Test Type: RACB **Route:** Dosing in Feed

Species/Strain: Rat/Sprague-Dawley

C Number:

Study Gender:

PWG Approval Date

PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence

Test Compound: 4-Methylimidazole **CAS Number:** 822-36-6

R92025B

Both

See web page for date of PWG Approval

Date Report Requested: 08/23/2018

Time Report Requested: 14:02:50

Lab: RTI

Test Type: RACB

Route: Dosing in Feed

PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence

Test Compound: 4-Methylimidazole

Species/Strain: Rat/Sprague-Dawley

CAS Number: 822-36-6

Date Report Requested: 08/23/2018 Time Report Requested: 14:02:50

Lab: RTI

F۸	Male

	Treatment Groups (ppm)			
	0	750	2500	5000
Disposition Summary				
Animals Initially In Study	23	23	23	23
Early Deaths				
Unscheduled Sacrifice			3	2
Survivors				
Scheduled sacrifice, terminal (SD 15 - 178)	23	23	20	21
Animals Examined Microscopically	23	23	23	23
ALIMENTARY SYSTEM				
LIVER	(23)	(0)	(23)	(23)
BASOPHILIC FOCUS			1	
CLEAR CELL FOCUS			3	
HEPATODIAPHRAGMATIC NODULE			1 [3.0]	
PERIPORTAL; LYMPHOCYTE; INFILTRATION; FOCAL			2 [1.0]	
INFLAMMATION, CHRONIC; ACTIVE, FOCAL			1 [1.0]	
CENTRILOBULAR; NECROSIS; DIFFUSE			1 [3.0]	
CENTRILOBULAR; NECROSIS; FOCAL			1 [3.0]	
CENTRILOBULAR; HEPATOCYTE; VACUOLATION; CYTOPLASMIC				19 [1.9]

CARDIOVASCULAR SYSTEM

No Tissues/Organs Examined

Test Type: RACB **Route:** Dosing in Feed

PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence

Test Compound: 4-Methylimidazole

CAS Number: 822-36-6

Date Report Requested: 08/23/2018
Time Report Requested: 14:02:50

Lab: RTI

Species/Strain: Rat/Sprague-Dawley

F٥	M	a	ها
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	Treatment Groups (ppm)			
	0	750	2500	5000
ENDOCRINE SYSTEM				
ADRENAL GLANDS	(23)	(0)	(23)	(23)
CORTEX; HYPERTROPHY; FOCAL				3 [2.0]
CORTEX; BILATERAL; VACUOLATION; DIFFUSE	3 [1.7]		3 [1.3]	
CORTEX; VACUOLATION; FOCAL	1 [2.0]		1 [1.0]	5 [1.0]
PITUITARY GLAND	(23)	(0)	(23)	(23)
PARS DISTALIS; CYST				1
THYROID GLANDS	(23)	(0)	(23)	(23)
C-CELL; HYPERPLASIA; FOCAL	1 [1.0]			

GENERAL BODY SYSTEM

No Tissues/Organs Examined

PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence
Test Compound: 4-Methylimidazole

Test Type: RACB
Route: Dosing in Feed

CAS Number: 822-36-6

Species/Strain: Rat/Sprague-Dawley

Experiment Number: R92025B

Date Report Requested: 08/23/2018 Time Report Requested: 14:02:50

Lab: RTI

F0 Male

	Treatment Groups (ppm)			
_	0	750	2500	5000
GENITAL SYSTEM				
COAGULATING GLANDS	(23)	(0)	(23)	(23)
COWPERS GLANDS	(23)	(0)	(20)	(21)
UNILATERAL; ATROPHY	1 [2.0]			
EPIDIDYMIS	(22)	(23)	(23)	(23)
DUCT; RIGHT; EXFOLIATED GERM CELL			1 [2.0]	
DUCT; EXFOLIATED GERM CELL	1 [1.0]		2 [1.5]	7 [1.3]
DUCT; EXFOLIATED GERM CELL (TOTAL)	1 [1.0]		3 [1.7]	7 [1.3]
HYPOSPERMIA			1 [2.0]	
LEVATOR ANI PLUS BULBOCAVERNOSUS MUSCLE	(23)	(0)	(20)	(21)
PREPUTIAL GLANDS	(9)	(6)	(1)	(4)
UNILATERAL; ABSCESS	1 [3.0]			
DUCT; ECTASIA	5 [2.0]	5 [2.8]	1 [3.0]	4 [2.3]
INFILTRATION; MONONUCLEAR CELL	1 [1.0]			
INFLAMMATION		1 [1.0]		
UNILATERAL; INFLAMMATION, CHRONIC; ACTIVE	1 [2.0]			
INFLAMMATION, CHRONIC; ACTIVE	6 [2.0]	5 [2.2]		2 [2.5]
INFLAMMATION, CHRONIC; ACTIVE (TOTAL)	7 [2.0]	5 [2.2]		2 [2.5]
PROSTATE	(23)	(23)	(23)	(23)
VENTRAL LOBE; ATROPHY		9 [1.0]	20 [1.1]	23 [2.4]
VENTRAL LOBE, INTERSTITIUM; LYMPHOCYTE; INFILTRATION	5 [1.2]	5 [1.0]	1 [1.0]	
VENTRAL LOBE; INFLAMMATION; CHRONIC ACTIVE		1 [1.0]		
SEMINAL VESICLES	(23)	(0)	(23)	(23)
TESTIS	(22)	(23)	(23)	(23)
GERMINAL EPITHELIUM; ATROPHY				1 [1.0]
GERM CELL; DEGENERATION	1 [1.0]		4 [1.8]	8 [1.6]
SEMINIFEROUS TUBULE; BILATERAL; SPERMATID RETENTION				1 [2.0]
SEMINIFEROUS TUBULE; SPERMATID RETENTION	2 [1.0]	3 [1.0]	1 [1.0]	7 [1.1]

Test Type: RACB

Route: Dosing in Feed

PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence

Test Compound: 4-Methylimidazole **CAS Number:** 822-36-6

Date Report Requested: 08/23/2018 Time Report Requested: 14:02:50

Lab: RTI

F0 Male				
	Treatment Groups (ppm)			
	0	750	2500	5000
SEMINIFEROUS TUBULE; SPERMATID RETENTION (TOTAL)	2 [1.0]	3 [1.0]	1 [1.0]	8 [1.3]
HEMATOPOIETIC SYSTEM THYMUS	(23)	(0)	(23)	(23)
INTEGUMENTARY SYSTEM No Tissues/Organs Examined				
LYMPHOID SYSTEM No Tissues/Organs Examined				
MUSCULOSKELETAL SYSTEM No Tissues/Organs Examined				
NERVOUS SYSTEM No Tissues/Organs Examined				
RESPIRATORY SYSTEM No Tissues/Organs Examined				
SPECIAL SENSES SYSTEM No Tissues/Organs Examined				
URINARY SYSTEM KIDNEYS	(23)	(0)	(23)	(23)
PELVIS; CONCRETION; FOCAL NEPHROPATHY, CHRONIC PROGRESSIVE	22 [1.9]		1 [1.0] 19 [1.1]	22 [1.1]

Test Compound: 4-Methylimidazole CAS Number: 822-36-6

Date Report Requested: 08/23/2018 Time Report Requested: 14:02:50

Lab: RTI

Species/Strain: Rat/Sprague-Dawley

Experiment Number: R92025B

Test Type: RACB **Route:** Dosing in Feed

F0 Female

	Treatment Groups (ppm)			
	0	750	2500	5000
Disposition Summary				
Animals Initially In Study	23	23	23	23
Early Deaths				
Euthanized, moribund	1	1	3	8
Found Dead			1	1
Unscheduled Sacrifice				2
Survivors				
Scheduled sacrifice, terminal (LD 4, SD 28 - 220)	22	22	19	12
Animals Examined Microscopically	23	10	23	23
ALIMENTARY SYSTEM				
LIVER	(23)	(3)	(23)	(23)
ATROPHY; DIFFUSE				2 [1.0]
CONGESTION; DIFFUSE	1 [2.0]			1 [2.0]
DEFORMITY		1 [1.0]		
HEMATOPOIESIS; EXTRAMEDULLARY, FOCAL			1 [1.0]	2 [1.5]
HEPATODIAPHRAGMATIC NODULE		1 [1.0]		
PERIPORTAL; LYMPHOCYTE; INFILTRATION; FOCAL	2 [1.0]		1 [1.0]	2 [1.0]
CENTRILOBULAR; NECROSIS; DIFFUSE				1 [2.0]
CENTRILOBULAR; NECROSIS; FOCAL			1 [2.0]	

CARDIOVASCULAR SYSTEM

No Tissues/Organs Examined

Test Type: RACB

Route: Dosing in Feed

PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence

Test Compound: 4-Methylimidazole CAS Number: 822-36-6

Date Report Requested: 08/23/2018 Time Report Requested: 14:02:50

Lab: RTI

Species/Strain: Rat/Sprague-Dawley

F0 Female

	Treatment Groups (ppm)			
	0	750	2500	5000
ENDOCRINE SYSTEM				
ADRENAL GLANDS	(23)	(1)	(23)	(23)
CONGESTION; DIFFUSE			1 [3.0]	
CORTEX; HYPERTROPHY; FOCAL				2 [1.5]
CORTEX; VACUOLATION; FOCAL	3 [1.0]			3 [1.0]
PITUITARY GLAND	(23)	(1)	(23)	(23)
PARS DISTALIS; CYST				2
THYROID GLANDS	(23)	(1)	(23)	(23)
C-CELL; HYPERPLASIA; FOCAL				3 [1.0]
GENERAL BODY SYSTEM				
WHOLE BODY	(0)	(0)	(0)	(1)

Test Compound: 4-Methylimidazole
CAS Number: 822-36-6

Species/Strain: Rat/Sprague-Dawley

Experiment Number: R92025B

Test Type: RACB

Route: Dosing in Feed

Date Report Requested: 08/23/2018 Time Report Requested: 14:02:50

Lab: RTI

F0 Female

	Treatment Groups (ppm)			
	0	750	2500	5000
GENITAL SYSTEM				
CERVIX	(23)	(1)	(23)	(21)
INFLAMMATION; ACUTE			1 [2.0]	
CLITORAL GLANDS	(3)	(4)	(1)	(1)
UNILATERAL; ABSCESS; CHRONIC			1 [4.0]	
DUCT; UNILATERAL; ECTASIA	1 [3.0]	3 [2.3]		
DUCT; ECTASIA	1 [4.0]	1 [2.0]		1 [2.0]
DUCT; ECTASIA (TOTAL)	2 [3.5]	4 [2.3]		1 [2.0]
INFILTRATION; MONONUCLEAR CELL	1 [2.0]			1 [2.0]
DUCT; LUMEN; INFLAMMATION, ACUTE				1 [2.0]
UNILATERAL; INFLAMMATION, CHRONIC; ACTIVE		2 [2.0]		
INFLAMMATION, CHRONIC; ACTIVE		1 [2.0]		
INFLAMMATION, CHRONIC; ACTIVE (TOTAL)		3 [2.0]		
OVARIES	(23)	(1)	(23)	(23)
CONGESTION	1 [2.0]			
CORPUS LUTEUM; CYST				2
FOLLICLE; CYST				1
PLACENTA	(0)	(0)	(1)	(5)
BILATERAL; EDEMA				1 [2.0]
EDEMA; DIFFUSE				3 [2.3]
EDEMA				1 [3.0]
INFLAMMATION; ACUTE				1 [2.0]
INFLAMMATION; SUPPURATIVE				1 [2.0]
BILATERAL; NECROSIS; DIFFUSE				1 [3.0]
NECROSIS; DIFFUSE				1 [2.0]
NECROSIS				1 [2.0]
UTERUS	(23)	(3)	(23)	(23)
ENDOMETRIUM; CYST				1

Test Type: RACB **Route:** Dosing in Feed

Experiment Number: R92025B

Species/Strain: Rat/Sprague-Dawley

Test Compound: 4-Methylimidazole
CAS Number: 822-36-6

Date Report Requested: 08/23/2018 Time Report Requested: 14:02:50

Lab: RTI

F0 Female

	Treatment Groups (ppm)			
	0	750	2500	5000
OVIDUCT; CYST			1	
HORN; LUMEN; DILATION			1 [3.0]	
DILATION		1 [2.0]		
DILATION (TOTAL)		1 [2.0]	1 [3.0]	
ENDOMETRIUM; HYPERPLASIA; CYSTIC	2 [2.0]			4 [1.5]
INFLAMMATION; CHRONIC-ACTIVE			1 [3.0]	
INFLAMMATION; SUPPURATIVE				2 [2.5]
ENDOMETRIUM; METAPLASIA; SQUAMOUS	2 [2.0]			
ENDOMETRIUM; METAPLASIA; SQUAMOUS (TOTAL)	2 [2.0]	1 [1.0]		
METAPLASIA; SQUAMOUS		1 [1.0]		
NECROSIS				1 [2.0]
ULCER; MULTIFOCAL			1 [2.0]	
VAGINA	(23)	(1)	(23)	(23)
CYST			1	
SUBMUCOSA; LYMPHOCYTE; INFILTRATION; FOCAL	1 [1.0]			
INFLAMMATION; ACUTE			1 [2.0]	
MUCIFICATION	7 [3.0]		5 [3.0]	
ULCER; FOCAL			1 [2.0]	
HEMATOPOIETIC SYSTEM				
LYMPH NODE, MEDIASTINAL	(3)	(0)	(0)	(0)
CONGESTION	1 [2.0]			
THYMUS	(23)	(1)	(22)	(23)
CORTEX; DECREASED LYMPHOCYTE; DIFFUSE			2 [3.5]	6 [2.5]

Test Type: RACB

Route: Dosing in Feed

PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence

Test Compound: 4-Methylimidazole

CAS Number: 822-36-6

Date Report Requested: 08/23/2018
Time Report Requested: 14:02:50

Lab: RTI

F0 Female				
	Treatment Groups (ppm)			
	0	750	2500	5000
INTEGUMENTARY SYSTEM				
MAMMARY GLANDS	(1)	(2)	(0)	(0)
INFILTRATION; BACTERIA	1 [3.0]			
INFLAMMATION; SUPPURATIVE	1 [3.0]			
SKIN	(2)	(0)	(1)	(0)
ALOPECIA			1 [3.0]	
LYMPHOID SYSTEM				
No Tissues/Organs Examined				
MUSCULOSKELETAL SYSTEM				
BONE	(1)	(0)	(0)	(0)
INTERVERTEBRAL DISK; RUPTURE; FOCAL	1 [4.0]			
LIMB	(2)	(1)	(2)	(0)
ALOPECIA		1 [1.0]	1 [3.0]	
EPIDERMIS; HYPERPLASIA; FOCAL		1 [2.0]		
EPIDERMIS; PARAKERATOSIS; FOCAL		1 [1.0]		
RIGHT; ULCER; DIFFUSE			1 [3.0]	
NERVOUS SYSTEM				
BRAIN	(0)	(0)	(0)	(2)
RESPIRATORY SYSTEM				
NOSE	(0)	(0)	(1)	(0)
SUBCUTANEOUS; CYST			1	
SPECIAL SENSES SYSTEM				
No Tissues/Organs Examined				

PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence

Date Report Requested: 08/23/2018

Test Type: RACB Route: Dosing in Feed Test Compound: 4-Methylimidazole

Time Report Requested: 14:02:50

Species/Strain: Rat/Sprague-Dawley

CAS Number: 822-36-6 Lab: RTI

FN I	Fem	al	Δ

	FU Female			
	Treatment Groups (ppm)			
	0	750	2500	5000
URINARY SYSTEM				
KIDNEYS	(23)	(1)	(23)	(23)
PELVIS; CONCRETION; FOCAL				1 [1.0]
PAPILLA; COLLECTING DUCT; DILATION	1 [1.0]			
INFLAMMATION, ACUTE; FOCAL				1 [1.0]
MINERAL	1 [1.0]		2 [1.0]	1 [2.0]
RENAL TUBULE; NECROSIS; ACUTE, MULTIFOCAL				3 [1.3]
NEPHROPATHY, CHRONIC PROGRESSIVE	17 [1.2]	1 [1.0]	11 [1.0]	11 [1.1]

Test Type: RACB **Route:** Dosing in Feed

Experiment Number: R92025B

Species/Strain: Rat/Sprague-Dawley

Test Compound: 4-Methylimidazole
CAS Number: 822-36-6

Date Report Requested: 08/23/2018
Time Report Requested: 14:02:50

Lab: RTI

F1 Male: F1 NonParental Male

	Treatment Groups (ppm)		
	0	750	2500
Disposition Summary			
Animals Initially In Study	49	56	20
Early Deaths			
Survivors			
Scheduled sacrifice, terminal (PND 91 - 93)	49	56	20
Animals Examined Microscopically	49	56	20
Total number litters	18	22	8
ALIMENTARY SYSTEM			
LIVER	(49)	(1)	(20)
DEFORMITY			1 [2.0] (1)
HEMATOPOIETIC CELL PROLIFERATION; EXTRAMEDULLARY			1 [1.0] (1)
HYPERTROPHY; HEPATOCELLULAR	3 [1.0] (2)		
ACCESSORY LOBE; INFARCTION		1 [3.0] (1)	
LYMPHOCYTE; INFILTRATION; MULTIFOCAL	1 [1.0] (1)		
CARDIOVASCULAR SYSTEM			
No Tissues/Organs Examined			
ENDOCRINE SYSTEM			
ADRENAL GLANDS	(49)	(1)	(20)
ATROPHY; DIFFUSE		1 [3.0] (1)	
CORTEX; HYPERTROPHY; FOCAL	2 [1.0] (1)		
METAPLASIA; OSSEOUS			1 [1.0] (1)
CORTEX; VACUOLATION; FOCAL	1 [2.0] (1)		
PITUITARY GLAND	(49)	(0)	(20)
PARS DISTALIS; CYST	4 (3)		
THYROID GLANDS	(49)	(0)	(20)

Test Type: RACB **Route:** Dosing in Feed

Test Compound: 4-Methylimidazole CAS Number: 822-36-6

Date Report Requested: 08/23/2018
Time Report Requested: 14:02:50

Lab: RTI

Species/Strain: Rat/Sprague-Dawley

Experiment Number: R92025B

F1 Male: F1 NonParental Male

	Treatment Groups (ppm)		
	0	750	2500
GENERAL BODY SYSTEM			
No Tissues/Organs Examined			
GENITAL SYSTEM			
COAGULATING GLANDS	(49)	(0)	(20)
COWPERS GLANDS	(48)	(3)	(20)
EPIDIDYMIS	(49)	(56)	(20)
DUCT; EXFOLIATED GERM CELL	3 [1.3] (2)	5 [1.2] (4)	4 [1.3] (4)
LEVATOR ANI PLUS BULBOCAVERNOSUS MUSCLE	(49)	(0)	(20)
PROSTATE	(49)	(56)	(20)
VENTRAL LOBE; ATROPHY	4 [1.0] (3)	25 [1.0] (17)	17 [1.2] (7)
VENTRAL LOBE, INTERSTITIUM; LYMPHOCYTE; INFILTRATION	25 [1.1] (13)	33 [1.4] (18)	6 [1.0] (5)
VENTRAL LOBE; INFLAMMATION; CHRONIC ACTIVE	1 [2.0] (1)		
INFLAMMATION; CHRONIC ACTIVE	1 [3.0] (1)		
SEMINAL VESICLES	(49)	(1)	(20)
ATROPHY	1 [3.0] (1)	1 [1.0] (1)	
RUPTURE		1 [3.0] (1)	
TESTIS	(49)	(56)	(20)
GERM CELL; DEGENERATION	4 [1.3] (3)	6 [1.0] (4)	1 [2.0] (1)
SEMINIFEROUS TUBULE; SPERMATID RETENTION		3 [1.0] (2)	4 [1.0] (3)
HEMATOPOIETIC SYSTEM			
THYMUS	(49)	(0)	(20)
INTEGUMENTARY SYSTEM			
SKIN	(1)	(1)	(1)
DERMIS; FIBROSIS; FOCAL	. ,	1 [2.0] (1)	. ,
EPIDERMIS; HYPERPLASIA; FOCAL		1 [1.0] (1)	
LYMPHOID SYSTEM			
No Tissues/Organs Examined			

Test Type: RACB

Route: Dosing in Feed

PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence

Test Compound: 4-Methylimidazole

CAS Number: 822-36-6

Date Report Requested: 08/23/2018
Time Report Requested: 14:02:50

Lab: RTI

Species/Strain: Rat/Sprague-Dawley

F1 Male: F1 NonParental Male

	Treatment Groups (ppm)			
	0	750	2500	
MUSCULOSKELETAL SYSTEM				
LIMB	(5)	(1)	(0)	
BONE; DEFORMITY	4 [2.0] (4)	1 [2.0] (1)		
NERVOUS SYSTEM				
No Tissues/Organs Examined				
RESPIRATORY SYSTEM				
LUNGS	(1)	(1)	(0)	
CONGESTION; DIFFUSE		1 [1.0] (1)		
SPECIAL SENSES SYSTEM				
No Tissues/Organs Examined				
URINARY SYSTEM				
KIDNEYS	(49)	(1)	(20)	
PAPILLA; COLLECTING DUCT; DILATION			1 [1.0] (1)	
PELVIS; RIGHT; DILATION	7 [2.0] (6)	1 [2.0] (1)	3 [2.0] (3)	
TRANSITIONAL CELL; EPITHELIUM; HYPERPLASIA; FOCAL		1 [1.0] (1)		
MINERAL			1 [1.0] (1)	
NEPHROPATHY, CHRONIC PROGRESSIVE	45 [1.2] (17)	1 [1.0] (1)	20 [1.0] (8)	

Test Compound: 4-Methylimidazole **CAS Number:** 822-36-6

Date Report Requested: 08/23/2018 Time Report Requested: 14:02:50

Lab: RTI

Species/Strain: Rat/Sprague-Dawley

Experiment Number: R92025B

Test Type: RACB

Route: Dosing in Feed

F1 Female: F1 NonParent Female

		Treatment Groups (ppm)		
	0	750	2500	
Disposition Summary				
Animals Initially In Study	47	58	27	
Early Deaths				
Survivors				
Scheduled sacrifice, terminal (PND 91 - 93)	47	58	27	
Animals Examined Microscopically	47	58	27	
Total number litters	17	22	12	
ALIMENTARY SYSTEM				
LIVER	(47)	(2)	(27)	
HEPATODIAPHRAGMATIC NODULE	1 [2.0] (1)	1 [2.0] (1)	1 [2.0] (1)	
LYMPHOCYTE; INFILTRATION; MULTIFOCAL	5 [1.0] (5)			
INFLAMMATION, CHRONIC; ACTIVE, FOCAL	1 [1.0] (1)			
CARDIOVASCULAR SYSTEM				
No Tissues/Organs Examined				
ENDOCRINE SYSTEM				
ADRENAL GLANDS	(47)	(0)	(27)	
PITUITARY GLAND	(47)	(0)	(27)	
PARS DISTALIS; CYST	1 (1)		1 (1)	
THYROID GLANDS	(47)	(0)	(25)	
FOLLICULAR CELL; MINERAL			1 [1.0] (1)	
GENERAL BODY SYSTEM				
No Tissues/Organs Examined				

Test Type: RACB

Route: Dosing in Feed

Test Compound: 4-Methylimidazole

CAS Number: 822-36-6

Species/Strain: Rat/Sprague-Dawley

Experiment Number: R92025B

Date Report Requested: 08/23/2018 Time Report Requested: 14:02:50

Lab: RTI

F1 Female: F1 NonParent Female

		Treatment Groups (ppm)		
	0	750	2500	
GENITAL SYSTEM				
CERVIX	(47)	(0)	(26)	
ENDOMETRIUM; CYST	1 (1)			
OVARIES	(47)	(2)	(27)	
CORPUS LUTEUM; CYST	1 (1)		1 (1)	
FOLLICLE; UNILATERAL; CYST		1 (1)		
UTERUS	(47)	(2)	(27)	
OVIDUCT; CYST			1 (1)	
SUBSEROSA; CYST	4 (4)			
ENDOMETRIUM; HYPERPLASIA; CYSTIC	4 [1.3] (4)			
VAGINA	(47)	(0)	(27)	
MUCIFICATION	5 [3.0] (3)			
HEMATOPOIETIC SYSTEM				
LYMPH NODE	(1)	(0)	(0)	
NO MICROSCOPIC FINDING RECORDED	1 (1)	, ,	, ,	
LYMPH NODE, MEDIASTINAL	(1)	(0)	(1)	
CONGESTION	`,	, ,	1 [2.0] (1)	
DECREASED LYMPHOCYTE			1 [2.0] (1)	
SPLEEN	(2)	(1)	(0)	
THYMUS	(47)	(0)	(27)	
INTEGUMENTARY SYSTEM				
MAMMARY GLANDS	(47)	(0)	(27)	
SKIN	(1)	(1)	(0)	
ALOPECIA; DIFFUSE	()	1 [1.0] (1)	V-1	
NO MICROSCOPIC FINDING RECORDED		1 (1)		
LYMPHOID SYSTEM				
No Tissues/Organs Examined				

Test Compound: 4-Methylimidazole CAS Number: 822-36-6

Date Report Requested: 08/23/2018
Time Report Requested: 14:02:50

Lab: RTI

Species/Strain: Rat/Sprague-Dawley

Experiment Number: R92025B

Test Type: RACB

Route: Dosing in Feed

F1 Female: F1 NonParent Female

	Treatment Groups (ppm)		
	0	750	2500
MUSCULOSKELETAL SYSTEM			
LIMB	(4)	(4)	(1)
BONE; DEFORMITY	3 [2.0] (3)	4 [2.3] (3)	1 [2.0] (1)
PAW	(1)	(0)	(0)
NO MICROSCOPIC FINDING RECORDED	1 (1)		
NERVOUS SYSTEM			
No Tissues/Organs Examined			
RESPIRATORY SYSTEM			
No Tissues/Organs Examined			
SPECIAL SENSES SYSTEM			
No Tissues/Organs Examined			
URINARY SYSTEM			
KIDNEYS	(47)	(58)	(27)
MINERAL	9 [1.0] (7)	44 [1.3] (19)	20 [1.2] (11)
NEPHROPATHY, CHRONIC PROGRESSIVE	27 [1.1] (14)	[1.3] (13)	21 [1.0] (12)

Test Type: RACB

Route: Dosing in Feed

CAS Number: 822-36-6

Species/Strain: Rat/Sprague-Dawley

Experiment Number: R92025B

Date Report Requested: 08/23/2018
Time Report Requested: 14:02:50

Lab: RTI

F1 Male: F1 Parental Males

	Treatment Groups (ppm)		
	0	750	2500
Disposition Summary			
Animals Initially In Study	40	44	40
Early Deaths			
Euthanized, moribund			1
Survivors			
Scheduled sacrifice, terminal (PND 218 - 224)	40	44	39
Animals Examined Microscopically	40	44	40
Total number litters	18	22	15
ALIMENTARY SYSTEM			
LIVER	(40)	(0)	(40)
CLEAR CELL FOCUS	1 (1)		4 (3)
HEPATODIAPHRAGMATIC NODULE	3 [2.0] (3)		5 [2.8] (4)
BILE DUCT; HYPERPLASIA; FOCAL	1 [1.0] (1)		1 [1.0] (1)
HYPERTROPHY; DIFFUSE, HEPATOCELLULAR			1 [2.0] (1)
LYMPHOCYTE; PERIPORTAL; INFILTRATION; MULTIFOCAL	1 [1.0] (1)		7 [1.0] (6)
INFLAMMATION, CHRONIC; ACTIVE, FOCAL	3 [1.0] (3)		
HEPATOCYTE; NECROSIS; FOCAL	1 [1.0] (1)		2 [1.0] (2)
HEPATOCYTE; CENTRILOBULAR; VACUOLATION; CYTOPLASMIC, DIFFUSE			1 [1.0] (1)
HEPATOCYTE; VACUOLATION; CYTOPLASMIC, FOCAL			1 [1.0] (1)

No Tissues/Organs Examined

Test Type: RACB Route: Dosing in Feed

Experiment Number: R92025B

Species/Strain: Rat/Sprague-Dawley

Test Compound: 4-Methylimidazole **CAS Number:** 822-36-6

Date Report Requested: 08/23/2018 Time Report Requested: 14:02:50

Lab: RTI

F1 Male: F1 Parental Males

		Treatment Groups (ppm)			
	0	750	2500		
ENDOCRINE SYSTEM					
ADRENAL GLANDS	(40)	(0)	(40)		
CORTEX; HYPERTROPHY; FOCAL	1 [2.0] (1)		1 [1.0] (1)		
CORTEX; VACUOLATION; FOCAL			3 [1.3] (3)		
CORTEX; VACUOLATION, CYTOPLASMIC; DIFFUSE	1 [2.0] (1)		1 [1.0] (1)		
PITUITARY GLAND	(40)	(0)	(40)		
PARS DISTALIS; CYST	3 (3)		1 (1)		
THYROID GLANDS	(40)	(0)	(40)		
C-CELL; HYPERPLASIA; FOCAL	1 [3.0] (1)		1 [2.0] (1)		
GENERAL BODY SYSTEM					
FAT	(2)	(0)	(0)		

Test Compound: 4-Methylimidazole CAS Number: 822-36-6

Date Report Requested: 08/23/2018 Time Report Requested: 14:02:50

Lab: RTI

Species/Strain: Rat/Sprague-Dawley

Experiment Number: R92025B

Test Type: RACB

Route: Dosing in Feed

F1 Male: F1 Parental Males

	Treatment Groups (ppm)		
	0	750	2500
GENITAL SYSTEM			
COAGULATING GLANDS	(40)	(0)	(40)
COWPERS GLANDS	(40)	(0)	(40)
EPIDIDYMIS	(40)	(44)	(40)
DUCT; LEFT; EXFOLIATED GERM CELL			1 [1.0] (1)
DUCT; RIGHT; EXFOLIATED GERM CELL			2 [1.0] (2)
DUCT; EXFOLIATED GERM CELL		5 [1.2] (5)	1 [2.0] (1)
DUCT; EXFOLIATED GERM CELL (TOTAL)		5 [1.2] (5)	4 [1.3] (4)
LEVATOR ANI PLUS BULBOCAVERNOSUS MUSCLE	(40)	(0)	(40)
PREPUTIAL GLANDS	(3)	(1)	(0)
DUCT; UNILATERAL; ABSCESS	1 (1)		
UNILATERAL; INFLAMMATION, CHRONIC; ACTIVE		1 [3.0] (1)	
PROSTATE	(40)	(44)	(40)
DORSAL LOBE; EPITHELIUM; ATROPHY			1 [1.0] (1)
VENTRAL LOBE; ATROPHY	4 [1.0] (3)	10 [1.0] (8)	35 [1.5] (15)
VENTRAL LOBE, INTERSTITIUM; LYMPHOCYTE; INFILTRATION	5 [1.0] (4)	1 [1.0] (1)	
SEMINAL VESICLES	(40)	(1)	(40)
ATROPHY			2 [1.0] (2)
TESTIS	(40)	(44)	(40)
GERMINAL EPITHELIUM; LEFT; ATROPHY	1 [1.0] (1)		1 [2.0] (1)
GERMINAL EPITHELIUM; ATROPHY			1 [2.0] (1)
GERMINAL EPITHELIUM; ATROPHY (TOTAL)	1 [1.0] (1)		2 [2.0] (2)
GERM CELL; LEFT; DEGENERATION	1 [1.0] (1)		1 [2.0] (1)
GERM CELL; DEGENERATION	1 [1.0] (1)	5 [2.0] (5)	4 [1.0] (4)
GERM CELL; DEGENERATION (TOTAL)	2 [1.0] (2)	5 [2.0] (5)	5 [1.2] (4)
SEMINIFEROUS TUBULE; SPERMATID RETENTION		5 [1.2] (5)	4 [1.0] (3)

PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence

Test Compound: 4-Methylimidazole **CAS Number:** 822-36-6

Date Report Requested: 08/23/2018 Time Report Requested: 14:02:50

Lab: RTI

Species/Strain: Rat/Sprague-Dawley

Test Type: RACB

Route: Dosing in Feed

F1 Male: F1 Parental Males

	Treatment Groups (ppm)		
	0	750	2500
HEMATOPOIETIC SYSTEM			
LYMPH NODE, MEDIASTINAL	(1)	(0)	(0)
LYMPH NODE, RENAL	(1)	(0)	(0)
SPLEEN	(3)	(0)	(1)
HEMATOPOIETIC CELL PROLIFERATION; EXTRAMEDULLARY			1 [3.0] (1)
PIGMENTED MACROPHAGE; INCREASED NUMBER; DIFFUSE	1 [2.0] (1)		
THYMUS	(40)	(0)	(40)
INTEGUMENTARY SYSTEM			
SKIN	(0)	(2)	(0)
SKIN, ABDOMINAL	(3)	(0)	(0)
LYMPHOID SYSTEM		\	
No Tissues/Organs Examined			
*			
MUSCULOSKELETAL SYSTEM	(0)	(0)	(4)
DIAPHRAGM	(0)	(0)	(1)
LIMB	(1)	(0)	(1)
BONE; DEFORMITY	1 [2.0] (1)		
NERVOUS SYSTEM			
No Tissues/Organs Examined			
RESPIRATORY SYSTEM			
No Tissues/Organs Examined			
SPECIAL SENSES SYSTEM			
No Tissues/Organs Examined			

Test Type: RACB **Route:** Dosing in Feed

Test Compound: 4-Methylimidazole CAS Number: 822-36-6

Date Report Requested: 08/23/2018
Time Report Requested: 14:02:50

Lab: RTI

Species/Strain: Rat/Sprague-Dawley

Experiment Number: R92025B

F1 Male: F1 Parental Males

	Treatment Groups (ppm)			
	0	750	2500	
URINARY SYSTEM				
KIDNEYS	(40)	(6)	(40)	
PELVIS; CONCRETION; FOCAL	6 [1.7] (5)		1 [1.0] (1)	
PAPILLA; CYST			1 (1)	
PELVIS; LEFT; DILATION	1 [2.0] (1)			
PELVIS; RIGHT; DILATION	8 [1.4] (7)	4 [1.8] (3)	1 [1.0] (1)	
PELVIS; DILATION (TOTAL)	9 [1.4] (8)	4 [1.8] (3)	1 [1.0] (1)	
EPITHELIUM; TRANSITIONAL CELL; HYPERPLASIA; FOCAL (TOTAL)	5 [1.8] (4)	1 [2.0] (1)	1 [1.0] (1)	
EPITHELIUM; TRANSITIONAL CELL; HYPERPLASIA; FOCAL, LEFT	1 [1.0] (1)			
EPITHELIUM; TRANSITIONAL CELL; HYPERPLASIA; FOCAL, RIGHT	4 [2.0] (3)	1 [2.0] (1)	1 [1.0] (1)	
TRANSITIONAL CELL; EPITHELIUM; INFLAMMATION, CHRONIC; ACTIVE, FOCAL	2 [1.0] (2)	1 [2.0] (1)		
MINERAL	3 [1.0] (3)		5 [1.0] (2)	
NEPHROPATHY, CHRONIC PROGRESSIVE	40 [1.6] (18)	6 [1.8] (4)	40 [1.3] (15)	

Test Compound: 4-Methylimidazole
CAS Number: 822-36-6

Species/Strain: Rat/Sprague-Dawley

Experiment Number: R92025B

Test Type: RACB

Route: Dosing in Feed

Date Report Requested: 08/23/2018
Time Report Requested: 14:02:50

Lab: RTI

F1 Female: F1 Parental Females

	Treatment Groups (ppm)		
	0	750	2500
Disposition Summary			
Animals Initially In Study	40	44	40
Early Deaths			
Euthanized, moribund	2	3	6
Found Dead		1	1
Unscheduled Sacrifice	1	1	1
Survivors			
Scheduled sacrifice, terminal (LD 26 - 28, PND 246 - 251)	37	39	32
Animals Examined Microscopically	40	43	40
Total number litters	19	22	15
ALIMENTARY SYSTEM			
LIVER	(40)	(43)	(40)
SUBCAPSULAR; FIBROSIS; FOCAL		1 [1.0] (1)	
SUBCAPSULAR; HEMORRHAGE; FOCAL		1 [1.0] (1)	
HEPATODIAPHRAGMATIC NODULE	1 [2.0] (1)	1 [2.0] (1)	2 [2.0] (2)
BILE DUCT; HYPERPLASIA; DIFFUSE			1 [1.0] (1)
LYMPHOCYTE; PERIPORTAL; INFILTRATION; MULTIFOCAL	9 [1.0] (9)	6 [1.0] (6)	5 [1.0] (3)
INFLAMMATION, CHRONIC; ACTIVE, FOCAL	1 [1.0] (1)		2 [1.0] (2)
CENTRILOBULAR; NECROSIS; FOCAL			2 [2.0] (2)
HEPATOCYTE; NECROSIS; DIFFUSE			1 [4.0] (1)

No Tissues/Organs Examined

Test Type: RACB **Route:** Dosing in Feed

PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence

Test Compound: 4-Methylimidazole CAS Number: 822-36-6

Date Report Requested: 08/23/2018
Time Report Requested: 14:02:50

Lab: RTI

Species/Strain: Rat/Sprague-Dawley

F1 Female: F1 Parental Females

	Treatment Groups (ppm)		
	0	750	2500
ENDOCRINE SYSTEM			
ADRENAL GLANDS	(40)	(43)	(40)
CORTEX; HYPERTROPHY; FOCAL	1 [2.0] (1)		1 [2.0] (1)
LYMPHOCYTE; INFILTRATION; MULTIFOCAL	1 [1.0] (1)		
CORTEX; VACUOLATION; FOCAL		2 [2.0] (2)	1 [1.0] (1)
PITUITARY GLAND	(39)	(43)	(40)
PARS DISTALIS; CYST		1 (1)	
THYROID GLANDS	(40)	(43)	(40)
C-CELL; HYPERPLASIA; FOCAL	5 [1.2] (5)	3 [1.0] (3)	1 [1.0] (1)
INFLAMMATION; CHRONIC ACTIVE	1 [1.0] (1)		

GENERAL BODY SYSTEM

No Tissues/Organs Examined

Test Compound: 4-Methylimidazole
CAS Number: 822-36-6

Date Report Requested: 08/23/2018 Time Report Requested: 14:02:50

Lab: RTI

Species/Strain: Rat/Sprague-Dawley

Experiment Number: R92025B

Test Type: RACB

Route: Dosing in Feed

F1 Female: F1 Parental Females

	Treatment Groups (ppm)		
	0	750	2500
GENITAL SYSTEM			
CERVIX	(40)	(42)	(40)
SEROSA; CYST	1 (1)		
CLITORAL GLANDS	(3)	(0)	(0)
DUCT; UNILATERAL; ECTASIA	1 [2.0] (1)		
DUCT; ECTASIA	2 [1.5] (2)		
DUCT; ECTASIA (TOTAL)	3 [1.7] (3)		
OVARIES	(40)	(43)	(40)
CORPUS LUTEUM; CYST; MULTIPLE			1 (1)
CORPUS LUTEUM; CYST		2 (2)	3 (3)
FOLLICLE; CYST		4 (4)	
CYST	1 (1)		
CORPUS LUTEUM; CYST (TOTAL)		2 (2)	4 (4)
PLACENTA	(0)	(1)	(0)
INFLAMMATION, ACUTE; MULTIFOCAL		1 [2.0] (1)	
NECROSIS; MULTIFOCAL		1 [2.0] (1)	
UTERUS	(40)	(43)	(40)
OVIDUCT; CYST			1 (1)
SUBSEROSA; CYST	1 (1)	2 (2)	2 (2)
HORN; DECIDUAL ALTERATION		1 [2.0] (1)	
ENDOMETRIUM; HYPERPLASIA; CYSTIC	6 [1.2] (4)		
ENDOMETRIUM; INFLAMMATION; SUPPURATIVE			1 [1.0] (1)
ENDOMETRIUM; ULCER; FOCAL			1 [2.0] (1)
VAGINA	(40)	(43)	(40)
MUCIFICATION	3 [3.0] (3)		

Test Type: RACB **Route:** Dosing in Feed

Experiment Number: R92025B

Species/Strain: Rat/Sprague-Dawley

Test Compound: 4-Methylimidazole
CAS Number: 822-36-6

Time Report Requested: 14:02:50

Lab: RTI

Date Report Requested: 08/23/2018

F1 Female: F1 Parental Females

	Treatment Groups (ppm)		
	0	750	2500
HEMATOPOIETIC SYSTEM			
LYMPH NODE, MEDIASTINAL	(1)	(1)	(0)
CONGESTION	1 [2.0] (1)	1 [2.0] (1)	
LYMPH NODE, MESENTERIC	(0)	(1)	(0)
SPLEEN	(0)	(1)	(0)
THYMUS	(40)	(42)	(40)
CORTEX; DECREASED LYMPHOCYTE; DIFFUSE	8 [1.3] (7)	10 [1.3] (9)	9 [2.0] (8)
INTEGUMENTARY SYSTEM			
MAMMARY GLANDS	(40)	(43)	(40)
INFLAMMATION; SUPPURATIVE	,	,	1 [4.0] (1)
INFLAMMATION, ACUTE; FOCAL		1 [3.0] (1)	[-]()
LACTATION	1 (1)	[5:5](1)	
NECROSIS; FOCAL	. (-)	1 [3.0] (1)	
SKIN	(1)	(2)	(1)
ABSCESS	1 [4.0] (1)	(-)	(' /
ALOPECIA	[](.)	2 [2.5] (2)	1 [3.0] (1)
LYMPHOID SYSTEM			
No Tissues/Organs Examined			
MUSCULOSKELETAL SYSTEM			
LIMB	(15)	(2)	(1)
BONE; DEFORMITY	11 [2.1] (7)	1 [2.0] (1)	1 [2.0] (1)
NO MICROSCOPIC FINDING RECORDED	1 (1)	1 (1)	. [] (,)
NERVOUS SYSTEM			
No Tissues/Organs Examined			
RESPIRATORY SYSTEM			
No Tissues/Organs Examined			

Test Type: RACB

Route: Dosing in Feed

PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence

Test Compound: 4-Methylimidazole CAS Number: 822-36-6

Date Report Requested: 08/23/2018
Time Report Requested: 14:02:50

Lab: RTI

Species/Strain: Rat/Sprague-Dawley

F1 Female: F1 Parental Females

	Treatment Groups (ppm)		
	0	750	2500
SPECIAL SENSES SYSTEM No Tissues/Organs Examined			
URINARY SYSTEM			
KIDNEYS	(40)	(43)	(40)
PELVIS; CONCRETION; FOCAL	9 [1.0] (8)	1 [1.0] (1)	2 [1.0] (2)
PAPILLA; CYST		1 (1)	
RENAL TUBULE; EPITHELIUM; HYPERPLASIA; FOCAL			1 [3.0] (1)
MINERAL	8 [1.0] (5)	21 [1.1] (14)	27 [1.1] (12)
NEPHROPATHY, CHRONIC PROGRESSIVE	34 [1.2] (17)	41 [1.1] (21)	40 [1.1] (15)
URINARY BLADDER	(1)	(0)	(0)

PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence

Test Compound: 4-Methylimidazole CAS Number: 822-36-6

Time Report Requested: 14:02:50
Lab: RTI

Date Report Requested: 08/23/2018

Route: Dosing in Feed

Test Type: RACB

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rz maie			
Treatment Groups (ppm)			
0	750	2500	
107	132	69	
	400		
		69	
	5		
7	4		
(4)	(1)	(0)	
2 [1.5] (1)	1 [2.0] (1)	()	
	0 107 107 10 7	Treatment Groups (ppm) 0 750 107 132 107 132 10 5 7 4	

Test Type: RACB

Route: Dosing in Feed

PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence

Test Compound: 4-Methylimidazole **CAS Number:** 822-36-6

Date Report Requested: 08/23/2018 Time Report Requested: 14:02:50

Lab: RTI

	F2 Male		
	Treatment Groups (ppm)		
	0	750	2500
MUSCULOSKELETAL SYSTEM No Tissues/Organs Examined			
NERVOUS SYSTEM No Tissues/Organs Examined			
RESPIRATORY SYSTEM No Tissues/Organs Examined			
SPECIAL SENSES SYSTEM No Tissues/Organs Examined			
URINARY SYSTEM			
KIDNEYS	(6)	(4)	(0)
RENAL TUBULE; BILATERAL; CYST	1 (1)		
PELVIS; LEFT; DILATION		1 [1.0] (1)	
PELVIS; RIGHT; DILATION	4 [1.8] (3)	3 [2.3] (2)	
LEFT; INFLAMMATION, CHRONIC		1 [1.0] (1)	

Test Type: RACB

Route: Dosing in Feed

PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence

Test Compound: 4-Methylimidazole

CAS Number: 822-36-6

Date Report Requested: 08/23/2018 Time Report Requested: 14:02:50

Lab: RTI

F2 Female				
	Treatment Groups (ppm)			
	0	750	2500	
Disposition Summary Animals Initially In Study Early Deaths Survivors Scheduled sacrifice, terminal (PND 28) Animals Examined Microscopically	98 98	132 132	76 76	
ALIMENTARY SYSTEM No Tissues/Organs Examined				
CARDIOVASCULAR SYSTEM No Tissues/Organs Examined				
ENDOCRINE SYSTEM No Tissues/Organs Examined				
GENERAL BODY SYSTEM No Tissues/Organs Examined				
GENITAL SYSTEM No Tissues/Organs Examined				
HEMATOPOIETIC SYSTEM No Tissues/Organs Examined				
INTEGUMENTARY SYSTEM No Tissues/Organs Examined				
LYMPHOID SYSTEM No Tissues/Organs Examined				
MUSCULOSKELETAL SYSTEM No Tissues/Organs Examined				

Test Type: RACB

Route: Dosing in Feed

Species/Strain: Rat/Sprague-Dawley

PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence

Test Compound: 4-Methylimidazole CAS Number: 822-36-6

Date Report Requested: 08/23/2018
Time Report Requested: 14:02:50

Lab: RTI

F2 Female				
		Treatment Groups (ppm)		
	0	750	2500	
NERVOUS SYSTEM No Tissues/Organs Examined				
RESPIRATORY SYSTEM No Tissues/Organs Examined				
SPECIAL SENSES SYSTEM No Tissues/Organs Examined				
URINARY SYSTEM No Tissues/Organs Examined				

Experiment Number: R92025B PA18R: Non-Neoplastic Lesions with Mean Severity Grade and Litter Incidence

Test Type: RACB

Route: Dosing in Feed

CAS Number: 822-36-6

Species/Strain: Rat/Sprague-Dawley

Date Report Requested: 08/23/2018
Time Report Requested: 14:02:50

Lab: RTI

LEGEND

[a] Number of animals examined given for each tissue. If none of the animals examined have the specific lesion then there is a blank for that dose group for that specific lesion.

Number of animals with observation reported with mean severity grade in square brackets

[b] Mean severity grade denoted by 1 - minimal, 2 - mild, 3 - moderate, 4 - marked

Number of litters shown in parentheses for F1 and F2 animals

Phase day range of terminal sacrifice shown in parentheses in disposition summary

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

** END OF REPORT **