

Experiment Number: 20403 - 01
Test Type: CHRONIC
Route: DOSED FEED
Species/Strain: RATS/HSD

P03: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE(a)

Zinc Carbonate, Basic
CAS Number: 5263-02-5

Date Report Requested: 05/25/2016
Time Report Requested: 10:24:19
First Dose M/F: 09/03/09 / 09/04/09
Lab: BAT

F1_Rev.1_HSD

NTP Study Number: C20403
Lock Date: 04/05/2013
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: 09/08/2015

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Harlan Sprague Dawley RATS MALE

Control (38ppm)

3.5ppm SevZnDef

7ppm ZnDef

250ppmModZnExc

500ppm ZnExc

Disposition Summary

	Control (38ppm)	3.5ppm SevZnDef	7ppm ZnDef	250ppmModZnExc	500ppm ZnExc
Animals Initially In Study	60	60	60	60	60
Scheduled Sacrifice	10	10	9	10	10
Early Deaths					
Moribund Sacrifice	11	12	10	15	7
Natural Death	19	7	13	14	22
Survivors					
Natural Death	2		1		1
Terminal Sacrifice	18	31	27	21	20
Animals Examined Microscopically	50	50	50	50	50

ALIMENTARY SYSTEM

	Control (38ppm)	3.5ppm SevZnDef	7ppm ZnDef	250ppmModZnExc	500ppm ZnExc
Esophagus	(50)	(50)	(50)	(50)	(50)
Intestine Large, Cecum	(50)	(50)	(50)	(50)	(47)
Erosion	1 (2%)				
Epithelium, Necrosis					1 (2%)
Intestine Large, Colon	(49)	(50)	(49)	(50)	(48)
Parasite Metazoan					1 (2%)
Ulcer	1 (2%)				
Intestine Large, Rectum	(50)	(50)	(50)	(50)	(48)
Intestine Small, Duodenum	(50)	(49)	(50)	(49)	(48)
Epithelium, Hyperplasia	1 (2%)				
Intestine Small, Ileum	(50)	(49)	(48)	(50)	(45)
Intestine Small, Jejunum	(50)	(49)	(50)	(50)	(47)
Peyer's Patch, Hyperplasia					1 (2%)
Liver	(50)	(50)	(50)	(50)	(46)
Atrophy					1 (2%)
Basophilic Focus		1 (2%)		1 (2%)	
Clear Cell Focus	18 (36%)	26 (52%)	19 (38%)	21 (42%)	23 (50%)
Eosinophilic Focus	4 (8%)		1 (2%)	1 (2%)	
Fatty Change	5 (10%)	4 (8%)	5 (10%)	2 (4%)	4 (9%)
Hematopoietic Cell Proliferation					1 (2%)
Hepatodiaphragmatic Nodule		1 (2%)		1 (2%)	
Inflammation				1 (2%)	1 (2%)

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Harlan Sprague Dawley RATS MALE	Control (38ppm)	3.5ppm SevZnDef	7ppm ZnDef	250ppmModZnExc	500ppm ZnExc
Mixed Cell Focus			1 (2%)	1 (2%)	
Bile Duct, Hyperplasia				3 (6%)	
Hepatocyte, Atrophy	1 (2%)				
Hepatocyte, Necrosis	4 (8%)		3 (6%)	1 (2%)	
Hepatocyte, Vacuolization Cytoplasmic				1 (2%)	1 (2%)
Serosa, Inflammation, Acute			1 (2%)		
Mesentery	(0)	(1)	(0)	(0)	(0)
Oral Mucosa	(1)	(0)	(2)	(1)	(1)
Hyperplasia			1 (50%)		1 (100%)
Inflammation			1 (50%)		
Ulcer	1 (100%)				
Pancreas	(49)	(50)	(48)	(48)	(48)
Inflammation, Acute					1 (2%)
Inflammation, Chronic Active					1 (2%)
Mineralization	1 (2%)				
Acinus, Atrophy	3 (6%)	3 (6%)	4 (8%)	3 (6%)	13 (27%)
Acinus, Basophilic Focus	1 (2%)		1 (2%)		2 (4%)
Acinus, Hyperplasia	23 (47%)	32 (64%)	23 (48%)	21 (44%)	28 (58%)
Duct, Hyperplasia, Cystic		1 (2%)			
Salivary Glands	(49)	(50)	(50)	(50)	(49)
Cyst	1 (2%)	1 (2%)			
Stomach, Forestomach	(50)	(50)	(50)	(50)	(49)
Mineralization	2 (4%)				
Ulcer	3 (6%)		1 (2%)	2 (4%)	2 (4%)
Epithelium, Hyperplasia	11 (22%)	16 (32%)	11 (22%)	14 (28%)	7 (14%)
Stomach, Glandular	(50)	(50)	(50)	(50)	(49)
Metaplasia, Squamous			1 (2%)		
Mineralization	2 (4%)		1 (2%)	1 (2%)	1 (2%)
Tongue	(0)	(0)	(0)	(0)	(1)
Hemorrhage					1 (100%)
Inflammation, Chronic					1 (100%)
Ulcer					1 (100%)
Tooth	(3)	(0)	(1)	(0)	(2)
Inflammation					1 (50%)
Malformation			1 (100%)		
Necrosis	3 (100%)				2 (100%)

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3.5ppm SevZnDef

7ppm ZnDef

250ppmModZnExc

500ppm ZnExc

CARDIOVASCULAR SYSTEM

	Control (38ppm)	3.5ppm SevZnDef	7ppm ZnDef	250ppmModZnExc	500ppm ZnExc
Blood Vessel	(50)	(50)	(50)	(50)	(50)
Inflammation	24 (48%)	29 (58%)	29 (58%)	27 (54%)	16 (32%)
Mineralization	3 (6%)				
Necrosis			1 (2%)		
Aorta, Mineralization		1 (2%)			
Heart	(50)	(50)	(50)	(50)	(50)
Cardiomyopathy	42 (84%)	38 (76%)	39 (78%)	35 (70%)	32 (64%)
Mineralization	2 (4%)			1 (2%)	
Atrium, Thrombosis	3 (6%)		4 (8%)	3 (6%)	
Valve, Inflammation			1 (2%)		

ENDOCRINE SYSTEM

	Control (38ppm)	3.5ppm SevZnDef	7ppm ZnDef	250ppmModZnExc	500ppm ZnExc
Adrenal Cortex	(50)	(50)	(50)	(50)	(50)
Degeneration, Cystic		1 (2%)			
Hyperplasia	7 (14%)	3 (6%)	7 (14%)	5 (10%)	5 (10%)
Hypertrophy		1 (2%)			
Necrosis	1 (2%)		1 (2%)		
Thrombosis				1 (2%)	
Vacuolization Cytoplasmic	1 (2%)	1 (2%)			
Adrenal Medulla	(50)	(50)	(50)	(50)	(50)
Hyperplasia	16 (32%)	21 (42%)	14 (28%)	15 (30%)	11 (22%)
Bilateral, Hyperplasia	6 (12%)	3 (6%)	8 (16%)	4 (8%)	5 (10%)
Islets, Pancreatic	(50)	(50)	(50)	(49)	(49)
Atrophy		1 (2%)			1 (2%)
Hyperplasia	1 (2%)		3 (6%)		4 (8%)
Parathyroid Gland	(47)	(41)	(44)	(40)	(42)
Hyperplasia	6 (13%)	2 (5%)	2 (5%)	6 (15%)	5 (12%)
Pituitary Gland	(50)	(50)	(50)	(50)	(49)
Inflammation					1 (2%)
Pars Distalis, Hyperplasia	12 (24%)	17 (34%)	17 (34%)	13 (26%)	15 (31%)
Pars Intermedia, Hyperplasia	1 (2%)	1 (2%)		1 (2%)	

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Thyroid Gland	(50)	(50)	(50)	(50)	(49)
Mineralization				1 (2%)	
Thrombosis, Chronic	1 (2%)				
C-cell, Hyperplasia	16 (32%)	16 (32%)	13 (26%)	10 (20%)	12 (24%)
Follicular Cell, Hyperplasia	1 (2%)				1 (2%)
<hr/>					
GENERAL BODY SYSTEM					
None					
<hr/>					
GENITAL SYSTEM					
Epididymis	(50)	(50)	(50)	(50)	(50)
Degeneration				2 (4%)	
Hyperplasia				1 (2%)	
Penis	(0)	(0)	(1)	(0)	(0)
Developmental Malformation			1 (100%)		
Preputial Gland	(50)	(50)	(50)	(50)	(50)
Inflammation			2 (4%)		
Prostate	(50)	(50)	(50)	(50)	(50)
Inflammation	1 (2%)			1 (2%)	
Epithelium, Hyperplasia	2 (4%)		1 (2%)		
Seminal Vesicle	(50)	(50)	(50)	(50)	(50)
Inflammation	1 (2%)				
Testes	(50)	(50)	(50)	(50)	(50)
Edema		2 (4%)			
Mineralization		1 (2%)			
Bilateral, Germ Cell, Degeneration		1 (2%)		1 (2%)	1 (2%)
Bilateral, Germinal Epithelium, Atrophy		7 (14%)	1 (2%)		1 (2%)
Germinal Epithelium, Atrophy	5 (10%)	3 (6%)		3 (6%)	4 (8%)
Interstitial Cell, Hyperplasia	1 (2%)				
Seminiferous Tubule, Dilation	1 (2%)	1 (2%)		1 (2%)	

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HEMATOPOIETIC SYSTEM					
Bone Marrow	(50)	(50)	(50)	(50)	(50)
Atrophy	1 (2%)	1 (2%)	1 (2%)	1 (2%)	2 (4%)
Hyperplasia	4 (8%)	4 (8%)		1 (2%)	1 (2%)
Myelofibrosis				1 (2%)	
Lymph Node	(6)	(1)	(4)	(3)	(2)
Deep Cervical, Inflammation	1 (17%)				
Inguinal, Ectasia				1 (33%)	
Mediastinal, Atrophy	1 (17%)		2 (50%)		
Mediastinal, Ectasia					1 (50%)
Mediastinal, Hemorrhage	2 (33%)	1 (100%)	4 (100%)	1 (33%)	
Mediastinal, Hemorrhage, Chronic	1 (17%)				
Mediastinal, Pigmentation, Hemosiderin	1 (17%)				
Pancreatic, Hemorrhage		1 (100%)			1 (50%)
Pancreatic, Hyperplasia					1 (50%)
Renal, Hemorrhage	1 (17%)			1 (33%)	
Lymph Node, Mandibular	(49)	(50)	(50)	(50)	(48)
Atrophy	2 (4%)	1 (2%)	2 (4%)	2 (4%)	2 (4%)
Ectasia		1 (2%)	1 (2%)	1 (2%)	
Hyperplasia	15 (31%)	14 (28%)	11 (22%)	10 (20%)	11 (23%)
Infiltration Cellular, Histiocyte				1 (2%)	
Infiltration Cellular, Plasma Cell	12 (24%)	9 (18%)	13 (26%)	12 (24%)	10 (21%)
Lymph Node, Mesenteric	(50)	(50)	(49)	(50)	(49)
Atrophy	2 (4%)			1 (2%)	
Hyperplasia		2 (4%)		2 (4%)	4 (8%)
Infiltration Cellular, Plasma Cell		1 (2%)			
Inflammation, Granulomatous	1 (2%)		1 (2%)	1 (2%)	
Inflammation, Chronic Active	1 (2%)				
Spleen	(50)	(50)	(49)	(48)	(45)
Atrophy			1 (2%)		
Hematopoietic Cell Proliferation	27 (54%)	37 (74%)	24 (49%)	26 (54%)	24 (53%)
Pigmentation, Hemosiderin	44 (88%)	43 (86%)	49 (100%)	40 (83%)	34 (76%)
Capsule, Inflammation				1 (2%)	
Lymphoid Follicle, Atrophy	6 (12%)	1 (2%)	3 (6%)	3 (6%)	4 (9%)
Lymphoid Follicle, Hyperplasia	7 (14%)	8 (16%)	10 (20%)	8 (17%)	3 (7%)

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Harlan Sprague Dawley RATS MALE	Control (38ppm)	3.5ppm SevZnDef	7ppm ZnDef	250ppmModZnExc	500ppm ZnExc
Thymus	(47)	(49)	(50)	(47)	(48)
Atrophy	37 (79%)	40 (82%)	35 (70%)	36 (77%)	37 (77%)
Hyperplasia		1 (2%)	3 (6%)	1 (2%)	1 (2%)
INTEGUMENTARY SYSTEM					
Mammary Gland	(50)	(49)	(50)	(48)	(49)
Skin	(50)	(50)	(50)	(50)	(50)
Cyst Epithelial Inclusion	1 (2%)	1 (2%)	1 (2%)		2 (4%)
Dysplasia				1 (2%)	
Fibrosis	1 (2%)			1 (2%)	
Inflammation	4 (8%)		2 (4%)	1 (2%)	
Ulcer	3 (6%)			1 (2%)	2 (4%)
Epidermis, Hyperplasia	2 (4%)	2 (4%)	2 (4%)	1 (2%)	
Hair Follicle, Cyst	2 (4%)	1 (2%)		5 (10%)	2 (4%)
Hair Follicle, Cyst, Multiple	1 (2%)				
Hair Follicle, Hyperplasia		1 (2%)			
Pinna, Hyperplasia, Squamous					1 (2%)
MUSCULOSKELETAL SYSTEM					
Bone	(50)	(50)	(50)	(50)	(50)
Fibrous Osteodystrophy	3 (6%)		1 (2%)	1 (2%)	
Inflammation	1 (2%)				
Skeletal Muscle	(0)	(0)	(1)	(2)	(0)
NERVOUS SYSTEM					
Brain	(48)	(50)	(50)	(50)	(50)
Edema				1 (2%)	1 (2%)
Inflammation			1 (2%)		
Mineralization				1 (2%)	
Cerebrum, Gliosis		1 (2%)		1 (2%)	1 (2%)
Cerebrum, Neuron, Necrosis				1 (2%)	

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Ventricle, Developmental Malformation	1 (2%)				
Venule, Mineralization				1 (2%)	
Peripheral Nerve	(1)	(1)	(1)	(1)	(0)
Sciatic, Degeneration				1 (100%)	
Spinal Cord	(0)	(1)	(1)	(1)	(0)
Axon, Degeneration		1 (100%)	1 (100%)	1 (100%)	

RESPIRATORY SYSTEM

Lung	(50)	(50)	(50)	(50)	(50)
Edema	1 (2%)				
Hemorrhage					1 (2%)
Infiltration Cellular, Histiocyte	18 (36%)	21 (42%)	21 (42%)	14 (28%)	14 (28%)
Inflammation	3 (6%)	4 (8%)	7 (14%)	10 (20%)	4 (8%)
Necrosis	1 (2%)				
Alveolar Epithelium, Hyperplasia				1 (2%)	
Interstitial, Thrombosis	1 (2%)				
Nose	(50)	(50)	(50)	(50)	(49)
Accumulation, Hyaline Droplet		1 (2%)			
Inflammation	8 (16%)		4 (8%)	2 (4%)	4 (8%)
Olfactory Epithelium, Atrophy			1 (2%)		
Respiratory Epithelium, Hyperplasia			3 (6%)	2 (4%)	1 (2%)
Respiratory Epithelium, Metaplasia, Squamous	1 (2%)				
Trachea	(50)	(50)	(50)	(50)	(50)

SPECIAL SENSES SYSTEM

Eye	(50)	(49)	(50)	(50)	(49)
Atrophy		1 (2%)	1 (2%)	1 (2%)	
Cataract		1 (2%)			
Anterior Chamber, Inflammation, Acute	1 (2%)		1 (2%)		
Anterior Chamber, Bilateral, Inflammation, Acute	1 (2%)				
Bilateral, Cornea, Inflammation, Acute	2 (4%)	1 (2%)	2 (4%)		
Bilateral, Cornea, Inflammation, Chronic Active	1 (2%)	1 (2%)	2 (4%)	3 (6%)	1 (2%)

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Bilateral, Cornea, Necrosis	1 (2%)		1 (2%)	1 (2%)	
Cornea, Inflammation, Acute		1 (2%)		2 (4%)	1 (2%)
Cornea, Inflammation, Chronic Active			2 (4%)		1 (2%)
Cornea, Necrosis				3 (6%)	
Cornea, Ulcer		1 (2%)			
Lens, Cataract	1 (2%)				
Harderian Gland	(50)	(49)	(50)	(50)	(49)
Inflammation			1 (2%)		
Zymbal's Gland	(1)	(0)	(0)	(0)	(0)

URINARY SYSTEM

Kidney	(50)	(50)	(50)	(50)	(50)
Cyst		1 (2%)	4 (8%)	4 (8%)	
Infarct, Chronic		3 (6%)	1 (2%)		3 (6%)
Nephropathy	49 (98%)	50 (100%)	48 (96%)	49 (98%)	49 (98%)
Pelvis, Inflammation, Chronic Active				1 (2%)	
Renal Tubule, Hyperplasia, Atypical			1 (2%)		
Urinary Bladder	(50)	(50)	(50)	(50)	(49)
Inflammation	2 (4%)			1 (2%)	
Ulcer				1 (2%)	

*** END OF MALE ***

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Disposition Summary

Animals Initially In Study	60	60	60	60	60
Scheduled Sacrifice	9	10	9	9	9
Early Deaths					
Moribund Sacrifice	21	11	12	19	14
Natural Death	5	7	5	5	6
Survivors					
Terminal Sacrifice	25	32	34	27	31
Animals Examined Microscopically	50	50	50	50	50

ALIMENTARY SYSTEM

Esophagus	(50)	(49)	(50)	(50)	(49)
Intestine Large, Cecum	(50)	(49)	(50)	(49)	(48)
Intestine Large, Colon	(50)	(49)	(50)	(50)	(49)
Parasite Metazoan				1 (2%)	1 (2%)
Intestine Large, Rectum	(50)	(50)	(50)	(50)	(49)
Intestine Small, Duodenum	(50)	(49)	(50)	(49)	(49)
Intestine Small, Ileum	(50)	(49)	(50)	(49)	(49)
Intestine Small, Jejunum	(50)	(49)	(50)	(49)	(49)
Liver	(50)	(50)	(50)	(50)	(50)
Angiectasis		2 (4%)	3 (6%)	1 (2%)	1 (2%)
Basophilic Focus	1 (2%)				1 (2%)
Clear Cell Focus	2 (4%)	2 (4%)	7 (14%)	5 (10%)	5 (10%)
Developmental Malformation		1 (2%)			
Eosinophilic Focus		1 (2%)	3 (6%)	1 (2%)	2 (4%)
Fatty Change	6 (12%)	4 (8%)	11 (22%)	4 (8%)	3 (6%)
Hematopoietic Cell Proliferation	1 (2%)	2 (4%)			
Hepatodiaphragmatic Nodule	1 (2%)				
Inflammation	1 (2%)				
Mixed Cell Focus		1 (2%)	2 (4%)	4 (8%)	
Bile Duct, Cyst		1 (2%)			
Bile Duct, Hyperplasia		2 (4%)			
Hepatocyte, Hypertrophy				1 (2%)	1 (2%)
Hepatocyte, Inclusion Body Intracytoplasmic		1 (2%)			

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Hepatocyte, Necrosis		1 (2%)	2 (4%)		1 (2%)
Hepatocyte, Vacuolization Cytoplasmic	1 (2%)	1 (2%)		2 (4%)	
Pancreas	(50)	(48)	(49)	(49)	(49)
Thrombosis		1 (2%)			
Acinus, Atrophy	2 (4%)	4 (8%)	2 (4%)	5 (10%)	10 (20%)
Acinus, Basophilic Focus			2 (4%)		
Acinus, Depletion Secretory					1 (2%)
Acinus, Hyperplasia	2 (4%)	1 (2%)	5 (10%)		1 (2%)
Duct, Hyperplasia, Cystic		1 (2%)			1 (2%)
Salivary Glands	(50)	(49)	(50)	(48)	(49)
Stomach, Forestomach	(50)	(50)	(50)	(50)	(49)
Edema	1 (2%)				
Inflammation				1 (2%)	
Ulcer	1 (2%)	1 (2%)		1 (2%)	1 (2%)
Epithelium, Hyperplasia	5 (10%)	8 (16%)	4 (8%)	2 (4%)	4 (8%)
Stomach, Glandular	(50)	(50)	(50)	(50)	(49)
Erosion	1 (2%)				
Tooth	(1)	(1)	(0)	(6)	(0)
Inflammation				3 (50%)	
Malformation		1 (100%)			
Necrosis	1 (100%)			3 (50%)	

CARDIOVASCULAR SYSTEM

Blood Vessel	(50)	(50)	(50)	(50)	(50)
Inflammation	1 (2%)	1 (2%)		1 (2%)	1 (2%)
Heart	(50)	(50)	(50)	(50)	(50)
Cardiomyopathy	7 (14%)	10 (20%)	4 (8%)	8 (16%)	6 (12%)
Endocardium, Fibrosis	1 (2%)				
Endocardium, Hyperplasia			1 (2%)	1 (2%)	
Myocardium, Inflammation, Chronic Active	1 (2%)				

ENDOCRINE SYSTEM

Adrenal Cortex	(50)	(50)	(50)	(50)	(50)
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Experiment Number: 20403 - 01

Test Type: CHRONIC

Route: DOSED FEED

Species/Strain: RATS/HSD

P03: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE(a)

Zinc Carbonate, Basic

CAS Number: 5263-02-5

Date Report Requested: 05/25/2016

Time Report Requested: 10:24:19

First Dose M/F: 09/03/09 / 09/04/09

Lab: BAT

Harlan Sprague Dawley RATS FEMALE	Control (38ppm)	3.5ppm SevZnDef	7ppm ZnDef	250ppmModZnExc	500ppm ZnExc
Degeneration, Cystic	3 (6%)	4 (8%)	1 (2%)	1 (2%)	2 (4%)
Hyperplasia	6 (12%)	5 (10%)	5 (10%)	4 (8%)	5 (10%)
Necrosis	1 (2%)				1 (2%)
Thrombosis			1 (2%)	2 (4%)	
Adrenal Medulla	(50)	(50)	(50)	(50)	(50)
Hyperplasia	6 (12%)	4 (8%)	3 (6%)	3 (6%)	2 (4%)
Islets, Pancreatic	(50)	(50)	(50)	(49)	(49)
Hyperplasia			1 (2%)		
Parathyroid Gland	(42)	(43)	(41)	(42)	(43)
Hyperplasia		1 (2%)			
Pituitary Gland	(50)	(50)	(50)	(50)	(50)
Angiectasis	1 (2%)				
Hemorrhage				1 (2%)	
Pars Distalis, Angiectasis		1 (2%)		1 (2%)	
Pars Distalis, Hyperplasia	15 (30%)	15 (30%)	22 (44%)	13 (26%)	17 (34%)
Thyroid Gland	(50)	(49)	(50)	(50)	(48)
C-cell, Hyperplasia	18 (36%)	14 (29%)	9 (18%)	14 (28%)	5 (10%)

GENERAL BODY SYSTEM

None

GENITAL SYSTEM

Clitoral Gland	(49)	(50)	(50)	(49)	(50)
Cyst			1 (2%)		
Hyperplasia				1 (2%)	
Ovary	(50)	(50)	(50)	(50)	(49)
Atrophy	31 (62%)	29 (58%)	30 (60%)	29 (58%)	26 (53%)
Cyst	12 (24%)	8 (16%)	5 (10%)	11 (22%)	4 (8%)
Inflammation	1 (2%)				
Bilateral, Cyst			2 (4%)		
Granulosa Cell, Hyperplasia	1 (2%)		1 (2%)		
Interstitial Cell, Hyperplasia		2 (4%)			1 (2%)
Uterus	(50)	(50)	(49)	(50)	(50)

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Harlan Sprague Dawley RATS FEMALE	Control (38ppm)	3.5ppm SevZnDef	7ppm ZnDef	250ppmModZnExc	500ppm ZnExc
Cyst		1 (2%)			
Hemorrhage					1 (2%)
Inflammation	1 (2%)	1 (2%)		1 (2%)	
Metaplasia, Squamous	21 (42%)	19 (38%)	18 (37%)	15 (30%)	20 (40%)
Pigmentation, Hemosiderin	2 (4%)				
Polyp, Inflammatory			1 (2%)		
Thrombosis	1 (2%)				
Cervix, Adenomyosis				1 (2%)	
Cervix, Hypertrophy	1 (2%)				
Endometrium, Hyperplasia, Cystic	9 (18%)	13 (26%)	5 (10%)	7 (14%)	7 (14%)

HEMATOPOIETIC SYSTEM

Bone Marrow	(50)	(49)	(50)	(50)	(50)
Atrophy	1 (2%)		1 (2%)	2 (4%)	
Hyperplasia	14 (28%)	10 (20%)	9 (18%)	14 (28%)	18 (36%)
Lymph Node	(1)	(0)	(0)	(0)	(1)
Mediastinal, Hemorrhage	1 (100%)				
Lymph Node, Mandibular	(50)	(49)	(49)	(48)	(48)
Atrophy		2 (4%)	1 (2%)	1 (2%)	
Hyperplasia	8 (16%)	12 (24%)	8 (16%)	8 (17%)	6 (13%)
Infiltration Cellular, Plasma Cell	15 (30%)	18 (37%)	8 (16%)	14 (29%)	10 (21%)
Lymph Node, Mesenteric	(50)	(49)	(50)	(50)	(49)
Atrophy		1 (2%)	1 (2%)		
Hyperplasia	1 (2%)	1 (2%)			1 (2%)
Infiltration Cellular, Histiocyte	1 (2%)	3 (6%)	2 (4%)		3 (6%)
Spleen	(50)	(50)	(50)	(50)	(49)
Hematopoietic Cell Proliferation	25 (50%)	28 (56%)	31 (62%)	39 (78%)	34 (69%)
Hemorrhage	1 (2%)				
Inflammation		1 (2%)			
Pigmentation, Hemosiderin	39 (78%)	38 (76%)	43 (86%)	42 (84%)	33 (67%)
Lymphoid Follicle, Atrophy	1 (2%)	2 (4%)	1 (2%)	3 (6%)	
Lymphoid Follicle, Hyperplasia	11 (22%)	9 (18%)	7 (14%)	7 (14%)	8 (16%)
Thymus	(48)	(50)	(48)	(49)	(49)
Atrophy	35 (73%)	34 (68%)	31 (65%)	32 (65%)	33 (67%)

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Harlan Sprague Dawley RATS FEMALE	Control (38ppm)	3.5ppm SevZnDef	7ppm ZnDef	250ppmModZnExc	500ppm ZnExc
Hyperplasia Epithelial Cell, Hyperplasia		1 (2%)	1 (2%)		
INTEGUMENTARY SYSTEM					
Mammary Gland	(50)	(50)	(50)	(50)	(50)
Cyst			1 (2%)		
Hyperplasia	2 (4%)	5 (10%)	2 (4%)	2 (4%)	2 (4%)
Skin	(50)	(50)	(50)	(50)	(50)
Inflammation		1 (2%)			
Ulcer					1 (2%)
MUSCULOSKELETAL SYSTEM					
Bone	(50)	(50)	(50)	(50)	(50)
Osteopetrosis				1 (2%)	
Joint, Degeneration				1 (2%)	
Maxilla, Fibrosis				2 (4%)	
NERVOUS SYSTEM					
Brain	(50)	(50)	(50)	(50)	(50)
Hemorrhage	1 (2%)	1 (2%)			
Hydrocephalus					1 (2%)
Cerebrum, Gliosis	1 (2%)				
Glial Cell, Hyperplasia	1 (2%)				
Peripheral Nerve	(0)	(0)	(0)	(1)	(1)
Spinal Cord	(0)	(0)	(0)	(1)	(1)
Axon, Degeneration				1 (100%)	1 (100%)
RESPIRATORY SYSTEM					
Lung	(50)	(50)	(50)	(50)	(50)

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Lab: BAT

Harlan Sprague Dawley RATS FEMALE	Control (38ppm)	3.5ppm SevZnDef	7ppm ZnDef	250ppmModZnExc	500ppm ZnExc
Cyst, Squamous Infiltration Cellular, Histiocyte Inflammation	37 (74%)	38 (76%) 1 (2%)	40 (80%)	1 (2%) 38 (76%)	35 (70%) 1 (2%)
Metaplasia, Squamous Alveolar Epithelium, Hyperplasia	1 (2%)			1 (2%)	1 (2%)
Nose Inflammation	(50) 1 (2%)	(50) 2 (4%)	(50)	(50) 2 (4%)	(50) 4 (8%)
Metaplasia, Squamous Respiratory Epithelium, Hyperplasia			1 (2%)		1 (2%)
Trachea	(50)	(50)	(50)	(50)	(50)
SPECIAL SENSES SYSTEM					
Eye Cataract	(50)	(50) 1 (2%)	(50)	(49)	(50)
Harderian Gland Hyperplasia	(50)	(50)	(50)	(49) 1 (2%)	(50)
Zymbal's Gland	(0)	(0)	(0)	(1)	(0)
URINARY SYSTEM					
Kidney Cyst	(50) 2 (4%)	(50)	(50)	(50)	(49)
Hydronephrosis Infarct, Chronic	1 (2%)	1 (2%)			
Mineralization		1 (2%)			2 (4%)
Nephropathy Bilateral, Papilla, Inflammation, Acute	27 (54%) 1 (2%)	28 (56%)	21 (42%)	31 (62%) 1 (2%)	29 (59%)
Cortex, Inflammation, Chronic Active Pelvis, Inflammation	1 (2%)			1 (2%)	
Pelvis, Inflammation, Acute				1 (2%)	
Urinary Bladder Inflammation	(50)	(50)	(50)	(50) 1 (2%)	(49)

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Harlan Sprague Dawley RATS FEMALE

Control (38ppm)

3.5ppm SevZnDef

7ppm ZnDef

250ppmModZnExc

500ppm ZnExc

*** END OF REPORT ***

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