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Uterus				
Adenomyosis Focal				
LESION RATES				
OVERALL (a)	2/50 (4%)	0/50 (0%)	0/50 (0%)	0/50 (0%)
POLY-3 RATE (b)	2/43.58	0/43.03	0/40.02	0/43.50
POLY-3 PERCENT (g)	4.6%	0%	0%	0%
TERMINAL (d)	2/34 (6%)	0/31 (0%)	0/24 (0%)	0/30 (0%)
FIRST INCIDENCE	731 (T)	---	---	---
STATISTICAL TESTS				
POLY 3	P=0.112N	P=0.240N	P=0.256N	P=0.237N
POLY 1.5	P=0.111N	P=0.240N	P=0.248N	P=0.236N
POLY 6	P=0.113N	P=0.239N	P=0.265N	P=0.239N
COCH-ARM / FISHERS	P=0.112N	P=0.247N	P=0.247N	P=0.247N
MAX-ISO-POLY-3	P=0.033N*	P=0.078N	P=0.094N	P=0.076N

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

P10: STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS
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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Uterus: Cervix Hyperplasia				
LESION RATES				
OVERALL (a)	7/50 (14%)	5/50 (10%)	8/50 (16%)	10/50 (20%)
POLY-3 RATE (b)	7/44.11	5/44.38	8/40.23	10/44.56
POLY-3 PERCENT (g)	15.9%	11.3%	19.9%	22.4%
TERMINAL (d)	5/34 (15%)	3/31 (10%)	6/24 (25%)	6/30 (20%)
FIRST INCIDENCE	599	409	684	629
STATISTICAL TESTS				
POLY 3	P=0.156	P=0.374N	P=0.422	P=0.303
POLY 1.5	P=0.161	P=0.378N	P=0.455	P=0.304
POLY 6	P=0.151	P=0.370N	P=0.388	P=0.301
COCH-ARM / FISHERS	P=0.160	P=0.380N	P=0.500	P=0.298
MAX-ISO-POLY-3	P=0.213	P=0.265N	P=0.322	P=0.218

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Uterus: Cervix Hypertrophy Stromal				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	2/50 (4%)	1/50 (2%)
POLY-3 RATE (b)	0/43.58	0/43.03	2/40.02	1/43.50
POLY-3 PERCENT (g)	0%	0%	5%	2.3%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	2/24 (8%)	1/30 (3%)
FIRST INCIDENCE	---	---	731 (T)	731 (T)
STATISTICAL TESTS				
POLY 3	P=0.252	(e)	P=0.218	P=0.500
POLY 1.5	P=0.253	(e)	P=0.226	P=0.501
POLY 6	P=0.248	(e)	P=0.211	P=0.498
COCH-ARM / FISHERS	P=0.249	(e)	P=0.247	P=0.500
MAX-ISO-POLY-3	P=0.156	(e)	P=0.075	P=0.158

Experiment Number: 20725 - 03
 Test Type: CHRONIC
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 Species/Strain: RATS/Wistar Han

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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Uterus: Endometrium Hyperplasia Cystic				
LESION RATES				
OVERALL (a)	24/50 (48%)	16/50 (32%)	17/50 (34%)	25/50 (50%)
POLY-3 RATE (b)	24/45.07	16/45.29	17/41.80	25/44.51
POLY-3 PERCENT (g)	53.3%	35.3%	40.7%	56.2%
TERMINAL (d)	19/34 (56%)	10/31 (32%)	10/24 (42%)	18/30 (60%)
FIRST INCIDENCE	599	409	509	635
STATISTICAL TESTS				
POLY 3	P=0.253	P=0.062N	P=0.163N	P=0.474
POLY 1.5	P=0.280	P=0.068N	P=0.137N	P=0.495
POLY 6	P=0.218	P=0.056N	P=0.194N	P=0.440
COCH-ARM / FISHERS	P=0.302	P=0.076N	P=0.111N	P=0.500
MAX-ISO-POLY-3	P=0.160	P=0.040N*	P=0.124N	P=0.387

Experiment Number: 20725 - 03
 Test Type: CHRONIC
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 Species/Strain: RATS/Wistar Han

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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Uterus: Endometrium Hyperplasia Focal				
LESION RATES				
OVERALL (a)	0/50 (0%)	0/50 (0%)	3/50 (6%)	1/50 (2%)
POLY-3 RATE (b)	0/43.58	0/43.03	3/40.33	1/43.85
POLY-3 PERCENT (g)	0%	0%	7.4%	2.3%
TERMINAL (d)	0/34 (0%)	0/31 (0%)	2/24 (8%)	0/30 (0%)
FIRST INCIDENCE	---	---	647	635
STATISTICAL TESTS				
POLY 3	P=0.257	(e)	P=0.105	P=0.501
POLY 1.5	P=0.257	(e)	P=0.111	P=0.502
POLY 6	P=0.255	(e)	P=0.100	P=0.500
COCH-ARM / FISHERS	P=0.251	(e)	P=0.121	P=0.500
MAX-ISO-POLY-3	P=0.106	(e)	P=0.037*	P=0.160

Experiment Number: 20725 - 03
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/Wistar Han

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**STATISTICAL ANALYSIS OF NON-NEOPLASTIC LESIONS IN RATS(Wistar Han)
 TERMINAL SACRIFICE AT 105 WEEKS**

DOSE	Females			
	Control	12.5 ppm	25 ppm	50 ppm
Uterus: Endometrium Metaplasia				
LESION RATES				
OVERALL (a)	5/50 (10%)	1/50 (2%)	7/50 (14%)	6/50 (12%)
POLY-3 RATE (b)	5/44.07	1/43.55	7/42.05	6/44.32
POLY-3 PERCENT (g)	11.4%	2.3%	16.7%	13.5%
TERMINAL (d)	3/34 (9%)	0/31 (0%)	2/24 (8%)	2/30 (7%)
FIRST INCIDENCE	614	571	452	629
STATISTICAL TESTS				
POLY 3	P=0.228	P=0.103N	P=0.345	P=0.504
POLY 1.5	P=0.230	P=0.104N	P=0.360	P=0.505
POLY 6	P=0.224	P=0.103N	P=0.332	P=0.501
COCH-ARM / FISHERS	P=0.226	P=0.102N	P=0.380	P=0.500
MAX-ISO-POLY-3	P=0.167	P=0.046N*	P=0.245	P=0.377

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LEGEND

- (a) Number of tumor-bearing animals/number of animals examined at site.
 - (b) Number of tumor-bearing animals/Poly-3 number
 - (d) Observed incidence at terminal kill.
 - (e) Value of statistic cannot be computed.
 - (f) Beneath the control incidence are the P-values associated with the trend test. Beneath the dosed group incidence are the P-values corresponding to pairwise comparisons between the controls and that dosed group.
 - (g) Poly-3 adjusted lifetime tumor incidence.
 - (n) No statistics are calculated if all dose groups have fewer than two tumors.
 - (I) Interim sacrifice
 - (T) Terminal sacrifice
 - # Tumor rates based on numbers of animals necropsied.
 - * To the right of any statistical result, indicates significance at ($P \leq 0.05$).
 - ** To the right of any statistical result, indicates significance at ($P \leq 0.01$).
 - N Indicates a negative trend for all tests
- The Cochran-Armitage and Fishers exact tests compare directly the overall incidence rates.

*** END OF REPORT ***