



# governmentattic.org

*"Rummaging in the government's attic"*

Description of document:	Smithsonian Institution (SI) Autopsy/Necropsy Reports from the National Zoological Park, 2016-2017
Requested date:	16-June-2017
Released date:	28-September-2017
Posted date:	13-November-2017
Source of document:	The Smithsonian Institution MRC 524 PO Box 37012 Washington DC 20013-7012 Fax: 202-633-7079

The governmentattic.org web site ("the site") is noncommercial and free to the public. The site and materials made available on the site, such as this file, are for reference only. The governmentattic.org web site and its principals have made every effort to make this information as complete and as accurate as possible, however, there may be mistakes and omissions, both typographical and in content. The governmentattic.org web site and its principals shall have neither liability nor responsibility to any person or entity with respect to any loss or damage caused, or alleged to have been caused, directly or indirectly, by the information provided on the governmentattic.org web site or in this file. The public records published on the site were obtained from government agencies using proper legal channels. Each document is identified as to the source. Any concerns about the contents of the site should be directed to the agency originating the document in question. GovernmentAttic.org is not responsible for the contents of documents published on the website.



# Smithsonian Institution

Office of General Counsel

VIA ELECTRONIC MAIL

September 28, 2017


Re: Your Request for Smithsonian Records (request number 48658)

This responds to your request, dated June 16, 2017 and narrowed by email on July 24, 2017, for a copy of the National Zoological Park autopsy reports dated October 1, 2016 to February 1, 2017. The Smithsonian responds to requests for records in accordance with Smithsonian Directive 807 – Requests for Smithsonian Institution Information (SD 807) and applies a presumption of disclosure when processing such requests. The policy is posted on our website at <http://www.si.edu/OGC/Records-Requests>.

Enclosed are 98 pages of material. Please note that all of the documents are appropriate for release without redaction and are provided in their entirety.

This concludes the Smithsonian's response to your request.

Sincerely,



Jessica Sanet  
Assistant General Counsel

Enclosures

You have the right to appeal a partial or full denial of your request. Your appeal must be in writing, addressed to the Smithsonian Institution Office of General Counsel at the address below, and made within sixty days from the date of this response letter. Your letter must explain your reason(s) for the appeal. The Smithsonian Under Secretary for Finance and Administration will decide your appeal and will respond to you in writing. You also have the right to seek dispute resolution services from the Office of Government Information Services, within the National Archives and Records Administration.

Office of General Counsel  
Smithsonian Institution Building Room 302 MRC 012  
Mail: P.O. Box 37012 • Washington DC 20013-7012  
Street: 1000 Jefferson Drive SW • Washington DC 20560-0012  
Telephone: 202.633.5115 • Fax: 202.357.4310

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2014-0136

Death Date: 10/3/2016

Necropsy Date: 10/3/2016

DEROPTYUS ACCIPITRINUS (no subsp) Gender: Male  
Hawk headed parrot Age: 21Y 2M 7D  
Name: Chip: 985112002898320

Accession No.: 216290  
Birth: 26 Jul 1995  
Acquired: 09 Apr 2014  
Removed: 03 Oct 2014

SEX: Male	AGE: 21Y 2M 7D	WEIGHT: 241.2 kg	STAY: > 30 Days
MANNER OF DEATH: Found Dead		INTERVAL: 0 6 hours	
TIME OF DEATH:		XRAYED: False	
DEATH LOCATION: BH24		DISPOSITION: NMNH	
SUBMITTOR: Ric Pinto		PROSECTOR: Tim Walsh	
OWNER/ANIMAL DEPT: DOO			

**HISTORY AND CLINICAL OBSERVATIONS:**

## KEEPER OBSERVATIONS:

On By RP

The bird had been seen in the morning by me as I serviced the exhibit. Two other keepers had seen him also an hour in a half before the bird was found dead. The bird was found close to the base of a dead tree that served as a perch holder and also next to the wall.

We think that that the bird was spooked, either by the female parrot or a visitor, and crashed against the wall. The glass was a little far from the scene so we do not think it played a role.

## CLINICIAN OBSERVATIONS:

On By

## GROSS DESCRIPTION:

On By

## GROSS DIAGNOSIS:

By

## LABORATORY STUDIES:

CULTURE: Heart blood

## TISSUE STATUS:

SHELVED: False  
TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: True

Tissues Ultrafrozen: Liver, intestine, lung

## SPECIAL REQUESTS:

On By TFW

USFWS muscle  
NMNH liver, barcode of life project.

## HISTOLOGY:

On 10/14/2016 By DSR

Tissue Preservation: Good

Slide 5. BRAIN. NSF.

Slide 6. BRAIN. NSF.

Slide 7. BRAIN. NSF.

Slide 8. DISTAL COLON/CLOACA. There Heterophils and macrophage expand the mucosa and efface crypts. Inflammatory cells spill into the submucosa and muscularis. In the skin, there is multifocal epithelial necrosis. Heterophils are present within the necrotic epithelium. At the epidermal is diffuse ulceration and necrosis of the mucosal epithelium. Necrotic cellular debris, fibrin, and bacterial coccobacilli are present on the surface and within the lumen. /dermal junction, there is expansion by extravasated erythrocytes and heterophils. Within the dermis and skeletal muscle, there are heterophils, lymphocytes, plasma cells, and macrophages. Lymphocytic nodular aggregates are present. There is moderate fibroplasia with associated myofiber loss and atrophy.

Slide 9. LARGE INTESTINE. There is diffuse mucosal ulceration. The mucosa is filled with heterophils. There is an aggregate of fibrin, necrotic cellular debris, and heterophils with enmeshed coccobacilli.

Slide 11. LIVER. NSF. VENTRICULUS. NSF. SPLEEN. NSF

Slide 12. VENTRICULUS. NSF. PROVENTRICULUS. NSF. PANCREAS. NSF.

Slide 13. ESOPHAGUS. NSF. PROVENTRICULUS. NSF.

Slide 14. HEART. NSF. TRACHEA. Erythrocytes are present within the lumen. THYROID GLAND. NSF. GREAT VESSELS. NSF.

Slide 15. HEART. NSF. LUNG. NSF.

Slide 16. SKIN. NSF. BONE. NSF. EYE. NSF.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Intestine and Cloaca: Colitis and Cloacitis, fibrinonecrotic and heterophilic, subacute, diffuse, severe with intralesional bacterial coccobacilli
- 2) Trachea: Intraluminal hemorrhage.
- 3) Skin and Skeletal Muscle: Dermatitis and myositis, heterophilic and histiocytic, chronic active, regionally extensive with fibroplasia.

**REMARKS:**

On 10/14/2016 By DSR

Diagnosis  
Colitis and Cloacitis

Primary Diagnostic Category: Infectious Bacterial

There is a severe bacterial colitis and cloacitis. Septicemia could have resulted and led to rapid decompensation and death. Culture and/or PCR would be needed to determine the causative agent. Salmonella spp. would be a differential diagnosis. Pullorum disease has been reported in hawk headed parrots.

Tim Walsh  
PROSECTOR

Tim Walsh  
PATHOLOGIST

10/14/2016  
DATE COMPLETED

Printed on: 8/21/2017 8:22:52 AM

CARES MED v2.119



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

**PATH # N2016-0210**

Death Date: 10/21/2016  
Necropsy Date: 10/21/2016

ANAS ACUTA  
Northern pintail  
Name:

Gender: Male  
Age: 13Y 9M 20D

Accession No.: 215181  
Birth: 01 Jan 2003  
Acquired: 21 Jan 2004  
Removed: 21 Oct 2016

SEX: Male

AGE: 13Y 9M 20D

WEIGHT: 670 gm

STAY: &gt; 30 Days

MANNER OF DEATH: Euthanasia

INTERVAL: 0 6 hours

TIME OF DEATH: 08:50

XRAYED: False

DEATH LOCATION: WHS

DISPOSITION: INCINERATE

SUBMITTOR: JCS

PROSECTOR: MCP

OWNER/ANIMAL DEPT: DOO

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On By

**CLINICIAN OBSERVATIONS:**

On 10/21/2016 By JCS

100% vision loss OD, 75% vision loss OS due to mature cataract formation. Weight loss from most recent exam (1/20/2016) 831grams to 700 grams. Keepers have been noticing self isolation and bird staring at walls. Due to vision loss and concerns for quality of life euthanasia performed with 1:2 euthasol to KCl IV via jugular vein and right medial metatarsal vein.

**GROSS DESCRIPTION:**

On 10/21/2016 By MCP

An adult, male, 670 g, Northern Pintail with a pink plastic band on the left leg, and a metal band on the right leg reading "Baltimore" "zoo8973" is necropsied 21 October 2016 following euthanasia. There is minimal autolysis with adequate musculature and complete lack of visceral and subcutaneous adipose tissue. The right wing is missing all structures distal to the elbow. The lens of both eyes is diffusely opaque white to gray, more extensively on the right eye. All other tissues and organs evaluated are grossly within normal limits.

**GROSS DIAGNOSIS:**

By MCP

1. Eyes: Marked, diffuse, bilateral, chronic cataracts

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False  
TRIMMED: True  
FROZEN: True  
ULTRAFROZEN: False

Tissues Ultrafrozen:

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 2/7/2017 By MCP

1. RIGHT EYE: There are multifocal areas of corneal epithelial hyperplasia with multifocal formations of intraepithelial and sub epithelial open, empty spaces. There is moderate edema, fibrosis and neovascularization of the corneal stroma, few infiltrating heterophils and macrophages and multifocal areas of vacuolation and disruption of the Descemet's membrane. There is marked, dissolution, fragmentation, vacuolation, and eosinophilia of lens fibers with formation of Morgagnian globules and an intact lens capsule. There are small numbers of lymphocytes and plasma cells within the submucosa of the conjunctiva.
2. LEFT EYE: Similar changes as those observed in the right eye are present.
3. CEREBRUM: A small vessel shows medial thickening by eosinophilic material. CEREBELLUM, BRAIN STEM and CERVICAL SPINAL CORD: WNL.
4. PROVENTRICULUS: There are small numbers of lymphocytes and plasma cells within the mucosal lamina propria. CEREBRUM and VENTRICULUS: WNL.
5. DUODENUM: The mucosal lamina propria contains moderate numbers of lymphocytes and plasma cells. PROVENTRICULUS: As described above. CEREBRUM, ESOPHAGUS, and PANCREAS: WNL.
6. JEJUNUM: Similar changes as those described in the duodenum are present. DUODENUM: As described above. CEREBRUM, VENTRICULUS, and BILE DUCT: WNL.

7. JEJUNUM: As described above. COLON and ILEO CECO COLIC JUNCTION: The mucosal lamina propria contains moderate numbers of lymphocytes and plasma cells. CEREBRUM, CEREBELLUM, BRAIN STEM and GALL BLADDER: WNL.  
8. LUNG: There are reduced numbers of red blood cells within the sections (hypoperfusion). TRACHEA: There are small numbers of lymphocytes and plasma cells within the submucosa. ILEO CECO COLIC JUNCTION: As described above. ESOPHAGUS: WNL.  
9. HEART and TONGUE: WNL.  
10. SPLEEN: There are increased numbers of lymphocytes, without evident germinal centers. LIVER, GALL BLADDER, and KIDNEY: WNL.  
11. TESTIS: There are no mature spermatozoa present. KIDNEY, THYROID and ADRENAL GLANDS: WNL.  
12. BURSA: There is a focal area of accumulation of mineral (concretion) and sloughed epithelial cells surrounded by a squamous to cuboidal epithelium. CLOACA, OVIDUCT, SKIN, and SKELETAL MUSCLE: WNL.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Eyes: Marked, diffuse, bilateral hypermature cataracts
- 2) Eyes: Marked, diffuse, bilateral, chronic keratitis with corneal edema, fibrosis and neovascularization
- 3) Eyes: Mild, multifocal, bilateral, chronic, lymphoplasmacytic conjunctivitis
- 4) Small and large intestines: Mild, multifocal, chronic, lymphoplasmacytic enteritis
- 5) Testis: Aspermatogenesis

**REMARKS:**

On 2/7/2017 By MCP

In addition to cataracts, histology also revealed chronic keratitis with a marked healing response. The cause of keratitis is no longer evident. The changes observed in the eyes are consistent with the clinical history of blindness and are likely severe enough to interfere with appropriate mobility and/or feeding, and result in the reported weight loss. The changes observed in the gastrointestinal tract are mild and likely do not account for the weight loss. No other significant comorbidities were present.

MCP  
PROSECTOR

CARTOCETI  
PATHOLOGIST

2/7/2017  
DATE COMPLETED

Printed on: 8/21/2017 9:11:07 AM

CARES MED v2.119

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2016-0200

Death Date: 10/5/2016

Necropsy Date: 10/5/2016

HYPHESOBRYCON HELIACUS

Gender: Unknown Sex

Accession No.: 500831

Kitty tetra

Age:

Birth:

Name:

Acquired: 11 Feb 2015

31 Dec 2016

SEX: Unknown Sex

AGE: ADULT

WEIGHT: 0.1 gm

STAY:

MANNER OF DEATH: Found Dead

INTERVAL: 6 24 hours

TIME OF DEATH:

XRAYED: False

DEATH LOCATION: FSA#9

DISPOSITION: INCINERATE

SUBMITTOR: Dennis Charlton

PROSECTOR: TFW/DHL

OWNER/ANIMAL DEPT: DOA

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 10/5/2016 By DC

0.0.1 Kitty Tetra found deceased in FSA #9 this AM. About half of its body appeared to have been consumed by snails. Observed 0.0.18 con specifics in tank to be normal BAR, as well as all other fish species.

Specimen submitted to pathology.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 10/6/2016 By TFW

A less than 0.1 gram carcass of a kitty tetra fish is found severely autolyzed and scavenged (presumptive scales). Most of the partially detached cranium and all internal organs are missing. The fins are truncated and much of the skin is missing.

**GROSS DIAGNOSIS:**

By TFW

1. Severe scavenging
2. Severe autolysis

**LABORATORY STUDIES:****TISSUE STATUS:**

No fixed tissues taken.

Tissues Ultrafrozen:

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On By

**MORPHOLOGIC DIAGNOSIS:**

- 1) Severe scavenging
- 2) Severe autolysis

**REMARKS:**

On 10/6/2016 By TFW

Unfortunately the poor postmortem condition of the carcass precludes meaningful gross or histopathological evaluation. No additional testing will be pursued.

TFW/DHL

T. Walsh

10/6/2016

PROSECTOR

PATHOLOGIST

DATE COMPLETED

Printed on: 8/21/2017 8:29:15 AM

CARES MED v2.119



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

**PATH # N2016-0203**

Death Date: 10/10/2016

Necropsy Date: 10/11/2016

LORICARIA (unk sp)  
Catfish  
Name:

Gender: Unknown Sex  
Age:

Accession No.: 500857  
Birth:  
Acquired: 26 Jun 2015  
31 Dec 2016

SEX: Unknown Sex

AGE: NEONATE

WEIGHT: 0 gm

STAY: &lt;= 30 Days

MANNER OF DEATH: Found Dead

INTERVAL: 6 24 hours

TIME OF DEATH: 08:00a

XRAYED: False

DEATH LOCATION:

DISPOSITION: FORMALIN

SUBMITTOR: E. Wray

PROSECTOR: Andrew Cartoceti

OWNER/ANIMAL DEPT:

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 10/11/2016 By EW

These guys are still juveniles and have not received accession numbers. Was mostly eaten by siblings unfortunately.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 10/11/2016 By ANC

Received is a marbled whiptail catfish fry that is necropsied on 11 October 2016. The fish is ~2 cm long and most of the flesh has been removed (postmortem scavenging). The carcass is saved whole in formalin.

**GROSS DIAGNOSIS:**

By ANC

Postmortem scavenging

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False

TRIMMED: True

FROZEN: False

ULTRAFROZEN: False

Tissues Ultrafrozen:

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 10/31/2016 By ANC

1. WHOLE BODY, SKELETAL MUSCLE, BONE: Most of the skin is sloughed and the exposed bone and skeletal muscle is overgrown with large bacilli. Many tissues have areas of diffuse eosinophilia and loss of differential staining (advanced autolysis).

**MORPHOLOGIC DIAGNOSIS:**

1) Whole body: Advanced autolysis

**REMARKS:**

On 10/31/2016 By ANC

10/31/16: Limited histologic examination did not reveal any significant lesions to suggest a cause of death. Water quality, which is not adequately assessed through necropsy, could be contributory. There was advanced autolysis and bacterial overgrowth of the tissues. This concludes all diagnostic testing.

Andrew Cartoceti

A. Cartoceti

10/31/2016

PROSECTOR

PATHOLOGIST

DATE COMPLETED

Printed on: 8/21/2017 9:05:38 AM

CARES MED v2.119

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

**PATH # N2016-0204**

Death Date: 10/11/2016  
Necropsy Date: 10/11/2016

LORICARIA (unk sp)  
Catfish  
Name:

Gender: Unknown Sex  
Age:

Accession No.: 500857  
Birth:  
Acquired: 26 Jun 2015  
31 Dec 2016

SEX: Unknown Sex	AGE: JUVENILE	WEIGHT: 0 gm	STAY: <= 30 Days
MANNER OF DEATH: Found Dead		INTERVAL: 0 6 hours	
TIME OF DEATH: 06:30a		XRAYED: False	
DEATH LOCATION: bottom of tank		DISPOSITION: FORMALIN	
SUBMITTOR: E. Wray		PROSECTOR: Andrew Cartoceti	
OWNER/ANIMAL DEPT:			

**HISTORY AND CLINICAL OBSERVATIONS:**

KEEPER OBSERVATIONS: On 10/11/2016 By EW  
Went from doing everyday water changes to every other day. Going to resume everyday.

CLINICIAN OBSERVATIONS: On By

GROSS DESCRIPTION: On 10/11/2016 By ANC  
Received are four marbled whiptail catfish fry that are necropsied on 11 October 2016. The fry are all approximately 2 cm in total length. The fish are saved whole in formalin.

GROSS DIAGNOSIS: By ANC  
No significant gross lesions identified

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False  
TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: False

Tissues Ultrafrozen:

SPECIAL REQUESTS: On By

HISTOLOGY: On 10/31/2016 By ANC

1. WHOLE BODY (x4), SKELETAL MUSCLE, BONE, GILLS, SPINAL CORD: Multifocally, the skin has sloughed and the exposed bone and skeletal muscle is overgrown with large bacilli. Many tissues have areas of diffuse eosinophilia and loss of differential staining (advanced autolysis). The surface of one fry is covered with cylindrical, parallel walled, basophilic hyphae (presumptive saprolegnia).

**MORPHOLOGIC DIAGNOSIS:**

1) Whole body: Advanced autolysis

REMARKS: On 10/31/2016 By ANC

10/31/16: Limited histology did not reveal any significant lesions to suggest a cause of death. Water quality, which is not adequately assessed through necropsy, could be contributory. The most severely autolyzed fish was overgrown with fungal like hyphae, which is suspected to represent postmortem Saprolegnia growth. This concludes all diagnostic testing.

Andrew Cartoceti  
PROSECTOR

A. Cartoceti  
PATHOLOGIST

10/31/2016  
DATE COMPLETED

Printed on: 8/21/2017 9:06:42 AM

CARES MED v2.119



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

**PATH # N2016-0205**

Death Date: 10/11/2016  
Necropsy Date: 10/11/2016

GEOPHAGUS (unk sp)  
Eartheater  
Name:

Gender: Unknown Sex  
Age:

Accession No.: 500846  
Birth:  
Acquired: 12 May 2015  
31 Dec 2016

SEX: Unknown Sex	AGE: ADULT	WEIGHT: 77.4 gm	STAY: > 30 Days
MANNER OF DEATH: Found Dead		INTERVAL: 0 6 hours	
TIME OF DEATH: 09:00a		XRAYED: False	
DEATH LOCATION: Pool 4 strainer		DISPOSITION: INCINERATE	
SUBMITTOR: E Wray		PROSECTOR: Cartoceti	
OWNER/ANIMAL DEPT:			

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 10/11/2016 By EW

Noticed she looked bloated on Friday and observed throughout the weekend. Was behaving normally otherwise.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 10/11/2016 By ANC

Received is an adult earth eater cichlid for necropsy on 11 October 2016. The fish is 16 cm in total length and weighs 77.4 g. The carcass is in poor postmortem condition; the gills are diffusely pale tan and most of the coelomic viscera (liver, spleen, pancreas, digestive tract) are partially liquefied and unidentifiable. The right cornea is cloudy. Within the posterior kidney, there are dozens of <1 mm diameter, white nodules. Squash impressions of the kidney contain short acid fast bacilli.

**GROSS DIAGNOSIS:**

By ANC

Kidney, posterior: Presumptive granulomatous nephritis  
Marked autolysis

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False  
TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: True

Tissues Ultrafrozen: liver, posterior kidney

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 10/20/2016 By ANC

1. GILL: Between two primary gill filaments, there is a small, unattached granuloma (float on).
2. EYE: Adjacent to the globe is a small, unattached granuloma (float on). PECTORAL FIN; SWIM BLADDER: WNL.
3. LIVER: The hepatic parenchyma and surrounding adipose are expanded by many variably sized granulomas composed of a center of plump macrophages, karyorrhectic nuclear and granular cellular debris and mineral surrounded by rim of fibrous connective tissue that is infiltrated by macrophages. Many macrophages, plasma cells and lymphocytes infiltrate the surrounding adipose. KIDNEY: Similar granulomas expand the renal parenchyma. There is advanced autolysis with loss of differential staining and overgrowth of large bacilli. INTESTINE: The subepithelial stroma of a villus tip is expanded by a ~300 x 200 um, ovoid, structure with a thin eosinophilic wall that contains hundreds of ~5 x 2 um, oval spores with a large polar vacuole (mature xenoma).
4. LIVER; INTESTINES: Granulomas expand the liver and peri intestinal adipose, as described above. OVARY: WNL.
5. LIVER; INTESTINES, OVARY: Granulomas expand the liver, peri intestinal adipose and ovary, as described above.
6. LIVER; INTESTINES; HEART: Granulomas expand the liver, peri intestinal adipose and myocardium, as described above. SKELETAL MUSCLE: WNL.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Syndrome: Systemic mycobacteriosis
- 2) Kidney: Severe, chronic, multifocal, granulomatous nephritis with intralesional acid fast bacilli (on cytology)
- 3) Liver: Severe, chronic, multifocal, granulomatous hepatitis
- 4) Adipose: Severe, chronic, multifocal, granulomatous steatitis
- 5) Ovary: Moderate, chronic, multifocal, granulomatous oophoritis
- 6) Heart: Mild, chronic, multifocal, granulomatous myocarditis
- 7) Intestine: Focal, mature, microsporidial xenoma

**REMARKS:**

On 10/20/2016 By ANC

10/20/16: Histology revealed the presence of numerous granulomas throughout the liver, kidney, adipose and heart, confirming the diagnosis of mycobacteriosis as the cause of death. A single microsporidial xenoma was also found in the intestinal tract but did not appear to be eliciting any inflammation. Further identification of microsporidia requires electron microscopy and/or molecular techniques; however, *Glugea* spp. are the most common microsporidia infecting the digestive tract of fish. The animal was histologically identified as a female. This concludes all diagnostic testing.

Cartoceti

PROSECTOR

A. Cartoceti

PATHOLOGIST

10/20/2016

DATE COMPLETED

Printed on: 8/21/2017 9:07:46 AM

CARES MED v2.119



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2016-0206

Death Date: 10/14/2016  
Necropsy Date: 10/14/2016

SPATULA DISCORS (no subsp)  
Blue winged teal  
Name:

Gender: Male  
Age: 9Y 4M 14D  
Chip: 480 F62 3C4F

Accession No.: 215707  
Birth: 31 May 2007  
Acquired: 15 Nov 2007  
Removed: 14 Oct 2016

SEX: Male

AGE: 9Y 4M 14D

WEIGHT: 393.1 gm

STAY: &gt; 30 Days

MANNER OF DEATH: Found Dead

INTERVAL: 0 6 hours

TIME OF DEATH: 09:45

XRAYED: False

DEATH LOCATION: BH 01

DISPOSITION: INCINERATE

SUBMITTOR:

PROSECTOR: Andrew Cartoceti

OWNER/ANIMAL DEPT: DOA

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 10/14/2016 By

Lived in mixed species aviary.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 10/14/2016 By ANC

Received is an adult, 393.1 g, male, blue winged teal that is necropsied on 14 October 2016. The carcass is in good postmortem condition and good nutritional state with well fleshed pectoral muscles and abundant subcutaneous and intra coelomic adipose stores. There is a blue plastic band on the left leg and a silver metal band that reads "St Louis Zoo 1949" on the right leg. The left adrenal gland is enlarged (4 mm diameter) and is soft, smooth contoured and pale tan. The right adrenal is ~4 x 2 x 1 has a bosselated surface and is golden orange yellow. The stomach contains grit, sand and small amounts of fibrous green ingesta. The small intestine contains pasty green brown ingesta. The remaining organs are grossly unremarkable.

**GROSS DIAGNOSIS:**

By ANC

1. Left adrenal gland mass
2. Good body condition

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False  
TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: True

Tissues Ultrafrozen: Brain, liver, kidney, colon

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 11/17/2016 By ANC

1. LUNG: Multifocally, the mucosal lining of large bronchi is undulating due to large nodular lymphoid aggregates and deposition of small amounts of myxomatous stroma in the lamina propria. Few macrophages containing granular brown grey cytoplasmic pigments infiltrate the myxomatous proprial tissue (silicosis). Lymphoid and macrophage aggregates also expand the adventitia of these large bronchi. The epithelium of affected bronchi is predominantly low cuboidal and lacks obvious cilia.

2. LUNG: As described above.

3. LIVER: In portal tracts, the walls of hepatic arteries are mildly expanded by paucicellular, glassy eosinophilic material. Small numbers of lymphocytes, plasma cells and heterophils infiltrate portal tracts. Focally, there is a large confluent area spanning several lobules where the normal architecture is replaced by erythrocytes, fibrin, and necrotic cellular debris. At the margins of this area, many hepatocytes have loss of differential staining but retention of architecture (coagulative necrosis). Bile ductules are tortuous and lined by hyperplastic epithelium and sinusoids are infiltrated by many macrophages and fewer heterophils.

4. KIDNEYS: The mesangium of many glomeruli is markedly expanded by lakes of glassy, homogeneous,

eosinophilic extracellular material (presumptive amyloid) that effaces much of the glomerular architecture. Similar material expands the walls of many small arterioles, similar to the liver. ADRENAL GLANDS: Regionally, the interstitium is markedly expanded by glassy eosinophilic material as are the wall of many arterioles scattered throughout the glands. Markedly expanding the left adrenal gland, there is a densely cellular, unencapsulated, neoplastic mass composed of sheets of round to polygonal cells with occasional interspersed islands of cortical adrenal cells, thin fibrovascular trabeculae and aggregates of small lymphocytes. Individual cells have variably distinct borders, large amount of amphophilic to basophilic to eosinophilic granular cytoplasm and a round or indented nucleus with coarsely clumped chromatin and typically one central nucleolus. Anisocytosis and anisokaryosis are moderate and 10 mitotic figures are counted in 5 high powered fields. There are scattered neoplastic cells that have hypereosinophilic cytoplasm and a pyknotic or karyorrhectic nucleus (necrotic). Neoplastic cells do not breach the adrenal capsule. TESTES: Multifocally, there are small dense aggregates of lymphocytes in the interstitium surrounding blood vessels. There is no active spermatogenesis. SPLEEN: The walls of many arterioles are expanded by glassy eosinophilic material. The red pulp contains moderate numbers of heterophils. THYROID GLAND: The walls of many arterioles in the periphery of the glands and surrounding connective tissue are expanded by glassy eosinophilic material (amyloid). 12/15/16: Synaptophysin, chromagranin A, PGP 9.5 and Endorphin IHC were non diagnostic, as neoplastic cells and internal controls were non immunoreactive to all antibodies. CONGO RED: The homogeneous, pale eosinophilic, amorphous material within the adrenal gland, kidney and spleen stains Congo Red and has apple green birefringence under polarized light.

5. HEART: Glassy eosinophilic material (amyloid) expands the walls of many arteries and arterioles in the epicardium and myocardium, as well as the tunica intima and media of great vessels and the valvular endocardium.

6. HEART: As described above. SKELETAL MUSCLE, PECTORAL: Arteriole walls are expanded by glassy eosinophilic material (amyloid).

7. PROVENTRICULUS, VENTRICULUS: Arteriole walls are expanded by glassy eosinophilic material (amyloid). TRACHEA, ESOPHAGUS: WNL.

8. DUODENUM, JEJUNUM, ILEUM, CECUM, COLON, CLOACA: Multifocally, small to moderate numbers of pleomorphic lymphocytes infiltrate the lamina propria, often forming nodular aggregates that extend into the muscularis. PANCREAS: There are multiple dense nodular aggregates of lymphocytes in the interstitium. Few blood vessels walls are expanded by glassy eosinophilic material.

9. BRACHIAL PLEXI: In the perineural adipose, there are nodular aggregates of lymphocytes surrounded by small blood vessels whose walls are expanded by glassy eosinophilic material. BONE MARROW: The marrow is ~80% adipose.

10. BRAIN, CEREBRUM, MIDBRAIN: WNL.

11. BRAIN, CEREBRUM, MIDBRAIN, CEREBELLUM, MIDBRAIN: WNL.

#### MORPHOLOGIC DIAGNOSIS:

- 1) Adrenal gland, left: Pheochromocytoma (presumptive)
- 2) Syndrome: Systemic and renal amyloidosis
- 3) Kidney: Severe, diffuse, global, glomerular amyloidosis
- 4) Liver, kidney, adrenal, spleen, thyroid, heart, skeletal muscle, GI tract, pancreas: Severe, multifocal, arterial amyloidosis
- 5) Adrenal gland: Moderate, multifocal, interstitial amyloidosis
- 6) Liver: Moderate, focal, subacute, necrosis with hemorrhage, histiocytic inflammation and biliary hyperplasia (subacute infarct)
- 7) Digestive tract: Mild, multifocal, chronic, lymphocytic enterotyphlocolitis
- 8) Lung: Bronchiolar associated lymphoid tissue hyperplasia and pneumoconiosis

#### REMARKS:

On 11/17/2016 By ANC

ADDENDUM (1/3/17): Immunohistochemistry to attempt to confirm the cell of origin for the adrenal tumor was unsuccessful (neoplastic cells and internal positive controls were non immunoreactive), likely due to these antibodies not working in avian species. Pheochromocytoma remains the most likely designation for this tumor. Amyloidosis in the kidney, spleen and adrenal glands was confirmed with Congo Red staining.

11/17/16: Histology of the adrenal mass is most consistent with a pheochromocytoma, although immunohistochemistry is pending to confirm this suspicion. In dogs and humans, pheochromocytomas have been associated with catecholamine induced cardiomyopathy, which can be manifest as arrhythmias, systemic hypertension and cardiac murmurs (1). In this manner, a functionally active pheochromocytoma could be contributing the clinically observed heart murmur; however, morphologic changes of cardiomyopathy (myocardial necrosis, degeneration, hemorrhage, lymphohistiocytic myocarditis, and interstitial fibrosis) were not evident histologically in this bird.

Severe amyloidosis affecting the renal glomeruli and arteries/arterioles throughout the body is also diagnosed (presumptive, pending confirmation of amyloid by Congo red staining). The underlying cause of systemic amyloidosis is unknown. The most common etiologies for amyloidosis are plasma cell neoplasia and chronic inflammatory states (often due to pododermatitis/bumblefoot in waterfowl). The chronic inflammation through the intestinal tract in this bird of a mild severity that is typically interpreted

as a subclinical finding in anseriformes; however, it cannot be ruled out that this inflammation is driving systemic amyloidosis. Certain species and breeds of animals can have a hereditary predisposition to amyloidosis, although this is not reported in teals.

Liver necrosis is consistent with a subacute vascular event (i.e. hemorrhage, infarction). Both catecholamine induced systemic hypertension and vascular wall fragility from amyloidosis are risk factors for abnormal hemostasis and could have contributed to this lesion. Speculatively, a similar covert cardiovascular event could be the cause for sudden death, but this could not be confirmed. Small cerebrovascular events (i.e. strokes) can be difficult to catch in tissue section and may not have enough time to produce a grossly or histologically recognizable lesion if the animal dies within 12 hours of the event.

The results of immunohistochemistry of the adrenal mass and Congo red staining will be conveyed in an addendum.

1. Edmondson EF, Bright JM, Halsey CH, Ehrhart EJ. Pathologic and cardiovascular characterization of pheochromocytoma associated cardiomyopathy in dogs. Vet Pathol. 2015 Mar;52(2):338-43.

Andrew Cartoceti  
PROSECTOR

A. Cartoceti  
PATHOLOGIST

11/17/2016  
DATE COMPLETED

Printed on: 8/21/2017 9:08:59 AM

CARES MED v2.119



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2016-0207

Death Date: 10/17/2016

Necropsy Date: 10/17/2016

MELURSUS URSINUS INORNATUS

Gender: Female

Accession No.: 113308

Sri Lankan sloth bear

Age: 21Y 9M 28D

Birth: 19 Dec 1994

Name: Hana

Chip: 00 0019 E8EE

Acquired: 06 May 1998

09 Sep 2016

Removed: 17 Oct 2016

SEX: Female

AGE: 21Y 9M 28D

WEIGHT: 107 kg

STAY: &gt; 30 Days

MANNER OF DEATH:Euthanasia

INTERVAL:0 6 hours

TIME OF DEATH:13::30

XRAYED:False

DEATH LOCATION:DAH

DISPOSITION:INCINERATE

SUBMITTOR:KB

PROSECTOR:MCP

OWNER/ANIMAL DEPT:DOM Asia Trail

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On By

**CLINICIAN OBSERVATIONS:**

On 10/17/2016 By KB

This geriatric sloth bear was noted to never completely come out of denning season last spring still sleeping very long hours. In addition intermittent vomiting was noted at that time. The animal has an ~4 month history of elevated liver enzymes. On liver and GI biopsies in August, gastritis and hepatitis were noted. The animal was treated with cerenia, clavamox, ursodiol, denamarin, and metronidazole. Liver enzymes were noted to improve with treatment. This animal has a 1 week history of hematochezia and large bowel diarrhea, ~4 day history of severe inappetence, and signs of suspect abdominal pain and nausea. On exploratory surgery today, there was a firm nodular ~1 cm mass in the subcutaneous fat on midline. There was >1 L free serosanguinous fluid removed from the abdomen. The omentum had a multifocal firm masses throughout. A ~3 cm diameter mass was palpated adjacent to dorsal, left, cranial liver lobes. The mass was not visualized, but was firm, multilobular, and had the same texture as the omental masses. The mass was thought to be arising from the liver. Due to concerns for possible metastatic neoplasia and poor quality of life, euthanasia was elected. Euthasol was administered IV.

**GROSS DESCRIPTION:**

On 10/17/2016 By MCP

A 21 year old, female, 107 kg, Sloth Bear is necropsied 17 October 2016 following euthanasia. There is minimal autolysis with adequate musculature and more than average adipose tissue. There is an approximately 30 cm long, midline abdominal incision, closed with suture material. The axillary lymph nodes are bilaterally enlarged up to 4 x 3 x 1 cm.

The abdominal cavity contains small amounts of a red tinged fluid and few frank blood clots adhered to the body wall incision and adjacent small intestine. The omentum and mesentery contain hundreds of, up to 5 mm in diameter, white, firm nodules. Similar nodules are present on the abdominal surface of the diaphragm. There are multiple, up to 2 x 1.5 x 1 cm, white to tan, firm, multinodular masses throughout the liver. Occasional masses bulge from the hepatic surface and are centrally umbilicated. The wall of the gallbladder in the neck region approaching the bile duct is thickened up to 1 cm by a white, firm mass. The hilus of the spleen contains multiple masses similar to those observed in the mesentery, and there is a small mesenteric attachment to the free surface of the spleen. The most distal 5 cm of the wall of the pylorus is diffusely thickened up to 1.5 cm. The stomach contains small amounts of grey brown mucus with small black flecks. The small intestine contains pasty to mucoid orange yellow ingesta. The colon contains mucus and no formed feces.

There are 2, up to 1 cm in diameter, firm, white masses on the cranial mediastinum. The lungs are multifocally dark red.

There is a 1.5 cm in diameter area of cartilage eburnation and pitting of the femoral head, bilaterally. All teeth, especially the canines, have excessive wear characterized by rounding, pitting and accumulation of orange brown calculus.

**GROSS DIAGNOSIS:**

By MCP

1. Liver, gall bladder, mesentery, omentum, mediastinum: Hepatic neoplasia with metastasis and carcinomatosis, presumptive
2. Pylorus: Marked, locally extensive, muscular hypertrophy, presumptive
3. Joints, hips: Mild, focal, chronic, degenerative joint disease

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False  
 TRIMMED: True  
 FROZEN: True  
 ULTRAFROZEN: False

Tissues Ultrafrozen:

SPECIAL REQUESTS:

On By

HISTOLOGY:

On 1/31/2017 By MCP

1. GALL BLADDER: Expanding the mucosal epithelium, invading into and expanding the wall of the gall bladder and the serosal surface (transmural) there is a highly cellular, poorly demarcated, unencapsulated, invasive mass composed of tubules and islands of neoplastic cells supported by abundant amounts of a fibrous (desmoplastic) stroma. The neoplastic cells are cuboidal to polygonal with distinct cell borders and moderate amounts of an amphophilic cytoplasm, containing a round to oval nucleus with a coarsely stippled chromatin pattern and a variably distinguishable, basophilic nucleolus. There is mild to moderate anisocytosis and anisokaryosis. Mitotic figures are 12 in 10 (400X) HPFs. There are multifocal to coalescing areas of necrosis within the mass. There are multifocal to coalescing areas of mucosal hyperplasia, and diffuse infiltration of the lamina propria and submucosa by moderate numbers of lymphocytes and plasma cells. There are multifocal areas of mesothelial hyperplasia on the serosal surface.

2. LIVER: Invading and effacing the normal architecture, there are multiple masses composed similarly as the gall bladder mass (metastasis) with large areas of central necrosis. Surrounding these masses are multifocal areas of nodular lymphoid aggregates. There is mild to moderate, diffuse, micro vesicular (lipid) vacuolation of hepatocytes and increased numbers of lipid laden stellate cells. There are multifocal areas of capsular fibrosis.

3. LIVER: As described above, with multifocal neoplastic emboli within lymphatic vessels. Within a large vein there is a small fibrinous thrombus occluding less than 30% of the vein's lumen. DIAPHRAGM: Similar masses as those observed in the liver are present on the abdominal surface of the diaphragm. There are multifocal to coalescing areas of myocyte vacuolation, hypereosinophilia and swelling (degeneration) as well as loss of nuclei and striation, and fragmentation (necrosis), with multifocal areas of cytoplasmic basophilia. Within a large vein there is a fibrinous thrombus occluding approximately 80% of the vein's lumen.

4. MESENTERIC LYMPH NODE: There is a focal mass composed similarly to those observed in the liver and gall bladder. There is marked, diffuse, lymphoid hyperplasia with dilation of the lymphatic sinusoids. DIAPHRAGM: As described above, with invasion of the neoplastic tissue into the perimysium and endomysium.

5. MESENTERIC LYMPH NODE: Multiple masses as those described before and marked lymphoid hyperplasia are present. MESENTERY: The tissue is multifocally expanded and effaced by similar masses as those described before.

6. CEREBRUM: WNL.

7. CEREBRUM: WNL.

8. CEREBRUM: WNL.

9. CEREBELLUM: WNL.

10. BRAINSTEM: WNL.

11. PITUITARY and TRIGEMINAL NERVES: WNL.

12. MESENTERY: As described above.

13. MEDIASTINAL LYMPH NODE: There is a mass similar to those described before, effacing over 60% of one of the sections. There is marked lymphoid hyperplasia of both sections.

14. SUBCUTANEOUS MASS: The mass is composed similarly to those described before. AXILLARY LYMPH NODE: There is marked lymphoid hyperplasia.

15. AXILLARY LYMPH NODE: There is marked lymphoid hyperplasia. LUNG: Expanding and replacing the normal architecture there is a highly cellular, well demarcated, unencapsulated, expansile mass composed of neoplastic cells with distinct cell borders, moderate amounts of an amphophilic to eosinophilic cytoplasm and an oval to round nucleus with a coarsely stippled chromatin pattern and a hardly distinguishable, basophilic nucleolus, lining and forming an alveolar pattern supported by scant fibrous stroma. There is minimal anisocytosis and anisokaryosis, with large numbers of goblet cells intermixed with the epithelial lining. Mitotic figures are less than 1 in 10 (400x) HPFs. There is moderate to marked, diffuse congestion of the rest of the section, with multifocal areas of alveolar dilation and atelectasis.

16. LUNG: There is moderate to marked, diffuse congestion of the rest of the section, with multifocal areas of alveolar dilation and atelectasis. THYROID: There are multiple, dilated follicles (up to 8 mm in diameter) filled with colloid.

17. ADRENAL GLANDS: There is marked, diffuse, cytoplasmic vacuolation of the cortical cells of the zona glomerulosa. KIDNEY: There is moderate, diffuse, segmental to global, thickening of the glomerular tuft by an eosinophilic material, with increased numbers of nuclei within these glomeruli. There are few small areas of lymphoplasmacytic infiltration in the interstitium. Multiple small tubules are tortuous, irregular and lined by a cuboidal to columnar epithelium, with amphophilic to basophilic cytoplasm, and a round to oval nucleus with a coarsely stippled chromatin pattern and a variably distinguishable, basophilic nucleolus (presumptive tubular metaplasia).

18. KIDNEY: The glomerular changes described before are present. SPLEEN: There is moderate to marked congestion of all sections, with large numbers of pigment (hemosiderin presumptive) laden macrophages. The hilum is expanded by coalescing masses similar to those described in the liver and gall bladder. There are multifocal areas of capsular, mesothelial hyperplasia. SPLENIC LYMPH NODE: There is marked

lymphoid hyperplasia and marked numbers of pigment laden macrophages.

19. HEART and SKELETAL MUSCLE (HIND LEG): WNL.

20. HEART: WNL.

21. TONGUE: There are small numbers of lymphocytes and plasma cells within the submucosa. HEART: WNL.

22. STOMACH: There are multifocal to coalescing areas of infiltration of the lamina propria by small number of lymphocytes and plasma cells. There is marked, segmental thickening of the muscular layers, more severely in the inner muscular layer. ESOPHAGUS: There are multifocal areas of infiltration of the submucosa by small numbers of lymphocytes and plasma cells, occasionally forming nodular aggregates.

TRACHEA: There are multifocal areas of thickening and papillomatous proliferation of the mucosal epithelium, with multifocal areas of infiltration of the lamina propria and submucosa by small numbers of lymphocytes and plasma cells.

23. STOMACH: Similar changes as described before are present, with multiple nodular accumulations of lymphocytes and plasma cells. DUODENUM: There is moderate to marked, segmental infiltration of the lamina propria by large numbers of eosinophils, lymphocytes and plasma cells, with marked lymphoid hyperplasia of the Peyer's patches. COLON: The lamina propria contains small numbers of lymphocytes and plasma cells. PANCREAS: WNL.

24. COLON: As described above. URINARY BLADDER: The lamina propria contains small numbers of lymphocytes and plasma cells. UTERUS: WNL.

25. SMALL INTESTINE: The lamina propria is multifocally infiltrated by small numbers of lymphocytes and plasma cells. PANCREAS: WNL.

#### MORPHOLOGIC DIAGNOSIS:

1) Gallbladder, liver, splenic hilum, peritoneum, mesentery, mesenteric and mediastinal lymph node, subcutis: Cholangiocarcinoma and metastasis

2) Gallbladder: Moderate, multifocal, lymphoplasmacytic cholecystitis/choledochitis with mucosal hyperplasia

3) Liver: Mild, multifocal, lymphoplasmacytic hepatitis with mild, diffuse, hepatic lipidosis and stellate cell hyperplasia, and capsular fibrosis

4) Liver: Focal fibrin thrombus

5) Diaphragm: Mild, multifocal muscular degeneration and necrosis with focal, fibrin thrombus

6) Lymph nodes: Marked, diffuse, lymphoid hyperplasia

7) Lung: Pulmonary adenoma, lepidic to papillary type

8) Lung: Marked, diffuse, congestion and edema, with multifocal atelectasis

9) Kidney: Moderate, diffuse, segmental to global, membranoproliferative glomerulopathy with multifocal, tubular epithelial metaplasia

10) Trachea: Mild, multifocal, lymphoplasmacytic tracheitis with mild, multifocal, mucosal hyperplasia

11) Stomach: Mild, multifocal, lymphoplasmacytic gastritis with marked, locally extensive, muscular hypertrophy (see comment)

12) Duodenum: Mild to marked, multifocal to coalescing, lymphoplasmacytic and eosinophilic enteritis

13) Urinary bladder: Mild, multifocal, lymphoplasmacytic cystitis

14) Joints, hips: Mild, focal, chronic, degenerative joint disease

#### REMARKS:

On 1/31/2017 By MCP

The multiple masses described clinically, including the subcutaneous mass, appear to be of a single origin, which based on the larger masses and the histologic appearance, is consistent with a cholangiocellular carcinoma. Based on the continuity of the neoplasm with areas of gall bladder mucosal hyperplasia, the wall of the gall bladder is considered a likely location of origin. Hepatic inflammation and fibrosis, cholecystitis, diaphragm degeneration, vascular thrombosis and presumptive hemosiderosis are most likely secondary to the metastasizing neoplasm. There is no evidence of active intestinal hemorrhage, and the intestinal inflammatory changes observed are of unknown significance. The mass observed in the lung is benign. Prominent/thickened smooth muscle within the pyloric region of the stomach may be a normal feature of this species, as another animal from this collection (110051, N16 0116) also had this finding. The remaining findings are considered mild and less clinically significant.

MCP  
PROSECTOR

CARTOCETI  
PATHOLOGIST

1/31/2017  
DATE COMPLETED



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

**PATH # N2016-0214**

Death Date: 11/1/2016  
Necropsy Date: 11/1/2016

NEMATOBRYCON PALMERI  
Emperor tetra  
Name:

Gender: Unknown Sex  
Age:

Accession No.: 500875  
Birth:  
Acquired: 03 May 2016

SEX: Unknown Sex	AGE: ADULT	WEIGHT: 1.6 gm	STAY: > 30 Days
MANNER OF DEATH: Found Dead		INTERVAL: 0 6 hours	
TIME OF DEATH: 09:00a		XRAYED: False	
DEATH LOCATION: FSA10		DISPOSITION: FORMALIN	
SUBMITTOR: Hilary Colton		PROSECTOR: Andrew Cartoceti	
OWNER/ANIMAL DEPT: DOA			

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 11/1/2016 By HC

0.0.1 Emperor tetra found dead at bottom of tank during normal AM procedures. Animal was tangled in plants, and began floating once freed. Some snail predation observed, specimen bloated and pale at time of discovery.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 11/2/2016 By ANC

Received is an adult, sex pending histology, Emperor tetra for necropsy on 1 November 2016. The fish is 5.0 cm in total length and weighs 1.6 grams. The carcass is in fair postmortem condition with pale tan gills, sloughing of the scales and absence of skin and muscle over the peduncle (presumed postmortem scavenging). The coelomic organs are partially liquefied, consisting predominantly of pasty yellow tissue. Both corneas are moderately cloudy. The remaining organs are grossly unremarkable. On wet mounts of skin scraping and fin and gill clippings, there are many free swimming ciliated protozoa, consisting predominantly of ~50 x 20 um pyriform ciliates and fewer numbers of ~80 to 100 um spherical ciliates. Both types of ciliates contain granular internal structures but a macronucleus is not visualized.

**GROSS DIAGNOSIS:**

By ANC

Body as a whole: Advanced autolysis

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False  
TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: False

Tissues Ultrafrozen:

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 11/30/2016 By ANC

1. HEAD, EYES, BRAIN, GILLS, ESOPHAGUS; CRANIAL COELOM, LIVER, SPLEEN, KIDNEYS, TESTES, INTESTINES, SPINAL CORD: Abundant granulomas, consisting of a core of eosinophilic granular debris surrounded by many macrophages and further rimmed by small amounts of fibrous connective tissue, expand the liver, spleen, posterior kidney, mucosa and serosal of the esophagus and intestines and adipose. Focally, the hepatic parenchyma is effaced by a large aggregates of degenerate cells. KINYOUN ACID FAST: Numerous acid fast bacilli are present within granulomas.

2. CAUDAL COELOM; PEDUNCLE: Few previously described granulomas are present in the skeletal muscle, perivertebral connective tissue and meninges of the spinal cord.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Syndrome: Systemic mycobacteriosis
- 2) Liver, spleen, kidney, gastrointestinal tract, adipose, skeletal muscle, meninges: Abundant chronic



granulomas with intralesional acid fast bacilli

## REMARKS:

On 11/30/2016 By ANC

1/10/17 (ADDENDUM): Acid fast staining revealed numerous acid fast bacilli were present within granulomas, confirming the diagnosis of systemic mycobacteriosis as the cause of death.

11/30/16: Histology is consistent with systemic mycobacteriosis as the cause of death, although special staining is pending to confirm the presence of acid fast bacteria within granulomas. The results of staining will be communicated in an addendum. The fish is identified as a male based on histology.

Andrew Cartoceti

PROSECTOR

A. Cartoceti

PATHOLOGIST

11/30/2016

DATE COMPLETED

---

Printed on: 8/21/2017 9:12:35 AM

CARES MED v2.119

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2016-0215

Death Date: 11/4/2016  
Necropsy Date: 11/4/2016

SETOPHAGA RUTICILLA  
American redstart  
Name:

Gender: Male  
Age: 0Y 4M 20D

Accession No.: 216546  
Birth: 15 Jun 2016  
Acquired: 08 Sep 2016  
Removed: 04 Nov 2016

SEX: Male

AGE: 0Y 4M 20D

WEIGHT: 7.6 gm

STAY: &gt; 30 Days

MANNER OF DEATH: Found Dead

INTERVAL: 0 6 hours

TIME OF DEATH: 07:15A

XRAYED: False

DEATH LOCATION: BH 11/12

DISPOSITION: FORMALIN

SUBMITTOR: K. Brader

PROSECTOR: David Lorom

OWNER/ANIMAL DEPT: DOO

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 11/4/2016 By KB

Bird was introduced in a howdy cage on Monday Oct 31st, released to Exhibit containing: 1.1 Indigo Bunting, 1.0 Ovenbird.  
On release that day, saw bird at the two feeders, no aggression seen between any of the birds. Redstart was even perching between buntings several times. No chasing seen. Redstart observed thru out day wed/Thursday, flying, spent a lot of time among ficus leaves, it looked like he might have been eating plant pests or possibly taking waterdrops from the leaves. I never saw any of the other birds even displace this bird, intro's looked fairly calm, bird was very active both days, looked alert and in good feather condition.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 11/7/2016 By ANC

Received is 4.6 gram, adult, male American redstart for necropsy on 5 November 2016. The carcass is in fair postmortem condition and good body condition, with adequate subcutaneous and intracoelomic adipose stores. There is a moderate amount of postmortem scavenging, consisting of loss of all skin over the head, loss of several secondary flight feather from the left wing, loss of most of the toes on the left leg, an open luxation of the left tibiotarsal joint with no associated hemorrhage and loss of many small fragments of skin and bone from the skull, left wing (adjacent to feather loss) and left leg (at the site of luxation). The right left has a blue plastic band. There is pooling of blood in the intraosseous spaces on the dorsal aspect of the calvarium (agonal change). The wall of the left atrium is diffusely discolored dark red. The remaining organs are grossly unremarkable.

**GROSS DIAGNOSIS:**

By ANC

Possible left atrial hemorrhage  
Good body condition  
Postmortem scavenging

**LABORATORY STUDIES:**

OTHER: Atoxoplasma PCR weak positive

**TISSUE STATUS:**

SHELVED: False  
TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: True

Tissues Ultrafrozen: Liver, lung, kidney, colon

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 12/2/2016 By ANC

1. HEART; LUNGS; KIDNEY; ADRENAL GLAND; THYROID GLAND; OVARY: WNL. LIVER: Hepatocytes often have a single, discrete, clear, cytoplasmic vacuole. Adjacent to few hepatic veins, there are large aggregates of unidentifiable mononuclear cells that have small hyperchromatic nuclei and moderate amounts of granular, pale basophilic cytoplasm (presumed lymphocytes).

2. ESOPHAGUS; TRACHEA; THYROID GLAND; VENTRICULUS: WNL. PROVENTRICULUS: Within the mucus layer, there are numerous large (~1 x 20 um) basophilic organisms (presumptive bacteria) with subtle segmentation that often form stacks. SMALL INTESTINE: There are increased numbers of lymphocytes and histiocytes in the lamina propria causing expansion of villi and separation of crypts. Larger infiltrating cells have intracytoplasmic, ~3-5 um diameter merozoites that sometimes displace the nucleus. There are numerous coccidial life stages, including intraluminal oocysts and intra epithelial gamonts and schizonts.

3. BRAIN; SKELETAL MUSCLE: WNL.

4. HINDLIMB; BONE MARROW; EYES: WNL.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Syndrome: Systemic isosporosis (formerly atoxoplasmosis), presumptive
- 2) Small intestine: Moderate, diffuse, chronic, lymphohistiocytic enteritis with coccidial oocysts, gamonts and intraleukocytic merozoites
- 3) Liver: Mild to moderate, multifocal, chronic, lymphohistiocytic hepatitis

**REMARKS:**

On 12/8/2016 By ANC

12/22/16: PCR for systemic isosporosis (formerly atoxoplasmosis) was weakly positive, confirming systemic *Isospora* sp. infection. The weak nature of positivity and lack of typical clinical signs (appetite loss, weight loss, diarrhea, lethargy) suggest that Isosporosis is unlikely to be the cause of sudden death.

12/8/16: The histologic findings are strongly suggestive of systemic *Isospora* infection, although PCR is pending for definitive diagnosis (results will be communicated in an addendum). At this time, infection appears to be subclinical/incidental as the bird was not noted to exhibit any of the typical signs of symptomatic isosporosis (appetite loss, weight loss, diarrhea, lethargy). Hepatic inflammation is likely due to systemic isosporosis although definitive intracellular organisms could not be identified in this location, likely due to poor tissue preservation. The red discoloration of the cardiac atrium that was noted grossly is interpreted as congestion based on histology. There is no indication of trauma to suggest enclosure mate aggression; however, the possibility of covert trauma (e.g. flight collision) that did not result in any morphologic lesions cannot be completely ruled out.

David Lorom

PROSECTOR

CARTOCETI

PATHOLOGIST

12/8/2016

DATE COMPLETED

Printed on: 8/21/2017 9:13:37 AM

CARES MED v2.119

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2016-0216

Death Date: 11/4/2016

Necropsy Date: 11/4/2016

THERAPHOSA (unk sp)  
Goliath birdeating tarantula  
Name:

Gender: Unknown Sex  
Age:

Accession No.: 601436  
Birth:  
Acquired: 14 Apr 2016

SEX: Unknown Sex	AGE: ADULT	WEIGHT: 36.4 gm	STAY: > 30 Days
MANNER OF DEATH:Died		INTERVAL:0 6 hours	
TIME OF DEATH:10:45A		XRAYED:False	
DEATH LOCATION:Q14B		DISPOSITION:FORMALIN	
SUBMITTOR:Hilary Colton		PROSECTOR:David Lorom	
OWNER/ANIMAL DEPT:DOA			

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 11/4/2016 By HC

0.1.0 Goliath bird eating tarantula discovered dead in holding tank at 10:45AM. This animal had been pulled from exhibit due to shriveling of the abdomen week of 10/10/16. Animal improved with ICU treatment in high humidity and showed interest in cockroach food items. Continued to be somewhat lethargic behind the scenes in her last days; most recent successful feed was 10/27/2016.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 11/8/2016 By ANC

Received is a 36.4 gram, adult, female, goliath bird eating tarantula for necropsy on 4 November 2016. The abdomen is markedly shrunk (~1.8 cm in diameter), giving the exoskeleton a wrinkled/corrugated appearance. On the carapace, there are three small (~0.8 x 0.2 cm), coalescing areas of alopecia. The prosoma (cephalothorax) contains gelatinous, opaque white to pale brown viscera. The opisthosoma (abdomen) contains wet, finely granular, pale brown viscera. The legs, pedipalps, chelicerae, book lungs, spinnerets, and eyes appear grossly within normal limits.

**GROSS DIAGNOSIS:**

By ANC

Presumptive dehydration/hemolymph loss  
Mild carapacial alopecia

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False  
TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: True

Tissues Ultrafrozen: Hemolymph, cephalothoracic and abdominal viscera

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 2/9/2017 By ANC

1. LEG (FAST DECAL): In the subcuticular hemolymphatic space of one limb, there is an aggregate of hemocytes admixed with neural tissue that surrounds a core of granular amphophilic to eosinophilic material (presumptive bacteria).

2. LEG (SLOW DECAL): WNL.

3. LEG (NAIR): WNL.

4. CHELICERA (NAIR): Within the venom gland at the tip of the chelicera, there are several large colonies of coccoid bacteria surrounded by many hemocytes that efface the glandular tissue.

5. LEG (NAIR): WNL.

6. CEPHALOTHORAX; MOUTHPARTS: In the pharyngeal region, there are aggregates of hemocytes and granular basophilic to refractile yellow brown debris, as previously described.

7. CEPHALOTHORAX: In the central and ventral portions of the cephalothorax, in the region of the

sucking stomach, brain and neural tissue, there are multiple large aggregates of granular basophilic material admixed with bacteria. This is surrounded by a thick rim of refractile, golden brown, paucicellular materia. Many hemocytes infiltrate and surround this material and bacteria. BROWN and HOPPS: Bacteria consist predominantly of Gram negative coccobacilli and fewer Gram negative bacilli and Gram positive cocci.

8. CEPHALOTHORAX: There are abundant aggregates of bacteria and hemocytes as previously described.

9. ABDOMEN, BOOK LUNGS: WNL.

10. ABDOMEN, BOOK LUNGS: WNL.

11. ABDOMEN: WNL.

12. ABDOMEN; SPINNERETS, SILK GLANDS: WNL.

**MORPHOLOGIC DIAGNOSIS:**

1) Brain, stomach, venom gland: Moderate to severe, regionally extensive encephalitis, gastritis and adenitis with abundant mixed bacteria

**REMARKS:**

On 2/9/2017 By ANC

2/8/17: Histology revealed bacterial infection in many tissues surrounding the stomach in the cephalothorax. Although this indicates a terminal bacterial infection, this may or may not represent the primary cause of this spider's demise as invasion of bacteria from the alimentary tract into surrounding tissue can occur antemortem in moribund spiders. No other significant comorbidities were identified.

David Lorom

PROSECTOR

A. Cartoceti

PATHOLOGIST

2/9/2017

DATE COMPLETED

Printed on: 8/21/2017 9:14:26 AM

CARES MED v2.119



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2016-0219

Death Date: 11/10/2016  
Necropsy Date: 11/10/2016

HALICHOERUS GRYPUS (no subsp)    Gender: Female  
Grey seal    Age: 43Y 0M 9D  
Name: Selkie

Accession No.: 102724  
Birth: 01 Nov 1973  
Acquired: 18 Jan 1979  
Removed: 10 Nov 2016

SEX: Female	AGE: 43Y 0M 9D	WEIGHT: 160 kg	STAY: > 30 Days
MANNER OF DEATH:Died		INTERVAL:0 6 hours	
TIME OF DEATH:9 :AM		XRAYED:False	
DEATH LOCATION:American Trail		DISPOSITION:INCINERATE	
SUBMITTOR:KLH		PROSECTOR:MCP	
OWNER/ANIMAL DEPT:			

**HISTORY AND CLINICAL OBSERVATIONS:**

## KEEPER OBSERVATIONS:

On By

## CLINICIAN OBSERVATIONS:

On 11/10/2016 By KLH

Animal underwent anesthetic procedure on 11/8 from which she recovered normally and was doing well yesterday at 7AM check this morning. Findings from 11/8 exam include:

Ventral subcutaneous masses    r/o fat necrosis  
Multiple Uterine masses  
Mediastinal mass effect    r/o positioning/normal variation v. true mass (enlarged lymph node, neoplastic mass, other)  
Severe periodontal disease and fractures (dental cleaning was done 11/8)  
Chronic keratitis OU

Animal was checked this morning at 7AM and was bright, alert, responsive, moving normally. At 8:30 check, animal started rubbing belly as though she was itchy. After a few minutes animal started "stress rolling" and hit head against the wall. At that point she lay quietly and was minimally responding. Breathing pattern described as shallow and rapid with occasionally deeper breaths/groans. Heart beat was visible externally and appeared "rapid" to staff.

Vets arrived ~20 30 minutes after episode began and by that point the animal had no respirations, no heart beat, and no corneal reflex. Attempted cardiopulmonary resuscitation performed chest compressions, intubated, administered epinephrine intrathoracically and intratracheally, and atropine IM. After ~5 minutes, CPR was discontinued and animal was pronounced dead.

## GROSS DESCRIPTION:

On 11/14/2016 By MCP

A 43 year old, female, 160 kg, Grey Seal is necropsied 10 November 2016 following sudden death. There is minimal autolysis. The blubber layer is 8 cm thick in the ventral thoracic, abdominal and pelvic areas, 6.5 cm in the dorsal thoracic area and 5 cm in the dorsal abdominal and pelvic areas. There is a 4.5 cm long skin incision on the right paramedian abdominal wall overlying a 3.5 cm in diameter subcutaneous mass filled with a viscous, pale brown to tan yellow fluid, and surrounded by 4 similar masses measuring up to 3 cm in diameter, located up to 17 cm away from the largest mass, and containing fluids ranging from pale tan to dark red. There are also 4, up to 1.5 cm in diameter, firm, white to tan, subcutaneous masses located up to 17 cm from the large, fluid filled mass. There is a similar, fluid filled (dark red), 1.5 cm in diameter mass on the blubber over the left hip. An approximately 1 cm x 3 cm off white cylinder is in the dorsal right lumbar blubber layer (contraceptive implant). There are multifocal to coalescing areas of brown to black discoloration and thickening on both corneas predominantly in the central region but also extending from the limbus, numerous small vessels radiate toward the center of the corneas and the corneas themselves are diffusely white/opaque. There is moderate gingival reddening, ulceration, loss and hemorrhage, particularly around the upper and lower, right canines. All teeth are markedly worn and there are fractures on the left, upper and lower, second premolars, the most lateral upper right incisor, and the lower right canine. Both lower left, the lateral lower right, and the medial upper right incisors are missing). There are moderate amounts of an orange to brown, pasty fluid around the anus and perianal area.

The lungs are diffusely dark red with faint scattered more pink lobules. Several tracheobronchial lymph nodes cortices are diffusely dark red (congestion). There is an area of dilation of the aortic arch (considered normal for the species) up to 17.5 cm in circumference (outflow circumference is 12 cm). The right ventricular free wall of the heart is 0.8 cm thick and the left ventricular free wall is 2.5 cm thick. There is a 1.5 cm in diameter, fluid filled (viscous) mass on the left ventral aspect of the intervertebral space between T9 and T10.

There are multiple (approximately 16), 0.5 cm to 8 cm in diameter, white to tan, firm, smooth masses on the wall of the uterine body and horns. Several mesenteric lymph nodes have darkened cortices. . The adrenal cortex is bilaterally, markedly thickened with a barely distinguishable medulla (cortex medulla

ratio is over 5:1) and irregular (bordering nodular).

There is loss of cartilage with moderate eburnation on the articular surface of the right elbow joint with few periarticular osteophytes. There is mild to moderate cartilage fibrillation of the articular surface of the carpi. The trachea, thyroids, esophagus, stomach (empty), small intestines, colon, spleen, liver (peripheral capsular fibrosis), pancreas, brain, pituitary, kidneys, and urinary bladder (scant amount of mucoid content) are otherwise considered grossly normal.

**GROSS DIAGNOSIS:**

By MCP

1. Subcutaneous tissue: Multiple chronic abscesses
2. Lungs: Marked, diffuse congestion
3. Eyes: Marked, multifocal to coalescing, bilateral, chronic pigmentary keratitis
4. Oral cavity: Marked, multifocal teeth fractures and gingival hemorrhage
5. Uterus: Multiple mural neoplasia
6. Right elbow and carpi: Moderate (elbow) to mild (carpi), multifocal cartilage eburnation and fibrillation with osteophyte formation

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False  
TRIMMED: True  
FROZEN: True  
ULTRAFROZEN: False

Tissues Ultrafrozen:

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 6/9/2017 By MCP

1. SUBCUTANEOUS MASSES: The blubber layer contains multiple nodules composed of a center of necrotic and cellular debris intermixed with many degenerated and intact neutrophils, epithelioid macrophages and multinucleated cells with many cholesterol clefts and surrounded by large numbers of lymphocytes and plasma cells, and variable amounts of fibrous connective tissue. The superficial dermis is multifocally infiltrated by moderate amounts of lymphocytes, plasma cells and fewer macrophages and neutrophils, particularly surrounding adnexal glands.
2. SUBCUTANEOUS MASSES: As described above.
3. SUBCUTANEOUS MASSES: As described above.
4. SUBCUTANEOUS MASSES: As described above.
5. LUNG: The tissue is diffusely congested with dilated lymphatic vessels and alveolar accumulation of an eosinophilic (proteinaceous) fluid (edema). NIPPLE: WNL.
6. SUBMANDIBULAR LYMPH NODE and SALIVARY GLAND: WNL.
7. PARAVERTEBRAL PSEUDOCYST: The wall of this fluid filled structures composed of fibrous connective tissue with no epithelial lining. LUNG: As described above. RETROPHARYNGEAL LYMPH NODE: WNL.
8. CEREBRUM: WNL.
9. CEREBRUM: WNL.
10. CEREBRUM: WNL.
11. CEREBELLUM and BRAIN STEM: WNL.
12. UTERINE MASSES: Arising from and expanding the myometrium there are multiple, highly cellular, well demarcated, unencapsulating, expansile masses composed of streams and bundles of neoplastic cells supported by a scant, preexisting stroma. The neoplastic cells are spindle to elongated with indistinct cell borders and moderate amounts of an eosinophilic, homogeneous cytoplasm, containing an oval to elongated, hyperchromatic nucleus with no distinguishable nucleolus. There is minimal anisocytosis and anisokaryosis. Mitotic figures are less than 1 in 10 HPFs.
13. OVARIES: Reduced numbers of viable follicles are observed, with replacement of the normal architecture by increased amounts of fibrous tissue with multifocal areas of mineralization, and few areas of mineralization of vascular walls.
14. PITUITARY: There are multiple, colloid filled, dilated spaces within the pars distalis. CERVICAL SPINAL CORD and TRIGEMINOUS NERVES: WNL.
15. LUNG: As described above. CERVICAL SPINAL CORD: WNL.
16. HEART: Myocardial fibers are separated and effaced by moderate amounts of fibrous tissue and clear space. SPLEEN: There are many brown pigment laden macrophages.
17. HEART: As described above. AORTA: WNL.
18. HEART: As described above. TONGUE: WNL.
19. MESENTERIC LYMPH NODES: One of the samples contains numerous, black to brown pigment laden macrophages.
20. MESENTERIC LYMPH NODE: There are numerous, black to brown pigment laden macrophages. THYROID: There are multiple, colloid filled, dilated follicles.
21. STOMACH: There are multifocal areas of nodular accumulation of lymphocytes and plasma cells within



the mucosal lamina propria. DUODENUM: The lamina propria contains small numbers of lymphocytes and plasma cells. ESOPHAGUS: WNL.

22. STOMACH: As described above. ESOPHAGUS: WNL.

23. TRACHEA: The submucosa is multifocally infiltrated by small numbers of lymphocytes and plasma cells. DUODENUM: As described above. AORTA and PANCREAS: WNL.

24. SKELETAL MUSCLE, VAGINA and GALLBLADDER: WNL.

25. LIVER: There are multifocal and locally extensive areas of thickening of the capsular fibrous tissue.

26. KIDNEY: The glomerular tuft is segmentally to globally thickened by an eosinophilic material in the majority of glomeruli present.

27. URINARY BLADDER, SKIN and COLON: WNL.

28. COLON and URETRA: WNL.

29. MESENTERIC LYMPH NODE: One of the samples contains numerous, black to brown pigment laden macrophages. LIVER: As described above.

30. ADRENAL GLAND: The cortex is multifocally expanded and compressed by hyperplastic nodules of cortical tissues. There are multifocal areas of mineralization of the cortico medullary connective tissue. AORTA: WNL.

31. CERVIX: The submucosa is diffusely infiltrated by small numbers of lymphocytes and plasma cells with multiple, dilated and blood filled blood vessels (congestion).

32. CERVIX: As described above.

33. EYE, FRONT END: There are multifocal and locally extensive areas of fibrosis and neovascularization of the corneal stroma with multifocal to coalescing areas of accumulation of a brown pigment within corneal epithelial cells. There are multiple, dilated spaces within the inner and outer plexiform layers. The lens fibers at the periphery of the lens are fragmented, pale and vacuolated, with no morgagnian globules observed.

34. EYE, BACK END: WNL.

35. EYE, FRONT END: As described above.

36. EYE, BACK END: WNL.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Heart: Moderate, multifocal, myocardial fibrosis and myocardial fiber separation
- 2) Lung: Moderate, diffuse, congestion and edema
- 3) Subcutaneous tissue: Marked, multifocal, chronic, pyogranulomatous panniculitis with cholesterol clefts, multinucleated giant cells and
- 4) central necrosis and abscess formation
- 5) Skin: Moderate, multifocal, lymphohistiocytic dermatitis
- 6) Eyes: Moderate, multifocal to coalescing, bilateral, corneal fibrosis and neovascularization and lens cataractous changes
- 7) Adrenal gland: Moderate, multifocal to coalescing, cortical nodular hyperplasia
- 8) Uterus: Multiple leiomyomas
- 9) Cervix: Mild, multifocal, lymphoplasmacytic cervicitis
- 10) Ovaries: Moderate, diffuse atrophy and fibrosis
- 11) Stomach: Mild, multifocal, lymphoplasmacytic gastritis
- 12) Liver: Moderate, multifocal and locally extensive capsular fibrosis
- 13) Liver: Mild, diffuse, hepatocellular vacuolation
- 14) Kidney: Mild, diffuse, segmental to global, membranous glomerulopathy

**REMARKS:**

On 6/9/2017 By MCP

The changes observed in the heart suggest that a post surgical cardiac event may have contributed to the death of this animal. Trichrome stain is pending to better characterize the extent of fibrosis. The subcutaneous masses observed clinically are mature and immature pyogranulomas, which appear to be sterile (Acid fast and GMS pending). The leiomyomas observed in the uterus, as well as the adrenal nodular hyperplasia, are benign neoplasias, most likely associated with the advance age. The changes observed in the eyes are consistent with the history of blindness.

MCP  
PROSECTOR

WALSH  
PATHOLOGIST

6/9/2017  
DATE COMPLETED

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

**PATH # N2016-0221**

Death Date: 11/16/2016  
Necropsy Date: 11/16/2016

EUBLEPHARIS MACULARIUS  
Leopard gecko  
Name:

Gender: Female  
Age: 23Y 6M 17D

Accession No.: 306361  
Birth: 30 Apr 1993  
Acquired:  
Removed: 16 Nov 2016

SEX: Female

AGE: 23Y 6M 17D

WEIGHT: 49.1 gm

STAY: &gt; 30 Days

MANNER OF DEATH: Euthanasia

INTERVAL: 0 6 hours

TIME OF DEATH: 09:00A

XRAYED: False

DEATH LOCATION: WHS

DISPOSITION: FORMALIN

SUBMITTOR: KLH

PROSECTOR: Andrew Cartoceti

OWNER/ANIMAL DEPT: DOH

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On By

**CLINICIAN OBSERVATIONS:**

On 11/16/2016 By KLH

Hx of weight loss, coelomic mass diagnosed previously on ultrasound.  
Due to ongoing weight loss and quality of life concerns, animal was euthanized today. Anesthetics administered IM in right rear and right front limbs, and euthasol administered intracardiac.

**GROSS DESCRIPTION:**

On 11/16/2016 By ANC

Received is a 49.1 gram, adult, female leopard gecko for necropsy on 16 November 2016 following euthanasia. The carcass is in excellent postmortem condition and fair body condition with small amounts of tail and fat body adipose and good musculature. The fat bodies measure ~0.8 cm in diameter by 0.2 cm thick. Most of digit five on the right forelimb and half of digit two on the right hindlimb are missing. The coelomic cavity contains ~0.1 ml of translucent pale white watery fluid. Adhered to the cranioventral aspect of the right and left lungs are two, large (~1.7 x 0.7 cm diameter), multinodular, soft, white to yellow masses that exude white flocculent fluid when incised. The surface of the masses is vascularized. The capsular surface of the liver is overlain with small tags of tenuous pale white material (fibrin). Throughout the hepatic parenchyma, there are dozens of pinpoint pale yellow discoloration. The ovaries contain many follicles in various stages of development, including two large vitellogenic follicles that are ~ 1.5 cm in diameter. The largest follicle on the right contains an area of splotchy dark red discoloration. The stomach contains cricket parts. A 2 cm long segment of distal small intestine contains dark red contents and the wall is discolored dark red. The colon contains formed feces. The remaining organs are grossly unremarkable.

**GROSS DIAGNOSIS:**

By ANC

Coelomic masses, rule out neoplasia versus granulomas  
Mild coelomic effusion  
Possible segmental enteritis  
Possible multifocal hepatitis

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False  
TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: True

Tissues Ultrafrozen: lung mass, liver, kidney, coelomic fluid

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 12/15/2016 By ANC

1. BRAIN: White matter tracts have mild vacuolation.
2. LUNG: Multifocally effacing the normal architecture of both lungs are several large granulomas. Granulomas consist of variably sized, nodular aggregates of mucus, cellular debris, clear acicular clefting (cholesterol), acellular eosinophilic globular material that sometimes has subtle concentric

lamellations and scattered heterophils and granular mineral surrounded by many epithelioid macrophages and multinucleated giant cells and further bound by rim of connective tissue. Multifocally, the fibrous capsule/trabeculae between granulomas is infiltrated by dense sheets of lymphocytes and macrophages. KIDNEY: The mesangium of most glomeruli is expanded by glassy, homogeneous, acellular eosinophilic material (presumptive amyloid). A similar material sometimes expands the walls of small arteries and arterioles. There is mild periglomerular fibrosis and occasional aggregates of lymphocytes and fewer macrophages within the interstitium. FAT BODY: WNL. ACID FAST: Acid fast organisms are not evident in pulmonary lesions. CONGO RED: Lakes of eosinophilic material within the lung lesions are congophilic and rarely exhibit green birefringence. The expanded mesangium of renal glomeruli is not congophilic and does not exhibit birefringence.

3. TRACHEA, ESOPHAGUS, STOMACH, SMALL INTESTINE, COLON, OVIDUCT: There are scattered lymphocytes in the lamina propria of the trachea, esophagus, stomach and intestines. In one segment of small intestine, the submucosa and serosa is expanded by a plexus of tortuous, congested, variable caliber, thin walled blood vessels. The surrounding stroma and lamina propria is infiltrated by few to moderate numbers of macrophages some of which contain lightly golden brown granular cytoplasmic pigment. In the colon, small numbers of macrophages, lymphocytes and heterophils infiltrate the lamina propria and serosa and there is a single intraluminal ciliate.

4. LIVER: A small cholesterol granuloma, as described in the lungs, is loosely adhered to the hepatic capsule. Most hepatocytes contain one or more discrete clear cytoplasmic vacuole. There are scattered aggregates of lymphocytes and fewer macrophages and heterophils. Portal tracts have prominent paucicellular fibrillar to smudgy eosinophilic stroma presumed fibrosis and possible amyloidosis). OVARY: There are follicles at varying stages of development. The stroma surrounding some follicles contains aggregates of macrophages with light brown granular cytoplasm small cholesterol granuloma. ADRENAL GLAND, HEART: WNL. OVIDUCT: Few scattered lymphocytes and macrophages infiltrate the lamina propria.

5. NASAL CAVITY: Segmentally, the subepithelial stroma of one nasal turbinate is infiltrated by dense sheets of large monomorphic round cells that expand the mucosa to twice the normal thickness and largely efface stromal architecture. Neoplastic cells often form whorls around nerve fibers and blood vessels and occasionally infiltrate the overlying nasal epithelium. Focally, neoplastic cells invade the turbinate cartilage, which is necrotic. Individual cells have moderate amounts of cytoplasm and coarse chromatin and typically one variably distinct central nucleolus. Anisocytosis and anisokaryosis are mild and there are 2-3 mitotic figures per 400x field. Segmentally, the overlying nasal epithelium is absent (ulcerated). Adjacent nasal glands are ectatic. EYES; CRANIUM, OLFACTORY BULBS: WNL. ACID FAST: No acid fast organisms are evident.

6: HINDLIMB: WNL.

#### MORPHOLOGIC DIAGNOSIS:

- 1) Lung: Severe, regionally extensive, chronic, granulomatous pneumonia with intralesional cholesterol (xanthoma/cholesteatoma) and amyloid (presumptive)
- 2) Liver: Mild, focal, chronic xanthoma
- 3) Kidney: Diffuse, global, membranous glomerulopathy with mesangial thickening
- 4) Nasal turbinate: Round cell tumor, presumptive lymphoma
- 5) Kidney: Mild, multifocal, chronic, lymphocytic interstitial nephritis
- 6) Liver: Mild, multifocal, chronic, lymphocytic hepatitis with portal tract fibrosis
- 7) Liver: Diffuse vacuolar change (lipid type)
- 8) Small intestine: Mild, segmental, chronic, heterophilic and histiocytic enteritis with telangiectasia and chronic hemorrhage
- 9) Oviduct: Minimal, chronic, lymphohistiocytic salpingitis

#### REMARKS:

On 12/15/2016 By ANC

1/10/17: Acid fast organisms were not evident within pulmonary cholesterol granulomas or the round cell tumor infiltrate in the nasal mucosa. The lakes of eosinophilic material within pulmonary granulomas are suggestive of amyloidosis based on special staining characteristics (congophilic and birefringent) but lack the classic green color to birefringence required for definitive confirmation. Interestingly though, the expanded renal glomerular mesangium is not consistent with amyloidosis on special staining and likely represents deposition of another non amyloid protein. Further work up of this glomerular lesion would require electron microscopy. Pulmonary cholesterol granulomas in this case resemble xanthomatosis that was previously reported in five geckos (1). Xanthoma(tosis), cholesterol granuloma and cholesteatoma appear to be synonymous diagnoses describing the same entity (granulomatous inflammation centered on cholesterol deposits). Additional possible etiologies for xanthomatosis considered in the published report include yolk coelomitis and hypercholesterolemia. Cholesterol deposition could be related to altered lipid metabolism during folliculogenesis/egg laying as all five geckos in the published report and this submitted animal were female.

12/15/16: The large masses within the lungs are due to an accumulation of cholesterol and protein that is inciting a granulomatous response. The underlying cause of this condition is unknown, but generally this process occurs in animals due to either inhalation/infusion of exogenous lipid or accumulation of endogenous lipid/surfactant produced in the lungs (i.e. endogenous lipid pneumonia). In horses, cholesterol granulomas in the choroid plexus are thought to be an age related change as a result of chronic recurrent hemorrhage, in which degrading red blood cells are the likely source of cholesterol. Acid fast staining to rule out mycobacteriosis is pending and results will be communicated in an addendum. Membranous glomerulopathy is likely due to amyloidosis; special stains to confirm amyloid

deposition are pending. Amyloidosis is presumed to be secondary to a longstanding granulomatous inflammation in the lungs. A round cell tumor was also diagnosed in the mucosa of the nasal cavity. Based on the cellular morphology, lymphoma is considered most likely. Mild inflammation was confirmed in the liver and intestines, although these are considered less clinically significant.

1. Garner MM, Lung NP, Murray S. Xanthomatosis in geckos: five cases. Journal of zoo and Wildlife Medicine. 1999, 30(3):443 447

Andrew Cartoceti  
PROSECTOR

A. Cartoceti  
PATHOLOGIST

12/15/2016  
DATE COMPLETED

---

Printed on: 8/21/2017 9:16:22 AM

CARES MED v2.119



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2016-0222

Death Date: 11/16/2016  
Necropsy Date: 11/16/2016

CORYDORAS (unk sp)  
Corydoras catfish  
Name:

Gender: Unknown Sex  
Age:

Accession No.: 500859  
Birth:  
Acquired: 15 Sep 2015  
31 Dec 2016

SEX: Unknown Sex

AGE: NEONATE

WEIGHT: 0 gm

STAY:

MANNER OF DEATH: Found Dead

INTERVAL: 0 6 hours

TIME OF DEATH: 09:00A

XRAYED: False

DEATH LOCATION:

DISPOSITION: FORMALIN

SUBMITTOR: E Wray

PROSECTOR: Andrew Cartoceti

OWNER/ANIMAL DEPT: DOA

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 11/16/2016 By EW

The individual was significantly smaller than it's hatch mates. It had sufficient access to food and had been witnessed eating.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 11/16/2016 By ANC

Received is a less than 0.1 gram, unknown sex Corydoras catfish fry in fair postmortem condition. Body condition cannot be assessed due the size. The fish has a total length of 1.2 cm. The corneas are cloudy (presumed postmortem artifact). The fish is placed whole in formalin.

**GROSS DIAGNOSIS:**

By ANC

Open

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False

TRIMMED: True

FROZEN: False

ULTRAFROZEN: False

Tissues Ultrafrozen:

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 12/8/2016 By ANC

1. WHOLE BODY, LONGITUDINAL; SKIN, EYES, SPINAL CORD, EPAXIAL MUSCLES: All of the epidermis is missing (autolysis).

**MORPHOLOGIC DIAGNOSIS:**

1) Body as a whole: Undetermined, no significant gross or histologic lesions identified

**REMARKS:**

On 12/8/2016 By ANC

12/8/16: Histology did not reveal any significant lesions to suggest a cause of death. However, due to a combination of postmortem autolysis and the small size of the fish, many of the coelomic organs could not be evaluated histologically (many organs sectioned through during tissue processing). Only eyes, skin, spine and axial musculature were present for microscopic evaluation. The stomach could not be assessed to determine adequate food consumption.

Andrew Cartoceti

A. Cartoceti

12/8/2016

PROSECTOR

PATHOLOGIST

DATE COMPLETED



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2016-0223

Death Date: 11/16/2016  
Necropsy Date: 11/17/2016

CARACAL CARACAL CARACAL  
Caracal lynx  
Name: Kibaru

Gender: Male  
Age: 16Y 4M 4D  
Chip: 0002133E2B

Accession No.: 114110  
Birth: 12 Jul 2000  
Acquired: 06 Jun 2006  
25 Jul 2016  
Removed: 16 Nov 2016

SEX: Male

AGE: 16Y 4M 4D

WEIGHT: 13.5 kg

STAY: &gt; 30 Days

MANNER OF DEATH:Euthanasia

INTERVAL:6 24 hours

TIME OF DEATH:07:00P

XRAYED:False

DEATH LOCATION:DAH

DISPOSITION:INCINERATE

SUBMITTOR:KB

PROSECTOR:Andrew Cartoceti

OWNER/ANIMAL DEPT:DOM Asia Trail

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On By

**CLINICIAN OBSERVATIONS:**

On 11/17/2016 By KB

This animal was anesthetized today for diagnostics including an MRI and CSF tap due to a history of intermittent seizures. The first reported possible seizure was in March of 2016. There were no significant findings on MRI and CSF cytology is pending. This animal had a seizure during induction today and had a severely prolonged recovery with numerous seizures during recovery. When the seizures became refractory to treatment, euthanasia was elected due to a poor prognosis. Euthasol and KCl were administered IV in the cephalic vein.

This animal also had a chronic history of a suspect herpes keratitis OD that had periodic flare ups and elevated kidney values.

**GROSS DESCRIPTION:**

On 11/17/2016 By ANC

Received is a 13.5 kg, adult, male caracal for necropsy on 17 November 2016. The carcass is in good postmortem condition and good body condition with adequate subcutaneous and intra abdominal adipose stores and well fleshed musculature. There are shaved regions over the craniodorsal neck (CSF collection), both cephalic veins and the left medial saphenous vein (venipuncture). The skin dorsal to each eye has a region of alopecia measuring ~2 x 1.5 cm. There is extensive wear of all canine teeth and mild to moderate amounts of calculus on all cheek teeth. Incisors 102, 201 to 203, and 401 to 403 are missing. In the center of the right cornea, there is a ~0.7 cm diameter region that is cloudy and has a slightly pitted center. The peripheral cornea contains several small blood vessels that stretch from the limbus to approximately halfway to the center of the cornea. A moderate amount of mucoid pale brown fluid exudes from the nose and fills the mainstem bronchi and secondary bronchi. The dorsal two thirds of the right and left lungs fields are collapsed and dark red (atelectasis). Multifocally and predominantly in the dorsal aspects of the lungs, there are dozens of pinpoint to 2 mm diameter, soft, white discolorations in the subpleural parenchyma (presumptive lipid accumulation). Tenuously adhered to the capsule of the liver are few strands of soft, pale yellow material (fibrin). The liver lobe margins are slightly rounded and the parenchyma of all lobes contains innumerable, pinpoint, pale yellow foci. Multifocally, the capsular surface of both kidneys has few regions of irregular, red pitting. Within the renal medulla, there is subtle white streaking along the renal crest. The stomach contains small amounts of mucoid orange to brown liquid. The distal small intestine contains small amounts of pasty, white ingesta and the colon contains formed feces. The head of both femurs is reddened and has mild eburnation of the articular cartilage. The remaining organs are grossly unremarkable.

**GROSS DIAGNOSIS:**

By ANC

Chronic keratitis with corneal edema and neovascularization, right eye  
Chronic nephropathy with cortical pitting  
Hepatopathy with hepatomegaly, suspect hepatic lipidosis  
Articular cartilage eburnation, femoral heads  
Dental attrition  
Bilateral lung atelectasis  
Subpleural lipid accumulation, presumptive

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False



TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: True

Tissues Ultrafrozen: Brain, triggeminal ganglia, dorsal root ganglia, lung, liver (2), kidney

SPECIAL REQUESTS:

On By

HISTOLOGY:

On 12/15/2016 By ANC

1. BRAIN, CEREBRUM: There is multifocal vacuolation of the grey and white matter (postmortem autolysis). Small numbers of macrophages with light brown cytoplasmic pigment aggregate next to parenchymal vessels.

2. BRAIN, CEREBRUM, THALAMUS: As previously described.

3, 4. BRAIN, CEREBRUM, HIPPOCAMPUS: As previously described.

5. BRAIN, MIDBRAIN: As previously described.

6. BRAIN, CEREBELLUM, BRAINSTEM: As previously described.

7. BRAIN, BRAINSTEM; SPINAL CORD, CERVICAL: As previously described.

8: DORSAL ROOT GANGLIA; TRIGEMINAL GANGLIA; PITUITARY GLAND: WNL.

9. EYE, LEFT: WNL.

10. EYE, RIGHT: Small numbers of lymphocytes and neutrophils infiltrate the corneal stroma, which also contains infrequent blood vessels. Centrally, the corneal stroma is irregular and is superficially infiltrated by stellate and spindloid cells. Also centrally, the deep corneal stroma contains small amounts of pigment and Descemet's membrane is discontinuous (ruptured) and absent. Small numbers of lymphocytes and plasma cells infiltrate perivascularly in the iris leaflets and ciliary body. FELINE HERPESVIRUS IHC: There is no immunoreactivity within corneal lesions.

11. LUNG: Regionally, some bronchioles contain few neutrophils and fewer macrophages within their lumina and surrounding alveolar lumina. Multifocally, there are subpleural aggregates of foamy macrophages and acicular clear clefting within alveolar lumina and septa (endogenous lipid pneumonia).

12. LIVER, GALLBLADDER, SPLEEN: In the liver, there are multiple small aggregates of lymphocytes and plasma cells within midzonal hepatic cords. Midzonal hepatocytes often have many, small, discrete, clear cytoplasmic vacuoles. The splenic red pulp is congested.

13. KIDNEY: There is multifocal infiltration of the cortical interstitium by aggregates of lymphocytes and fewer plasma cells. The basement membrane surrounding Bowman's capsule is sclerotic and thickened and the parietal epithelium is hypertrophied. Occasionally, the interstitium and tubules are mineralized. The capsule is multifocally pitted, sometimes corresponding to areas of inflammation.

14. HEART, INTERVENTRICULAR SEPTUM, RIGHT ATRIOVENTRICULAR FREE WALL: WNL.

15. HEART, LEFT ATRIOVENTRICULAR FREE WALL: WNL.

16. THYROID GLANDS; ADRENAL GLANDS; TESTIS; BONE MARROW; LYMPH NODE, MESENTERIC: In the testis, there is active spermatogenesis. In the thyroid glands, some follicles are ectatic and up to 10 times normal diameter. Bone marrow consists of ~30% hematopoietic cells.

17. URINARY BLADDER; THIRD EYELID, RIGHT; NASAL PLANUM: In the third eyelid, there are scattered perivascular infiltrates of macrophages, lymphocytes and plasma cells in the subepithelial stroma. In the gland of the third eyelids, several individual acini are mineralized.

18. DIAPHRAGM; SCIATIC NERVE; SKIN, PERIORBITAL: In the periorbital skin, the epidermis is often absent and there is basophilic tinctorial change to the color of superficial dermal collagen with smudging of nuclei.

19. STOMACH, CARDIA; ESOPHAGUS; COLON: WNL.

20. STOMACH, PYLORUS; DUODENUM; PANCREAS; ESOPHAGUS: In the pyloric mucosa, there are multiple vaguely nodular aggregates of lymphocytes in the lamina propria (GALT).

21. JEJUNUM: WNL.

22. ILEUM; CECUM; COLON; LYMPH NODE, CECOCOLIC: WNL.

23. TRACHEA; ESOPHAGUS: In the trachea, the mucosa is segmentally replaced by small amounts of fibrin and neutrophils.

24. BRAIN, CEREBRUM, PIRIFORM LOBE: As previously described.

25. BRAIN, MIDBRAIN: As previously described.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Eye, left: Moderate, regionally extensive, chronic keratoconjunctivitis with corneal neovascularization, pigmentation and Descemet's membrane rupture
- 2) Eye, right: Mild, chronic, lymphoplasmacytic, anterior uveitis (presumed secondary to #1)
- 3) Kidney: Mild, multifocal, chronic, lymphoplasmacytic interstitial nephritis with periglomerular fibrosis/sclerosis and tubulointerstitial mineralization
- 4) Liver: Multifocal hepatocyte vacuolation (lipid type) and minimal, chronic, lymphoplasmacytic hepatitis
- 5) Lung: Mild, multifocal, chronic endogenous lipid pneumonia
- 6) Lung: Mild, acute, multifocal, neutrophilic bronchopneumonia (presumptive anesthesia related)
- 7) Trachea: Mild, acute, ulcerative tracheitis (presumptive anesthesia related)

**REMARKS:**

On 12/15/2016 By ANC

2/3/17: Immunohistochemistry did not detect Feline Herpesvirus 1 antigen within the corneal lesion in the right eye. This result may be due to latency of herpesviral infection at the time of necropsy. This concludes all diagnostic testing.

12/15/16: Examined sections of brain (including cerebrum, thalamus, hippocampus, midbrain, cerebellum and brainstem) did not reveal any histologic lesions (including vascular, infectious/inflammatory, traumatic, anomalous, metabolic, toxic, neoplastic or degenerative disease) to suggest a cause for the recent seizure activity. Seizure activity/epilepsy is most often classified as an idiopathic disease in which abnormal functional neurologic signs exist without morphologically detectable changes in the nervous system. Chronic keratoconjunctivitis is confirmed in the right eye. There were no histologic lesions (inclusion bodies, ganglioneuritis, encephalitis) to suggest Feline Herpesvirus 1 (FHV1) as the cause of this condition; however, histology is neither a sensitive or specific modality for detecting FHV1. Immunohistochemistry to attempt to detect FHV is pending and results will be communicated in an addendum. Other possible causes of this condition include physical irritation and desiccation, as well as opportunistic infections and immune mediated disease, which are less likely given the lack of supporting histologic evidence. Renal disease is considered relatively mild for a felid of this age. Hepatic disease and lipid pneumonia are likely incidental. Bronchopneumonia and tracheitis are likely complications of anesthesia and are not clinically significant.

Andrew Cartoceti

A. Cartoceti

12/15/2016

PROSECTOR

PATHOLOGIST

DATE COMPLETED

Printed on: 8/21/2017 9:18:07 AM

CARES MED v2.119

Pathology Module Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

**PATH # N2016-0224**

Death Date: 11/21/2016  
Necropsy Date: 11/21/2016

ANTENNARIUS MACULATUS  
Warty frogfish  
Name:

Gender: Unknown Sex  
Age: 3Y 10M 20D

Accession No.: 500847  
Birth: 01 Jan 2013  
Acquired: 11 Jun 2015  
Removed: 21 Nov 2016

SEX: Unknown Sex	AGE: 3Y 10M 20D	WEIGHT: 28.6 gm	STAY: > 30 Days
MANNER OF DEATH: Found Dead		INTERVAL: 0 6 hours	
TIME OF DEATH: 11:00a		XRAYED: False	
DEATH LOCATION: Coral lab		DISPOSITION: FORMALIN	
SUBMITTOR: Donna Stockton		PROSECTOR: Andrew Cartoceti	
OWNER/ANIMAL DEPT: DOA			

**HISTORY AND CLINICAL OBSERVATIONS:**

**KEEPER OBSERVATIONS:**

On 11/21/2016 By DS

Did not eat Sunday morning. Found between to tube anemones.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 11/21/2016 By ANC

Received is a 28.6 gram, male (per submitter), adult warty frogfish for necropsy on 21 November 2016. The fish is 8.2 cm in total length. The carcass is in poor postmortem condition; the fish has a putrid odor and the skin and coelomic organs slough and disintegrate readily when manipulated. Minimal adipose stores are appreciated. The liver is diffusely pale green. The kidneys, spleen and gills are partially liquefied and difficult to identify. The heart is mottled pale red and pale brown. The remaining organs are grossly unremarkable. Skin scrape and fin clip revealed many free living protozoa (postmortem decomposition).

**GROSS DIAGNOSIS:**

By ANC

Cause of death undetermined  
Advanced autolysis

**LABORATORY STUDIES:**

**TISSUE STATUS:**

SHELVED:	False
TRIMMED:	True
FROZEN:	False
ULTRAFROZEN:	True

Tissues Ultrafrozen: liver

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 12/15/2016 By ANC

- LIVER; BLADDER (GALLBLADDER?); KIDNEY, POSTERIOR; HEART; GASTROINTESTINAL TRACT; SKELETAL MUSCLE:**  
There is marked eosinophilia, loss of differential staining and bacterial overgrowth of all organs (marked autolysis). In the liver, there are multiple foci of replacement of hepatocytes by amorphous eosinophilic paucicellular material admixed with nuclei and clear vacuoles. The hepatic parenchyma surrounding these areas is hypercellular (possible macrophage infiltration). In the lumen of the heart, there is a large fungal mat of thick walled, septate, branching hyphae. Few similar hyphae are present in the posterior kidney. KINYOUN ACID FAST: Acid fast organisms are not evident within hepatic lesions.
- OVARY; SWIM BLADDER:** Adjacent to the swim bladder, there are multiple spherical/tubular structures that are up to 1 mm in diameter (aorta/arteries?) in which there are many fungal hyphae (as described in the heart) surrounded by many unidentifiable round cells (leukocytes?). Fungi extend through the walls of these structures and into the surrounding connective tissues.
- GASTROINTESTINAL TRACT: WNL.**
- HEAD; TAIL:** There is a ~150 um diameter nematode embedded within the connective tissue of the dorsal spine.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Liver: Mild to moderate, multifocal hepatopathy (granulomas versus necrosis versus lipidosis)
- 2) Aorta/large arteries (presumptive): Possible fungal arteritis (see comment)
- 3) Heart, posterior kidney: Numerous fungal hyphae
- 4) Dorsal spine, connective tissue: Focal nematodiasis

**REMARKS:**

On 12/15/2016 By ANC

1/10/17 (ADDENDUM): Acid fast bacteria were not evident on special stains of hepatic lesions, making mycobacteriosis unlikely as the cause of this lesion. This concludes all diagnostic testing.

12/15/16: The severity of postmortem autolysis makes interpretation of the tissues difficult and the significance of presumptive lesions is speculative at best. The liver contains few discrete areas of loss of normal hepatic architecture, clear vacuolation and hypercellularity. These likely represent hepatic granulomas and acid fast staining is pending to rule out mycobacteriosis (results communicated in an addendum). Adjacent to the swim bladder, large colonies of fungi are centered on and overgrow large tubular structures that may represent the aorta or large arteries. The fungi are also present in the lumen of the heart. Due to the degree of autolysis, it is unclear if this is a true antemortem fungal infection or is simply postmortem overgrowth. The single nematode embedded within a dorsal spine is likely an incidental infestation as there is no accompanying tissue reaction. The level of autolysis precludes further identification of the worm.

Andrew Cartoceti

PROSECTOR

CARTOCETI

PATHOLOGIST

12/15/2016

DATE COMPLETED

Printed on: 8/21/2017 9:18:56 AM

CARES MED v2.119



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

**PATH # N2016-0230**

Death Date: 11/29/2016  
Necropsy Date: 11/29/2016

DENDROBATES TINCTORIUS  
Dyeing poison frog  
Name:

Gender: Unknown Sex  
Age:

Accession No.: 306308  
Birth:  
Acquired: 20 Oct 1992  
01 Jul 2016

SEX: Unknown Sex	AGE: ADULT	WEIGHT: 8.3 gm	STAY: > 30 Days
MANNER OF DEATH: Found Dead		INTERVAL: 0 6 hours	
TIME OF DEATH: 10: am		XRAYED: False	
DEATH LOCATION: F line exhibit		DISPOSITION: ALL IN FORMALIN	
SUBMITTOR: Michael Miller		PROSECTOR: MCP	
OWNER/ANIMAL DEPT: DOH			

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 11/29/2016 By MM

Frog individually identified as D.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 11/30/2016 By MCP

An adult, female, 8.3 g, Dyeing Poison Dart Frog is necropsied 29 November 2016 after being found dead. There is mild autolysis and adequate musculature with no visible fat bodies. All organs and tissues examined are within normal limits.

**GROSS DIAGNOSIS:**

By MCP

1. Whole body: Mild autolysis

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False  
TRIMMED: True  
FROZEN: True  
ULTRAFROZEN: False

Tissues Ultrafrozen:

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 2/24/2017 By MCP

1. COLON: There are multifocal areas of accumulation of granulocytes within the lamina propria. LUNG: The septa contain small numbers of granulocytes. HEART and LIVER: WNL.
2. KIDNEY: There are multiple dilated tubules, lined by an attenuated (flattened) epithelium and containing marked amounts of an eosinophilic (proteinaceous) fluid. LUNG: As described above. INTESTINES: Similar areas of granulocyte infiltration as described in the colon are observed. STOMACH, LIVER, PANCREAS, OVARY, OVIDUCT and ADRENALS: WNL
3. OVARY: There are few atrophic oocytes replaced by large accumulates of histiocytes (reabsorption). FAT BODIES: Adipocytes are robust. OVIDUCT: WNL.
4. EYES: There is a focal area of loss of the corneal epithelium (ulcer) with fibrosis and accumulation of granulocytes within the underlying corneal stroma. A different section of an eye (likely the same eye) contains small numbers of agranulocytic (neutrophil like) granulocytes within the anterior chamber. SKIN: Sections of the distal toes contain increased numbers of cells, some of which appear to be inflammatory in origin. BRAIN, NASAL CAVITY, ORAL CAVITY, BONE, and SPINAL CORD: WNL.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Eye: Focal corneal ulcer with chronic granulocytic keratitis and acute, granulocytic anterior endophthalmitis
- 2) Intestines: Mild to moderate, multifocal, granulocytic enterocolitis
- 3) Lung: Minimal, multifocal, granulocytic pneumonia

**REMARKS:**

On 2/24/2017 By MCP

The changes observed in the gastrointestinal tract and lungs are of unknown etiology and significance, but may be associated with the cause of death. The changes observed in the eye suggest a chronic process of unknown etiology; infectious agents were not evident and this could be due to mechanical irritation/trauma. Fat bodies were identified histologically and appear to be robust, suggesting disease progression and death may have been acute.

MCP

ANC

2/24/2017

PROSECTOR

PATHOLOGIST

DATE COMPLETED

Printed on: 8/21/2017 9:19:48 AM

CARES MED v2.119



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2016-0232

Death Date: 11/30/2016

Necropsy Date: 12/1/2016

FELIS CATUS                      Gender: Female  
Domestic cat (breed unspecified) Age: 8Y 10M 3D  
Name: Gabby

Accession No.: GABBY  
Birth: 27 Jan 2008  
Acquired: 18 Apr 2008  
Removed: 30 Nov 2016

SEX: Female	AGE: 8Y 10M 3D	WEIGHT: 3 kg	STAY: > 30 Days
MANNER OF DEATH: Euthanasia		INTERVAL: 6 24 hours	
TIME OF DEATH: 19:30		XRAYED: False	
DEATH LOCATION: SCBI vet hospital		DISPOSITION: INCINERATE	
SUBMITTOR: Joyner		PROSECTOR: MCP	
OWNER/ANIMAL DEPT: OUT			

**HISTORY AND CLINICAL OBSERVATIONS:**

## KEEPER OBSERVATIONS:

On By

## CLINICIAN OBSERVATIONS:

On 11/30/2016 By PHJ

Scheduled ovariectomy performed Nov 30, 2016 revealed severely distended uterine horns. Pre op medications included meloxicam 0.2 mg/kg SC and maropitant 2 mg/kg SC. Mild hypotension and hypothermia during anesthesia despite supplemental heat provided, otherwise excellent anesthesia. Post op treatments included warm LRS 40 mls SC and buprenorphine 0.03 mg/kg PO. Drooling during recovery from anesthesia and animal urinated and defecated. Animal was panting post op and was suspected to painful so buprenorphine was given as described.

Returned to enclosure alert and responsive. Due to warm ambient temperatures, air conditioning was on with a draft near the kennel. Animal was lethargic at recheck so atipamezole 0.8 mg IM dose was repeated. Animal declined in attitude and was returned to hospital. Exam revealed profound hypothermia, hypoglycemia and tachycardia. Supplemental heat, oxygen and oral glucose provided. Attempts to place IV catheter were unsuccessful due to peripheral vasoconstriction. Cat received 7.5 g dextrose orally and temperature gradually increased from 91.2 F to 96.4 F, at which time she seized followed by respiratory arrest.

CPR was initiated. Animal was intubated and IPPV initiated. No heart rate was detected. Epinephrine 0.1 mg/kg given intracardiac twice approximately 2 minutes apart. No response, pupils were dilated and fixed. CPR was discontinued. Animal submitted to DOP for necropsy.

## GROSS DESCRIPTION:

On 12/1/2016 By MCP

A 9 year old, female, 3 kg, Domestic Cat is necropsied 01 December 2016 following death shortly after recovery from ovariectomy. A blue/green tattoo on the left ear reads "028" and a similar tattoo on the right ear reads "08". There is minimal autolysis with adequate musculature and adipose tissue. There is a 4 cm long, sutured, midline abdominal incision through the skin, subcutaneous tissue and muscle layers, surrounded by a 5 x 3 cm area of suffusive subcutaneous hemorrhage.

There are approximately 10 ml of coagulated blood and 5 to 10 ml of uncoagulated blood within the abdominal cavity. The uterine horns have been removed and single suture is placed around the base of each horn. The ovaries have been removed as well. There is a single suture ligating the left ovarian pedicle caudal to the left kidney, with minimal associated hemorrhage. A single suture ligates a thin strand of tissue that is attached to the most dorsal abdominal wall and the right retroperitoneum caudal to the right kidney (unidentified tissue). Caudal to this ligature, there is an approximately 6 x 2 x 1 cm area of hemorrhage into the retroperitoneal space, caudal to the right kidney in the region of the right ovarian pedicle.

The lungs are not inflated. There is a 1 x 1 cm area of dark red discoloration (congestion) of the dorsal surface of the base of the tongue and there is mild thickening of the larynx wall by a clear fluid (edema).

All other organs and tissues examined are grossly within normal limits.

## GROSS DIAGNOSIS:

By MCP

1. Abdominal cavity: Moderate, acute, intra abdominal and retroperitoneal hemorrhage
2. Lung: Moderate, diffuse, atelectasis presumptive
3. Larynx: Mild, locally extensive edema

## LABORATORY STUDIES:

## TISSUE STATUS:

SHELVED: False  
 TRIMMED: False  
 FROZEN: False  
 ULTRAFROZEN: False

Tissues Ultrafrozen:

## SPECIAL REQUESTS:

On By

## HISTOLOGY:

On 2/22/2017 By MCP

1. TISSUE ATTACHED TO RIGHT OVARIAN LIGATURE: The tissue is composed of long sections of smooth muscle supported by fibrous tissue and few small vessels and nerves. Large ovarian artery and vein are not present. PITUITARY GLAND and TRIGEMINAL NERVES: WNL.
2. RIGHT OVARIAN PEDICLE: The ovarian artery and vein are present, supported by markedly hemorrhagic connective tissue with small numbers of hemosiderin laden macrophages. A large fibrin thrombus is observed within the ovarian vein. ADRENAL GLANDS: There are multifocal to coalescing areas of moderate to marked cytoplasmic vacuolation of the cortical cells at the zona glomerulosa.
3. LEFT OVARIAN PEDICLE: The ovarian artery and vein are present, supported by connective tissue as well as smooth muscle and smaller vessels. Minimal hemorrhage is present. LUNG: There are multifocal areas of atelectasis and over inflation of alveoli. There are multifocal areas of hyperplasia of the bronchiolar associated lymphoid tissue (BALT).
4. UTERUS: The endometrium is thickened (up to 10 times its normal thickness) by mucosal hyperplasia with multiple cystic glandular formations which occasionally contain and eosinophilic material with few foamy, macrophages and sloughed epithelial cells. The lumen of the uterus contains similar eosinophilic material, sloughed epithelial cells and foamy macrophages. CERVIX: WNL.
5. KIDNEY: The mesangium of all glomeruli is thickened by mildly increased amounts of eosinophilic material and there are increased numbers of nuclei within these glomeruli. Bowman's space of most glomeruli is obscured by and eosinophilic, acellular material (tubular reflux). The epithelium of most tubules lacks normal distinction and multiple cells contain a large, clear, discrete vacuole (fat droplet). There are multifocal areas of minimal interstitial lymphoplasmacytic infiltrates. URINARY BLADDER: WNL.
6. HEART: WNL.
7. LIVER and SPLEEN: WNL.
8. LARYNX: There are small numbers of lymphocytes and plasma cells within the submucosa with multifocal areas of lymphoid nodular hyperplasia. TRACHEA, ESOPHAGUS, THYROIDS and PARATHYROIDS: WNL.
9. SKIN, ABDOMINAL INCISION: There is diffuse hemorrhage of the subcutaneous tissue underlying the mammary gland. TONGUE, SKELETAL MUSCLE, SCIATIC NERVE, and MAMMARY GLAND: WNL.
10. CEREBRUM, DUODENUM and PANCREAS: WNL.
11. CEREBRUM: WNL.
12. CEREBRUM: WNL.
13. CEREBELLUM and BRAIN STEM: WNL.
14. STOMACH, ESOPHAGUS and DUODENUM: WNL.
15. SMALL INTESTINE: WNL.
16. LARGE INTESTINE and MESENTERIC LYMPH NODE: WNL.

## MORPHOLOGIC DIAGNOSIS:

- 1) Right ovarian pedicle: Marked, diffuse, acute hemorrhage
- 2) Lung: Moderate, multifocal atelectasis with moderate, multifocal, bronchiolar associated lymphoid hyperplasia
- 3) Uterus: Moderate, multifocal to coalescing, cystic endometrial hyperplasia
- 4) Larynx: Mild, locally extensive, lymphoplasmacytic laryngitis with multifocal, nodular lymphoid hyperplasia

## REMARKS:

On 2/22/2017 By MCP

The origin of the abdominal hemorrhage appears to be the right ovarian stump, based on the location of retroperitoneal hemorrhage, the hemorrhages observed histologically on the right ovarian stump and the inability to identify a ligation at the stump location. The tissue encompassed by the right ovarian ligation, which was adjacent to the right ovarian stump, is composed of smooth muscle and connective tissue without any large vessels (ovarian ligament presumptive). The blood loss, in combination with lung atelectasis (presumptively anesthesia related), and possibly other complications of general anesthesia (hypotension, hypothermia, etc), likely resulted in post operative cardiovascular shock. There were no other histological changes that would explain the cause of death in this case.

MCP  
 PROSECTOR

CARTOCETI  
 PATHOLOGIST

2/22/2017  
 DATE COMPLETED



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

**PATH # N2016-0233**

Death Date: 12/4/2016

Necropsy Date: 12/5/2016

KERODON RUPESTRIS  
Rock cavy  
Name: Paloma

Gender: Female  
Age: 10Y 10M 11  
Chip: 473 339 7C5C

Accession No.: 114080  
Birth: 23 Jan 2006  
Acquired:  
Removed: 04 Dec 2016

SEX: Female

AGE: 10Y 10M 11

WEIGHT: 600 gm

STAY: &gt; 30 Days

MANNER OF DEATH: Euthanasia

INTERVAL: 6 24 hours

TIME OF DEATH: 1 :PM

XRAYED: False

DEATH LOCATION: DAH

DISPOSITION: INCINERATE

SUBMITTOR: KB

PROSECTOR: MCP

OWNER/ANIMAL DEPT: DOM SMH

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On By

**CLINICIAN OBSERVATIONS:**

On 12/4/2016 By KB

This geriatric animal was presented due to an acute history of labored breathing. Respiratory rate and effort did not improve with supplemental oxygen. On radiographs, a spinal fracture was noted in T7. Due to concerns for poor quality of life, euthanasia was elected. Euthasol and KCl were administered intracardiac.

**GROSS DESCRIPTION:**

On 12/5/2016 By MCP

A 10 year old, female, 600 g, Rock Cavy is necropsied 05 December 2016 following euthanasia. There is mild autolysis with mild muscle wasting, minimal subcutaneous adipose tissue and moderate amounts of visceral adipose tissue.

The lungs are multifocally dark red, and diffusely heavy and wet. The heart has an irregular shape with multifocal areas of white to dark red, linear to irregular, myocardial discoloration, with multiple, up to 2 mm in diameter, dark red nodules.

There is a locally extensive, 5 mm long area of thinning, dorsal deviation and malformation of a vertebral spinal segment at the level of T7 (further dissection of the segment after fixation is pending), with increased joint laxity. The corresponding paravertebral flexor muscles are thinned. There is mild periarticular new bone formation (osteophytes) on the proximal aspects of both tibias.

The liver is diffusely mottled tan to dark red, with rounded edges and mild swelling.

All other organs and tissues examined are grossly within normal limits.

**GROSS DIAGNOSIS:**

By MCP

1. Spinal vertebra, T7: Marked, focally extensive, osteoarthropathy with kyphosis and paravertebral flexor muscles atrophy
2. Stifle joints (bilateral): Mild, chronic degenerative joint disease
3. Lung: Moderate, multifocal, congestion and edema
4. Heart: Moderate, multifocal, cardiomyopathy (presumptive)
5. Liver: Diffuse hepatopathy (Neoplasia vs Extramedullary hematopoiesis vs Lipidosis)

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False  
TRIMMED: True  
FROZEN: True  
ULTRAFROZEN: False

Tissues Ultrafrozen:

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 3/23/2017 By MCP

1. HEART: Multiple myocardial fibers are hypereosinophilic and swollen (degeneration) and there are few shrunken fibers (atrophy) as well as increased amounts of connective tissue (fibrosis, trichrome positive) between muscle fibers, intermixed with a PAS positive material. Fibrosis often extends from around intrinsic vessels or the subepicardium into the myocardial interstitium where it surrounds few atrophied myocytes. Few myofibers have homogeneous, eosinophilic inclusions in their sarcoplasm. The left atrioventricular valve leaflet is expanded up to 3 times its normal width by moderate amounts of mucinous material. There are few hemosiderin laden macrophages, lymphocytes and plasma cell within the epicardium at the base of the heart and base of the mitral valve leaflet.
2. LUNG: There are multifocal areas of interstitial fibrosis (expanding the alveolar septa up to 15 times its normal thickness) with infiltration by moderate numbers of neutrophils and macrophages and small amounts of fibrin. Alveoli have marked type two pneumocyte hyperplasia and markedly increased numbers of alveolar histiocytes, some of which contain small amounts of a Prussian blue positive, granular material (iron). Many blood vessels are lined by neutrophils, with some travelling through its wall into the adjacent interstitium and alveolar lumina. No organisms are observed on Acid fast and GMS stained slides.
3. LIVER: Hepatocytes are often swollen and have finely to coarsely clumped eosinophilic cytoplasm (hydropic change), anisocytosis and anisokaryosis and occasional binucleation. There are multifocal areas of macrovesicular (lipid) vacuolation of hepatocytes. There is a focus of increased amounts of fibrous tissue and increased bile duct profiles (bile duct hyperplasia) within a portal tract. The cystic duct wall is infiltrated by moderate amounts of lymphocytes and plasma cells that form nodular aggregates. There are multifocal areas of stellate cell hyperplasia.
4. CEREBRUM AND CEREBELLUM: Multiple small and medium size arteries in the brain parenchyma have moderate mineralization of their walls. BRAIN STEM: WNL.
5. CEREBRUM: as described above.
6. KIDNEY: There are multifocal areas of cortical depression overlying wedge shaped areas of interstitial fibrosis with infiltration by few lymphocytes and plasma cells. The mesangium of most glomeruli is globally expanded by small amounts of eosinophilic material that is positive for PAS and trichrome, but negative for congo red. Many glomeruli have dilated Bowman's spaces and periglomerular fibrosis. Scattered tubules in the cortex and medulla are mineralized. SPLEEN: WNL.
7. TONGUE: There are small numbers of lymphocytes and plasma cells multifocally within the submucosa. TRACHEO BRONCHIAL LYMPH NODES: There are increased numbers of lymphocytes (hyperplasia) with prominent germinal centers. Subcapsular and medullary sinuses contain erythrocytes, neutrophils and macrophages, some of which have phagocytosed erythrocytes. (pulmonary drainage reaction). TRACHEA, ESOPHAGUS, THYMUS, OVARIES, OVIDUCTS: WNL.
8. UTERUS, URINARY BLADDER, PITUITARY GLAND, ADRENAL GLANDS and TRIGEMINAL GANGLIA: WNL.
9. DUODENUM: There are multifocal areas of accumulation of a yellow to brown pigment within macrophages in the mucosal lamina propria. STOMACH: Similar pigment accumulation as the one observed in the duodenum is present. PANCREATIC LYMPH NODE: There is moderate, diffuse, lymphoid hyperplasia with prominent germinal centers. PANCREAS: The pancreatic islets are large/prominent (species variation vs hyperplasia).
10. SMALL INTESTINE, STOMACH and LARGE INTESTINE: Similar pigment as that described in the duodenum is present.
11. T7 VERTEBRA: There are multifocal areas of bone and cartilage necrosis of the vertebral body, characterized by hypereosinophilia and fragmentation of the osteoid/chondroid with loss of lacunae and osteocytes/chondrocytes. Adjacent to this area is a focally extensive area of fibrosis that replaces the bone and marrow cavity, with numerous small blood vessels, infiltrated by few lymphocytes, plasma cells, macrophages and multinucleated giant cells. The meninges overlying this area are locally extensively mineralized. CERVICO THORACIC VERTEBRAE: The intervertebral discs are either completely depleted of normal disk material or replaced by fibrous tissue. Small amounts of disc material protrude ventrally, where there are cartilaginous and bony changes in the vertebral bodies.
12. THORACIC VERTEBRAE: Similar changes as those described in the intervertebral discs above are present.

#### MORPHOLOGIC DIAGNOSIS:

- 1) Lung: Moderate, multifocal, alveolar histiocytosis with hemosiderosis and alveolar edema
- 2) Heart: Mild to moderate, multifocal subepicardial and perivascular interstitial fibrosis with myofibers atrophy
- 3) AV valve: Mild, segmental, mucinous endocardiosis
- 4) T7 vertebra: Marked, locally extensive fibrosis with chondroid and osteoid necrosis (presumptive non union fracture)
- 5) Thoracic vertebrae: Moderate to marked, multifocal discospondylosis with disc degeneration and protrusion
- 6) Lung: Mild, multifocal to coalescing, subacute, neutrophilic, interstitial pneumonia with type II pneumocyte hyperplasia
- 7) Lung: Mild, multifocal, interstitial fibrosis
- 8) Kidney: Moderate, multifocal chronic infarcts
- 9) Kidney: Moderate, diffuse, global, mesangial thickening
- 10) Liver: Moderate, diffuse, hydropic hepatocyte change with anisocytosis, anisokaryosis and binucleation
- 11) Liver: Mild, focal, portal fibrosis with biliary hyperplasia
- 12) Liver: Mild, multifocal, hepatic lipidosis
- 13) Hepatic duct: Mild, multifocal, lymphonodular choleductitis
- 14) Tongue: Mild, multifocal lymphoplasmacytic glossitis
- 15) Tracheobronchial lymph nodes: Moderate, diffuse, lymphoid hyperplasia and sinus erythrocytosis, neutrophilia and histiocytosis with erythrophagocytosis
- 16) Brain: Moderate, multifocal, mural vascular mineralization

## REMARKS:

On 3/23/2017 By MCP

Histology confirmed pulmonary edema as the cause of respiratory distress which is strongly suggestive of left sided congestive heart failure. Myocardial fibrosis and endocardiosis are likely the major contributor to cardiac dysfunction, but functional abnormalities that do not have a structural/morphologic manifestation (i.e. arrhythmias, contractility issues) may also be at play. Small amounts of neutrophilic inflammation type II pneumocyte hyperplasia in the lungs also indicate there may be some component of acute interstitial pneumonia that was terminally complicating the respiratory disease. An underlying etiology for pneumonia was not found and special stains were negative for acid fast bacteria and fungi. Changes in the thoracic vertebrae are suggestive of a chronic non union fracture, but there is also significant spondylosis along the spine. The variations in hepatocytes size and nucleation in the liver are common in long lived animals and suggest chronic low level toxin exposure over the course of the animal's lifetime. The remaining diagnoses are considered mild and less clinically significant.

MCP

CARTOCETI

3/23/2017

PROSECTOR

PATHOLOGIST

DATE COMPLETED

Printed on: 8/21/2017 9:21:58 AM

CARES MED v2.119

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2016-0234

Death Date: 12/5/2016

Necropsy Date: 12/5/2016

HYPHESOBRYCON SOCOLOFI  
Lesser bleeding heart tetra  
Name:

Gender: Unknown Sex  
Age:

Accession No.: 500820  
Birth:

Acquired: 11 Feb 2015  
01 Jul 2016

SEX: Unknown Sex

AGE: ADULT

WEIGHT: 4.2 gm

STAY: &gt; 30 Days

MANNER OF DEATH: Found Dead

INTERVAL: 0 6 hours

TIME OF DEATH: 11:00a

XRAYED: False

DEATH LOCATION: Pool 4 skimmer

DISPOSITION: FORMALIN

SUBMITTOR: E. Smith

PROSECTOR: Cartoceti

OWNER/ANIMAL DEPT: DOA

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 12/5/2016 By ES

0.0.2 bleeding heart tetras found deceased in AM at Pool 4 skimmer

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 12/5/2016 By ANC

Received are two, sex unknown (pending histology), adult bleeding heart tetras for necropsy on 5 December 2016 following being found dead in the pool skimmer. The first fish, designated A, is 4.2 grams, has total length of 6.5 cm and a circumference of 5.0 cm caudal to the pectoral fins. The carcass is in poor postmortem condition with the skin and muscle readily sloughing on manipulation, absence of the left eye and a strong putrid odor. Adipose stores cannot be assessed. The coelomic viscera are largely liquefied and unidentifiable. There are dozens of pinpoint (< 1 mm diameter) white nodules scattered throughout the remnant coelomic tissues (suspect granulomas). The second fish, designated B, is 6.4 grams, has a total length of 8.2 cm and a circumference of 5.6 cm caudal to the pectoral fin. The carcass is in poor postmortem condition with the skin and muscle readily sloughing on manipulation, liquefaction of most of the coelomic viscera and a strong putrid odor. Adipose stores cannot be assessed. There are dozens of pinpoint (< 1 mm diameter) white nodules scattered throughout the remnant coelomic tissues (suspect granulomas). Cytology of hepatic tissue from both fish revealed few acid fast short bacilli.

**GROSS DIAGNOSIS:**

By ANC

Systemic mycobacteriosis, presumptive  
Disseminated granulomas (presumptive) with acid fast bacilli

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False

TRIMMED: True

FROZEN: False

ULTRAFROZEN: True

Tissues Ultrafrozen: Liver (A and B)

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 1/10/2017 By ANC

1. FISH A, LIVER, POSTERIOR KIDNEY, INTESTINE, HEART, OVARY, SKELETAL MUSCLE, VERTEBRA: Abundant granulomas, consisting of a core of eosinophilic granular debris surrounded by many macrophages and further rimmed by fibrous connective tissue, expand the heart and liver. There is diffuse eosinophilia of most tissue and overgrowth of the skin by large numbers of mixed bacteria and fungal hyphae (autolysis).

2. FISH A, POSTERIOR KIDNEY, INTESTINE, OVARY, SKELETAL MUSCLE, VERTEBRA: There is marked autolysis as previously described.

3. FISH B, EYES, HEART, GILLS, SKELETAL MUSCLE, VERTEBRA: There is marked autolysis as previously



described.

4. FISH B, POSTERIOR KIDNEY, OVARY, SKELETAL MUSCLE, VERTEBRA: There is marked autolysis as previously described.

5. FISH B, PEDUNCLE, SKELETAL MUSCLE, VERTEBRA: There is marked autolysis as previously described.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Syndrome (Fish A): Systemic mycobacteriosis
- 2) Liver, heart (Fish A): Multifocal, chronic, granulomatous hepatitis and myocarditis with intralesional acid fast bacilli (on cytology)

**REMARKS:**

On 1/10/2017 By ANC

1/10/17: Histology revealed the presence of granulomas throughout the heart and liver of Fish A, confirming the diagnosis of mycobacteriosis as the cause of death. Granulomas were not evident in Fish B; however, most visceral organs were no longer present for evaluation due to advanced autolysis. The presumptive cause of death of Fish B remains mycobacteriosis based on gross and cytologic findings. Both fish are identified as females on histology.

Cartoceti  
PROSECTOR

CARTOCETI  
PATHOLOGIST

1/10/2017  
DATE COMPLETED

Printed on: 8/21/2017 9:22:56 AM

CARES MED v2.119

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2016-0235

Death Date: 12/8/2016

Necropsy Date: 12/8/2016

DENDROBATES TINCTORIUS

Gender: Unknown Sex

Accession No.: 306308

Dyeing poison frog

Age:

Birth:

Name:

Acquired: 20 Oct 1992

01 Jul 2016

SEX: Unknown Sex

AGE: ADULT

WEIGHT: 6.3 gm

STAY: &gt; 30 Days

MANNER OF DEATH: Found Dead

INTERVAL: 0 6 hours

TIME OF DEATH: 10:00A

XRAYED: False

DEATH LOCATION: F line exhibit

DISPOSITION: FORMALIN

SUBMITTOR: Michael Miller

PROSECTOR: Cartoceti

OWNER/ANIMAL DEPT: DOH

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 12/8/2016 By MM

This frog was individually identified in the exhibit as frog E. It shared the exhibit with 6 other frogs. Its last weight was taken on 7/21/16 and was 6.0g.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 12/8/2016 By ANC

Received is an adult, sex pending histology, 6.3 gram, Dyeing poison dart frog (individually designated frog E) in good postmortem condition and fair body condition with small fat bodies. There a small to moderate amount of excess thin, pale brown shedding skin along the dorsum and ventrum of the body and hind feet. The remaining organs are grossly unremarkable.

**GROSS DIAGNOSIS:**

By ANC

Dermal hyperkeratosis/hyperplasia

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False

TRIMMED: True

FROZEN: False

ULTRAFROZEN: True

Tissues Ultrafrozen: Liver, colon, foot

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 1/31/2017 By ANC

1. LUNG; KIDNEY; LIVER: In the liver, there is focally a small infiltrate of lymphocytes and fewer macrophages within a sinusoid. In the kidney, occasional tubules are dilated, filled with proteinaceous fluid and lined by flattened epithelium.
2. HEART; TONGUE; THYROID GLAND; TRACHEA; ESOPHAGUS, STOMACH; SMALL INTESTINE; LARGE INTESTINE; PANCREAS; SPLEEN: In the colonic lumen, there are many elongate ciliated protozoa and few nematode worms that are ~200 um in diameter, with prominent lateral alae, platymyarian musculature and a GI tract with a prominent brush border (probable oxyurid). Perivisceral adipocytes are adequate.
3. HEAD, EYES, BRAIN: Multifocally, the stratum corneum of the epidermis is slightly thickened and overlain by small amounts of orthokeratotic keratin. Multifocally, the epidermis has loss of differential staining, is fragmented and is infiltrated by thin walled, non parallel walled hyphae, along with the underlying dermis.
4. BODY: There are multifocal epidermal changes as previously mentioned.
5. FEET; LEGS: There are multifocal epidermal changes as previously mentioned.
6. FEET: There are multifocal epidermal changes as previously mentioned.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Skin: Mild, multifocal epidermal hyperplasia and hyperkeratosis and superficial hyphal elements
- 2) Large intestine: Intraluminal ciliates and nematodes (probable oxyurids)

**REMARKS:**

On 1/31/2017 By ANC

1/31/17: The only significant finding on histology is multifocal epidermal hyperkeratosis, which can result from a variety of infectious skin diseases or can be non specific lesion that reflects environmental irritants or suboptimal water quality. Growth of hyphal elements within the skin most likely represents postmortem colonization of water mold (i.e. Saprolegnia sp.) based on the lack of an inflammatory response; however, the possibility of an early antemortem infection cannot be completely ruled out. Other infectious agents, including Chytrid fungus, were not evident in the skin. Intestinal protozoa and nematodes are considered incidental.

<u>Cartoceti</u>	<u>CARTOCETI</u>	<u>1/31/2017</u>
PROSECTOR	PATHOLOGIST	DATE COMPLETED

---

| Printed on: 8/21/2017 9:23:43 AM |  | CARES MED v2.119 |

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2016-0237

Death Date: 12/14/2016

Necropsy Date: 12/14/2016

ECHINOPS TELFAIRI                      Gender: Male  
Lesser Madagascar hedgehog tenrec    Age: 9Y 5M 18D  
Name: Tyrion                              Chip: 109 608 035

Accession No.: 115104  
Birth: 26 Jun 2007  
Acquired: 02 Jul 2014  
Removed: 14 Dec 2016

SEX: Male	AGE: 9Y 5M 18D	WEIGHT: 95.6 gm	STAY: > 30 Days
MANNER OF DEATH: Found Dead		INTERVAL: 0 6 hours	
TIME OF DEATH:		XRAYED: False	
DEATH LOCATION: SMH Aq 2a		DISPOSITION: Carcass/ pelt FONZ	
SUBMITTOR: K Kens		PROSECTOR: T. Walsh	
OWNER/ANIMAL DEPT: DOM    SMH			

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 12/14/2016 By KK

Geriatric male tenrec found dead in aquarium in afternoon. Animal in torpor, acting normally until found dead. Housed solo.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 12/14/2016 By TFW

A geriatric (per history), 95.6 gram, male Lesser Tenrec is submitted and necropsied 14 Dec 2016. Transponder reads AVID 109 608 035. The carcass is malodorous with dark grey discoloration of the ventral skin and mild dessication of the lips (poor postmortem condition). Rare mulch fragments are in the oral cavity. Subcutaneous tissues, adipose tissue, and musculature of the ventrum particularly over the sternum are red black, edematous, and emphysematous. There is abundant adipose tissue stores with large discrete bilateral fat deposits in the dorsal lumbar sacral region dorsal to the prominent intraabdominal dark grey testes. The spleen and liver are black and friable. The stomach and intestines are distended with gas. Kidneys are grey black. The lungs and heart are red black and friable. Except for autolysis the brain, tongue, thyroids, adrenals, and urinary bladder (empty) are grossly normal.

**GROSS DIAGNOSIS:**

By TFW

1. Severe autolysis

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED:                      False  
TRIMMED:                      True  
FROZEN:                        False  
ULTRAFROZEN:                True

Tissues Ultrafrozen: Liver, spleen, lung

**SPECIAL REQUESTS:**

On 12/14/2016 By KK

Please save pelt for FONZ education Kirstin Schoeninger

**HISTOLOGY:**

On 1/10/2017 By tfw

Slide 1. All tissue have severe autolysis with loss of differential staining and bacterial overgrowth. LIVER. Hepatocytes frequently contain abundant finely granular brown pigment (presumptive hemosiderin). BRAIN: Severe autolysis and bacterial overgrowth. LUNG. In some areas silhouettes of larger nucleated cells are prominent. ESOPHAGUS, SKELETAL MUSCLE. Autolysis  
Slide 2. HEART. A leaflet of the left atrioventricular valve terminates in a nodule. TRACHEA, ESOPHAGUS, THYROID, LUNG: severe autolysis. AORTA There is fine dark blue black granules throughout the media (mineral vs autolysis precipitate).  
Slide 3. STOMACH, SMALL INTESTINE, COLON, SPLEEN: severe autolysis  
Slide 4. KIDNEY: Two sections. The glomeruli have large silhouettes with abundant mesangium. Multifocally, the interstitium is expanded by eosinophilic matrix (presumptive interstitial fibrosis). There are occasional mineral aggregates in tubules of the papilla. ADIPOSE TISSUE: abundant. ACCESSORY SEX GLANDS, PROSTATE: There are abundant small brown black pigment granules with the autolyzed epithelium. VAS DEFERENS. Contains spermatozoa. URINARY BLADDER: The epithelium is absent. TESTES. Severe autolysis.



**MORPHOLOGIC DIAGNOSIS:**

- 1) Autolysis, severe
- 2) Kidney, membranous glomerulopathy, mild to moderate
- 3) Kidney, interstitial fibrosis, mild, multifocal
- 4) Liver, hemosiderosis, (presumptive) moderate

**REMARKS:**

On 1/10/2017 By TFW

Unfortunately there is severe autolysis which hinders detailed evaluation. A cause of death for this animal found dead while also in a period of torpor is not found. There are some changes commonly found in older animals including pigment accumulation in liver ( presumptive hepatic hemosiderosis), renal interstitial fibrosis and membranous glomerulopathy, and mild mineralization of great vessels. It is unlikely these are directly contributory to death. Significant lesions particularly in the lungs and brain would be obscured by the autolysis. No severe changes such as neoplasia or effacing inflammatory lesions are detected.

T. Walsh

PROSECTOR

T. Walsh

PATHOLOGIST

1/10/2017

DATE COMPLETED

Printed on: 8/21/2017 9:24:44 AM

CARES MED v2.119

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2016-0238

Death Date: 12/16/2016

Necropsy Date: 12/16/2016

ANAS ACUTA  
Northern pintail  
Name:

Gender: Female  
Age: 13Y 7M 26D

Accession No.: 215034  
Birth: 20 Apr 2003  
Acquired:  
Removed: 16 Dec 2016

SEX: Female

AGE: 13Y 7M 26D

WEIGHT: 854.9 gm

STAY: &gt; 30 Days

MANNER OF DEATH: Found Dead

INTERVAL: 0 6 hours

TIME OF DEATH:

XRAYED: False

DEATH LOCATION: Flamingo Yard

DISPOSITION: INCINERATE

SUBMITTOR: Talbott

PROSECTOR: Andrew Cartoceti

OWNER/ANIMAL DEPT: DOO

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 12/16/2016 By DT

this bird was not present at morning checks, I was coming out of bh38 and heard red tailed hawks calling, then saw them in trees over the flamingo yard. When they saw me they flew off. We checked the yard and found her in the front near a pool

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 12/16/2016 By ANC

Received is a 854.9 gram, adult, female Northern pintail for necropsy on 16 December 2016 following being found dead in the Flamingo Yard. The carcass is in good postmortem condition with mild freezing of the tissues and good body condition with well fleshed muscles and abundant subcutaneous and intra coelomic adipose stores. A silver metal tag on the left leg reads "NZP DOO" and there is a plastic pink band on the right leg. There are multiple small (~0.2 1 cm diameter) puncture wounds and linear lacerations in the skin and underlying skeletal muscle, including just caudal the left and right commissures of the mouth, the caudal neck, dorsal and ventral thorax, pectoral muscles, dorsal lumbar spine, right carpus and left thigh. There is accompanying hemorrhage onto the feathers and into the subcutis and skeletal muscle. The largest wound is over the right dorsal shoulder and is ~3.5 cm in diameter. Some lacerations within the pectoral muscles extend into the thoracic inlet, where there is hemorrhage into the cranial aspects of the left and right lungs. The stomach contains pelleted feed; the intestines contain pale brown, pasty ingesta. There is a cluster of six, 1 mm diameter, dark brown discolorations in the distal oviduct. The leptomeninges over the cerebrum is reddened. The remaining organs, including the stifle and shoulder joints, are unremarkable.

**GROSS DIAGNOSIS:**

By ANC

Presumptive predation  
Multiple dermal and muscular lacerations with acute hemorrhage

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False  
TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: True

Tissues Ultrafrozen: Lung, liver, kidney

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 1/12/2017 By ANC

1. LUNG; SPLEEN: Many parabronchial and air capillary lumina are filled with hemorrhage. There are many immature and mature heterophils in the splenic pulp.
2. LIVER; KIDNEY; OVARY; ADRENAL GLAND: In the liver, small numbers of heterophils, lymphocytes and macrophages infiltrate portal tracts.
3. HEART: WNL.

4. HEART: WNL.

5. TRACHEA; ESOPHAGUS; OVIDUCT: Within the oviductal lumen, there are multiple lamellated aggregates of protein and degenerate cells.

6. VENTRICULUS; PROVENTRICULUS: WNL.

7. SMALL INTESTINE; PANCREAS; LARGE INTESTINE: WNL.

8. SCIATIC NERVE; CLOACA: WNL.

9. BRAIN, MIDBRAIN, CEREBELLUM: Superficial parenchymal blood vessels are congested.

10. BRAIN, CEREBRUM: Superficial parenchymal blood vessels are congested.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Skin, skeletal muscle: Multiple acute lacerations with acute hemorrhage (gross diagnosis)
- 2) Lung: Moderate acute regionally extensive hemorrhage

**REMARKS:**

On 1/12/2017 By ANC

1/12/17: Histology did not reveal any significant underlying conditions that could have predisposed this bird to predation, including vascular, infectious/inflammatory, anomalous, metabolic, toxic, neoplastic or degenerative diseases.

Andrew Cartoceti

CARTOCETI

1/12/2017

PROSECTOR

PATHOLOGIST

DATE COMPLETED

Printed on: 8/21/2017 9:25:31 AM

CARES MED v2.119

Pathology Module Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

**PATH # N2016-0239**

Death Date: 12/17/2016  
Necropsy Date: 12/18/2016

HEMIGRAMMUS ERYTHROZONUS  
Glowlight tetra  
Name:

Gender: Unknown Sex  
Age:

Accession No.: 500872  
Birth:  
Acquired: 24 Apr 2016

SEX: Unknown Sex	AGE: ADULT	WEIGHT: 0.6 gm	STAY:
MANNER OF DEATH: Found Dead	TIME OF DEATH: 08:30A	INTERVAL: 24 48 Hours	XRAYED: False
DEATH LOCATION: FSA5	SUBMITTOR: Hilary Colton	DISPOSITION: FORMALIN	PROSECTOR: Cartoceti
OWNER/ANIMAL DEPT: DOA			

**HISTORY AND CLINICAL OBSERVATIONS:**

**KEEPER OBSERVATIONS:** On 12/17/2016 By HC  
0.0.1 Glowlight tetra found during routine feeding of tank, sucked onto filter intake. Specimen is autolyzed and bloated. Remaining tetra and tankmates (dwarf cichlid & wood eating catfish) all BAR.

**CLINICIAN OBSERVATIONS:** On By

**GROSS DESCRIPTION:** On 12/19/2016 By ANC  
Received is a 0.6 g, adult, sex pending histology, Glowlight tetra for necropsy on 17 December 2016 after being found dead. The fish has a total length of 2.9 cm and is in poor postmortem condition. The tail and a large portion of the right side of the head and body wall are missing. The carcass is placed whole in formalin.

**GROSS DIAGNOSIS:** By ANC  
No external gross lesions

**LABORATORY STUDIES:**

**TISSUE STATUS:**

SHELVED: False  
TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: False

Tissues Ultrafrozen:

**SPECIAL REQUESTS:** On By

**HISTOLOGY:** On 1/12/2017 By ANC

1. WHOLE BODY, CROSS SECTIONS: All tissues are markedly autolyzed, characterized by diffuse loss of differential staining, eosinophilia, fragmentation and/or overgrowth by bacteria or fungal hyphae. Many organs are not present for evaluation. Small granulomas consisting of a core of degenerate cells and cellular debris, surrounded by macrophages and further rimmed by fibrous connective tissue, are present in the meninges of the spinal cord, epaxial skeletal muscle and posterior kidney.

ZIEHL NEELSEN ACID FAST (2/7/17): Many acid fast bacilli are present within granulomas in the spinal column, epaxial muscles and posterior kidney.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Syndrome: Mycobacteriosis
- 2) Meninges, skeletal muscle, posterior kidney: Multiple chronic granulomas with intralesional acid fast bacilli

**REMARKS:** On 1/12/2017 By ANC

2/7/17 (ADDENDUM): Mycobacteriosis was confirmed via special staining as the cause of granulomas and death.

1/12/17: The histologic finding of multiple granulomas is strongly suggestive of mycobacteriosis as the cause of death of this fish. Acid fast staining is pending to confirm this suspicion and results will



be communicated in an addendum.

Cartoceti  
PROSECTOR

CARTOCETI  
PATHOLOGIST

1/12/2017  
DATE COMPLETED

Pathology Module Final Pathology Report NATIONAL ZOOLOGICAL PARK			
<b>PATH # N2016-0240</b>		Death Date: 12/20/2016 Necropsy Date: 12/20/2016	
GEKKO GECKO Tokay gecko Name:	Gender: Unknown Sex Age: 0Y 1M 22D	Accession No.: 307651 Birth: 28 Oct 2016 Acquired: Removed: 20 Dec 2016	
SEX: Unknown Sex	AGE: 0Y 1M 22D	WEIGHT: 2.7 gm	STAY: > 30 Days
MANNER OF DEATH: Found Dead TIME OF DEATH: 11:00A DEATH LOCATION: C line back up holding SUBMITTOR: Matt Evans OWNER/ANIMAL DEPT: DOH		INTERVAL: 0 6 hours XRAYED: False DISPOSITION: FORMALIN PROSECTOR: Cartoceti	

**HISTORY AND CLINICAL OBSERVATIONS:**

KEEPER OBSERVATIONS: On 12/20/2016 By ANC

Keeper found this one month hatchling dead today in its enclosure. It had been living in its own enclosure since 12/18/16 when it was pulled off exhibit. This little guy hatched on exhibit and had been seen eating. Post mortem condition seems good, nothing obvious to note.

CLINICIAN OBSERVATIONS: On By

GROSS DESCRIPTION: On 12/20/2016 By ANC

Received is a 207 gram, juvenile, sex pending histology, Tokay gecko for necropsy on 20 December 2016 after being found dead. The carcass is in fair postmortem condition (mild putrid odor and mild organ friability) and poor to fair body condition with thinly fleshed muscles and no distinguishable fat bodies. There is mild accumulation of unshed skin around the head, eyes, pelvis and toes. The left spectacle/cornea is opaque pale yellow to white, has an irregularly pitted surface and is adhered to pieces of unshed skin. Along the left thoracic body wall, the scales are focally replaced by a 2 mm diameter area of flattened, shiny pale brown skin. The distal 1 mm of the tail is dry, brown and shrunken. Within the caudal oral cavity, there are 5 10, small (~0.5 long by <0.1 cm diameter), white worms that surround a 2 mm diameter bolus of soft, friable pale brown material (presumptive food material). The stomach is empty; the colon contains a small amount of pasty pale green feces. The remaining organs are grossly unremarkable.

GROSS DIAGNOSIS: By ANC

Multifocal dermatopathy, left eye, left body wall, tail  
Possible oral nematodiasis  
Fair to poor body condition

**LABORATORY STUDIES:**

PARASITOLOGY: Oral nematodes saved in 70% ethanol

**TISSUE STATUS:**

SHELVED: False  
TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: True

Tissues Ultrafrozen: Liver, colon

SPECIAL REQUESTS: On By

HISTOLOGY: On 2/9/2017 By ANC

1. ORAL WORMS; KIDNEY; SPLEEN; LUNG; LIVER; HEART: With the bolus of food removed from the mouth, there are arthropod parts and a larger (~350 um in diameter, presumptive adult) and several smaller (~100 um diameter, presumptive larval) nematodes that have platymyarian musculature, a tri radiate esophagus and a gastrointestinal tract lined by many uninucleate cells.

2. LUNG; LIVER; TRACHEA; ESOPHAGUS; GASTROINTESTINAL TRACT: There is marked autolysis of the liver and gastrointestinal tract. In the lumen of the esophagus and stomach, there are nematodes that are ~250 um in diameter and have large symmetric lateral cords, a GI tract lined by many uninucleate cuboidal cells

and a reproductive tract filled with embryonated eggs. Scattered throughout the liver, the hepatic cords are replaced by small foci of pyknotic and karyorrhectic debris admixed with eosinophilic material (necrosis?). STEINER'S, GIEMSA; ZIEHL NEELSEN ACID FAST: There no infectious agents within foci of suspected hepatic necrosis, save for overgrowth of large bacilli (postmortem).

3. GASTROINTESTINAL TRACT: There is marked autolysis of the tissues. Nematodes as described in slide 2 are present in the lumen of unidentifiable segments of intestine.

4. HEAD, EYES, BRAIN: Much of the epidermis is absent (autolysis). The spectacle of one eye is wrinkled and accumulations of foreign debris, proteinaceous fluid, bacteria line the outer and inner aspects of the keratin layer. A nematode is present on the outer surface of the spectacle embedded within debris. There is multifocal splitting of the alpha keratin. The spectacular stroma is markedly thinned. The underlying cornea is overgrown with bacteria, but lacks an inflammatory infiltrate. Adjacent to the eye (periocular space), there is a nematode beneath the keratin layer at the edge of the bony orbit and small amounts of protein, erythrocytes, granulocytes and an embryonated nematode egg line the bony orbit. The oral cavity contains a nematode as previously described and the adjacent oral subepithelial stroma and connective tissue is edematous and infiltrated by granulocytes and macrophages.

5. BODY WALL, THORACIC: Segmentally the dermis and musculature of the body wall are thinned, but otherwise normal.

#### MORPHOLOGIC DIAGNOSIS:

- 1) Oral cavity: Moderate, regional, histiocytic and granulocytic stomatitis with intraluminal nematodes
- 2) Eye, left: Moderate, periocular dermatitis, cellulitis and spectaculitis with spectacular and periocular nematodes
- 3) Esophagus, stomach, intestine: Intraluminal nematodes
- 4) Liver: Mild to moderate, multifocal, acute necrosis (presumptive)
- 5) Skin, left thoracic wall: Focal thinning of dermis and skeletal muscle

#### REMARKS:

On 2/9/2017 By ANC

2/9/17: Histology of several organs is hindered by marked postmortem autolysis. Histology confirmed nematode infestation of the oral cavity. Interestingly, nematodes also infest the spectacle and periocular tissues of the left eye and appear to be disrupting normal ecdysis of the spectacle. Nematodes within the esophagus, stomach and intestine may be due to swallowing and/or postmortem migration. Based on the similarity of infestation and nematode morphology to a report of subspectacular nematodiasis in snakes (1), nematodes may be *Serpentirhabdias* species or related worms. Nematode identification is pending and an addendum will be added with these results. Foci of presumptive hepatic necrosis lack significant infectious agents by special stains (including acid fast organisms); these may represent migration tracts of infesting nematodes. Histology of the dermal lesion in the left body wall was unexciting and there was no evidence of active inflammation or infection. This likely represents healing of a prior injury.

1. J.C. Hausmann, C. Mans, J. Dreyfus, D.R. Reavill, A. Lucio Forster, D.D. Bowman. Subspectacular Nematodiasis Caused by a Novel *Serpentirhabdias* species in Ball Pythons (*Python regius*). Journal of Comparative Pathology. Volume 152, Issues 2 3, February April 2015, Pages 260 264.

Cartoceti

PROSECTOR

CARTOCETI

PATHOLOGIST

2/9/2017

DATE COMPLETED

Printed on: 8/21/2017 9:27:06 AM

CARES MED v2.119



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

**PATH # N2016-0241**

Death Date: 12/21/2016  
Necropsy Date: 12/21/2016

HETEROCEPHALUS GLABER

Gender: Male

Accession No.: 115154

Naked mole rat

Age: 25Y 11M 20

Birth: 01 Jan 1991

Name:

Chip: 000D 58D1

Acquired: 22 Jan 2015

Removed: 21 Dec 2016

SEX: Male

AGE: 25Y 11M 20

WEIGHT: 33.3 gm

STAY: &gt; 30 Days

MANNER OF DEATH: Euthanasia

INTERVAL: 0 6 hours

TIME OF DEATH: 10:15A

XRAYED: False

DEATH LOCATION: WHS

DISPOSITION: FORMALIN

SUBMITTOR: KLH

PROSECTOR: Cartoceti

OWNER/ANIMAL DEPT: DOM SMH

**HISTORY AND CLINICAL OBSERVATIONS:**

KEEPER OBSERVATIONS:

On By

CLINICIAN OBSERVATIONS:

On 12/21/2016 By KLH

Geriatric animal, weight loss, ataxia. Anesthetized with ketamine IM and then euthanized with euthasol IC. No radiographs taken. Missing tip of right hind digit.

**GROSS DESCRIPTION:**

On 12/21/2016 By ANC

Received is a 33.3 gram, adult, male, naked mole rat submitted for necropsy on 21 December 2016 following euthanasia for weight loss and ataxia. Transponder read 00000D58D1. The carcass is in good postmortem condition and fair body condition with generalized muscle atrophy, scant subcutaneous adipose and small amounts of mesenteric, perirenal and peritesticular adipose. There is mild generalized flaking and crusting of the skin. The distal aspect of the 4th digit on the right hind foot is absent. The caudal thoracic cavity contains ~1 mL of clotted blood (euthanasia artifact). There is subtle, multifocal, pale yellow mottling in the liver. The kidneys are diffusely pale tan and have an irregular nodular cortical surface. There is hard, pale tan, irregular, nodular thickening along the ventral aspect of the body of vertebrae C6 to T5. The stomach contains scant clear mucus, the cecum contains pasty yellow green ingesta and the descending colon contains few formed feces. The remaining organs are grossly unremarkable.

**GROSS DIAGNOSIS:**

By ANC

Presumptive cervical and thoracic vertebral spondylosis  
Bilateral nephropathy (presumptive chronic nephritis)  
Fair body condition with generalized muscle atrophy

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False

TRIMMED: True

FROZEN: False

ULTRAFROZEN: True

Tissues Ultrafrozen: Lung, liver, esophagus, kidney, cecocolic contents

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 1/30/2017 By ANC

1. LIVER; LUNG; SPLEEN: In the liver, scattered groups of midzonal hepatocytes have one large or several small, discrete, clear, cytoplasmic vacuoles. Hepatocytes often contain abundant, light brown, granular cytoplasmic pigment and occasionally exhibit karyomegaly and binucleation. Focally, there are many bile ductule profiles embedded within dense fibrous connective tissue (biliary hyperplasia). In the spleen, there are erythroid precursors and megakaryocytes. In the lungs, terminal bronchioles are dilated, many alveoli are flooded with proteinaceous fluid and alveolar septa have loss of differential staining (euthanasia artifact).

2. HEART; KIDNEYS; ADRENAL GLANDS; TESTES; URINARY BLADDER; TRACHEA: In the kidneys, many tubules and



Bowman's spaces are dilated and filled with proteinaceous fluid. Some tubules are obscured by sheets of mineral. Rare tubules and collecting ducts have cellular casts composed of neutrophils. There is often peritubular and periglomerular fibrosis which contain scattered infiltrates of plasma cells, lymphocytes and neutrophils. In the testes, seminiferous tubules contain only proteinaceous fluid and pyknotic debris with no active spermatogenesis. Seminiferous tubules are widely separated by large sheets of interstitial cells that often have microvacuolated cytoplasm.

3. BRAIN, OLFATORY BULB, CEREBRUM, THALAMUS, MIDBRAIN, CEREBELLUM, BRAINSTEM: Multifocally in the leptomeninges between the midbrain and hippocampi, there are concentric aggregates of mineral (psammoma bodies).

4. STOMACH; SMALL INTESTINE; LARGE INTESTINE; PANCREAS: Lining the apical surface of the gastric mucosa, there are abundant, ~3-5 µm diameter, round to oval, basophilic yeast that have a clear polar vacuole. In the small intestinal lumen, there are many flattened flagellated protozoa. Within the large intestinal lumen, there are large ciliated protozoa with a horseshoe shaped macronucleus.

5. TONGUE; LARYNX; TRACHEA; ESOPHAGUS; THYROID GLAND: WNL.

6. SPINE, CERVICAL, THORACIC, LONGITUDINAL: Irregular proliferative nodules of cartilage and bone bridge the ventral aspects of vertebral bodies, obscuring the normal cortices of the bone. Proliferative cartilage is variably necrotic. The normal annulus fibrosis and nucleus pulposus of all discs is replaced by irregular nodules of proliferative and variably necrotic chondroid. Disc spaces are collapsed and focally, there is a nodule of necrotic chondroid surrounded by fibrous connective tissue that protrudes from the disc space into the vertebral canal. The overlying cord is mildly compressed. Subchondral bone is sclerotic with prominent cementing lines; sclerotic bone occasionally crowds out the marrow spaces. Scattered axons in the dorsal and ventral white matter tracts of the spinal cord are dilated. There is excess loose connective tissue surrounding veins ventral to the spinal cord.

7. SPINE, CERVICAL, TRANSVERSE: Vertebral bone is sclerotic and has cartilage proliferation as previously described.

8. SPINE, LUMBAR, LONGITUDINAL: As described in slide 6.

#### MORPHOLOGIC DIAGNOSIS:

- 1) (A) Vertebrae, cervical, thoracic, lumbar: Severe, multifocal, chronic, intervertebral disc degeneration with disc protrusion, chondroid proliferation
- 1) (B) and metaplasia and bridging spondylosis (intervertebral disc disease)
- 2) (A) Spinal cord, cervicothoracic: Mild, multifocal, ventral white matter compression with rare dilated myelin sheaths
- 2) (B) and perivenous fibrosis (compressive myelopathy)
- 3) (A) Kidney: Moderate to severe tubular and glomerular ectasia and proteinosis with interstitial fibrosis, tubular mineralization and lymphoplasmacytic
- 3) (B) and neutrophilic tubulointerstitial nephritis
- 4) Liver: Mild, multifocal, hepatocyte vacuolation (lipid type) and hemosiderosis (presumptive)
- 5) Testes: Interstitial cell hyperplasia
- 6) Spleen: Extramedullary hematopoiesis
- 7) Stomach: Apical yeast (consistent with *Candida pintolopesii*)
- 8) Small intestine: Intraluminal flagellates
- 9) Large intestine: Intraluminal ciliates

#### REMARKS:

On 1/30/2017 By ANC

1/30/17: Necropsy confirmed severe intervertebral disc disease that was affecting all vertebrae that were examined histologically. Disease is most severe at the cervico thoracic junction where there is both bridging spondylosis and disc protrusion that mildly compresses the adjacent spinal cord. The reported neurologic signs are likely due to a combination of compressive myelopathy and pain associated with disc disease. Renal lesions are consistent with Chronic Progressive Nephropathy (CPN) of rats, the etiology of which remains unknown. CPN, along with the diagnosed hepatic, splenic and testicular lesions, are commonly found spontaneous lesions in aged naked mole rats (1). Gastric yeast and intestinal protozoa are considered normal commensal organisms.

1. M. A. Delaney, L. Nagy, , M. J. Kinsel, P. M. Treuting. 2013. Spontaneous Histologic Lesions of the Adult Naked Mole Rat (*Heterocephalus glaber*). *Veterinary Pathology*. Vol 50, Issue 4, pp. 607-621

Cartoceti  
PROSECTOR

CARTOCETI  
PATHOLOGIST

1/30/2017  
DATE COMPLETED

Printed on: 8/21/2017 9:27:45 AM

CARES MED v2.119

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

**PATH # N2017-0007**

Death Date: 1/9/2017  
Necropsy Date: 1/9/2017

ANCISTRUS (unk sp)  
Bristlenose catfish  
Name:

Gender: Unknown Sex  
Age: 17Y 0M 8D

Accession No.: 500758  
Birth: 01 Jan 2000  
Acquired: 04 Dec 2001  
01 Jul 2016  
Removed: 09 Jan 2017

SEX: Unknown Sex

AGE: 17Y 0M 8D

WEIGHT: 27 gm

STAY: &gt; 30 Days

MANNER OF DEATH: Found Dead

INTERVAL: 0 6 hours

TIME OF DEATH: 11:30A

XRAYED: False

DEATH LOCATION: FSA 4

DISPOSITION: FORMALIN

SUBMITTOR: Dennis Charlton

PROSECTOR: Cartoceti

OWNER/ANIMAL DEPT: DOA

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 1/9/2017 By DC

0.0.1 Bristlenose catfish found deceased in tank FSA #4 under driftwood pieces. This animal was observed two days prior out and acting normally. All other fish in tank are normal BAR.

Specimen submitted to pathology.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 1/9/2017 By ANC

Received is a 27.0 gram, unknown sex, adult, Bristlenose catfish for necropsy on 9 January 2016 after being found dead in tank FSA #4. Two live leeches are contained within the bag used to submit the fish. The fish is 14.3 cm in total length and has a circumference of 9.2 cm at the widest point (pectoral girdle). The carcass is malodorous and is in poor postmortem condition with loss of most of the skin over the cranium, body and peduncle. The remaining skin is very friable and sloughs on manipulation. The eyes are deeply sunken and the corneas are diffusely opaque white (postmortem autolysis). The coelomic organs are green brown, liquefied and unidentifiable. Adipose stores cannot be determined due to the level of postmortem autolysis.

**GROSS DIAGNOSIS:**

By ANC

Advanced postmortem autolysis

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False

TRIMMED: True

FROZEN: False

ULTRAFROZEN: True

Tissues Ultrafrozen: Coelomic organ (liver?)

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 2/10/2017 By ANC

1. SKELETAL MUSCLE; LIVER; OVARY: There is marked autolysis of all organs characterized by diffuse eosinophilia, loss of differential staining and overgrowth of bacteria.
2. SKELETAL MUSCLE; LIVER; INTESTINE; OVARY: There is marked autolysis as previously described.
3. GILLS: There is marked autolysis with loss of all but the cartilage and dense fibrous connective tissue.
4. HEAD, EYES: Marked autolysis as previously described.
5. PEDUNCLE, CRANIAL, MIDDLE, CAUDAL: Marked autolysis as previously described.

**MORPHOLOGIC DIAGNOSIS:**

- 1) No significant histologic lesions identified

REMARKS:

On 2/10/2017 By ANC

2/9/17: Histology was unrewarding as there was marked autolysis and many organs were no longer present.  
No granulomas suggestive of mycobacteriosis were evident.

<u>Cartoceti</u>	<u>Cartoceti</u>	<u>2/10/2017</u>
PROSECTOR	PATHOLOGIST	DATE COMPLETED

---

Printed on: 8/21/2017 9:28:32 AM

CARES MED v2.119

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2017-0008

Death Date: 1/13/2017  
Necropsy Date: 1/13/2017

PHYLLOBATES TERRIBILIS  
Golden poison dart frog  
Name:

Gender: Unknown Sex  
Age:

Accession No.: 307213  
Birth:  
Acquired: 07 Apr 2009  
31 Dec 2016

SEX: Unknown Sex	AGE: ADULT	WEIGHT: 11.6 gm	STAY: > 30 Days
MANNER OF DEATH: Found Dead		INTERVAL: 0 6 hours	
TIME OF DEATH: 07:10A		XRAYED: True	
DEATH LOCATION: BioLab Holding		DISPOSITION: FORMALIN	
SUBMITTOR: Hilary Colton		PROSECTOR: Cartoceti	
OWNER/ANIMAL DEPT: DOA			

**HISTORY AND CLINICAL OBSERVATIONS:**

## KEEPER OBSERVATIONS:

On 1/13/2017 By HC

On 1/12/2017 this animal with inability to upright itself on exhibit. Earlier that morning and on Tuesday this animal showed signs of interest in food and the ability to visually follow prey items. Animal was removed from exhibit and placed in a holding container, where Amphibian Ringer solution was it's sole water source as prescribed by DAH.

At morning checks on 1/13/2017; animal was found deceased on it's back in the holding container. Specimen and hard copy will go up to the hospital shortly.

## CLINICIAN OBSERVATIONS:

On By

## GROSS DESCRIPTION:

On 1/13/2017 By a

Received is a 11.6 gram, adult, female, Golden poison frog for necropsy on 13 January 2017 following being found dead one day after presenting with an inability to right itself. The carcass is in good postmortem condition and fair nutritional state with small fat bodies. Small amounts of excess skin slough from the feet and ventrum. The coelomic cavity is subtly distended and the coelomic viscera are wet (carcass stored on wet paper towels until necropsy). The liver is diffusely pigmented dark grey to black, as are several ovarian follicles. The stomach contains dark grey to black, firm, friable material (substrate?). The eyes, trachea, esophagus, heart, spleen, kidneys and ovary are grossly unremarkable.

## GROSS DIAGNOSIS:

By ANC

Open, no significant gross lesions identified

## LABORATORY STUDIES:

## TISSUE STATUS:

SHELVED: False  
TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: True

Tissues Ultrafrozen: Liver, colon, stomach contents, hindfoot

## SPECIAL REQUESTS:

On By

## HISTOLOGY:

On 2/10/2017 By ANC

1. HEART; LUNG; SPLEEN; KIDNEY: In the lungs, air spaces often contain many neutrophil like granulocytes, fewer erythrocytes and small amounts of fibrin or proteinaceous fluid. Granulocytes occasionally surround and contains short, lightly basophilic rod shaped bacteria. Focally, granulocytes surround a piece of brown, refractile, foreign debris. In the kidney, there are few interstitial aggregates of small lymphocytes and small numbers of granulocytes in connective tissue surrounding the kidneys.

2. LIVER; GALL BLADDER; FAT BODY; OVARIES: The interstitium between ovarian follicles and the peripheral yolk of many larger vitellogenic follicles is infiltrated by many neutrophil like and eosinophilic granulocytes, macrophages and fewer multinucleated giant cells. Many macrophages have clear cytoplasmic vacuoles and/or or dark brown cytoplasmic pigment. In the liver, melanomacrophages



centers are numerous. Many hepatocytes contain one large, or several small, discrete, clear cytoplasmic vacuoles.

3. TONGUE; THYROID; STOMACH; INTESTINE: WNL.

4. HEAD, BRAIN, PITUITARY GLAND, EYES: WNL.

5. FEET: There are small amounts of excess keratin overlying some toes.

6. HIND LEG: WNL.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Lungs: Moderate, multifocal to coalescing, acute, granulocytic pneumonia with intralesional short bacilli
- 2) Ovary: Mild to moderate, multifocal, chronic, granulocytic and histiocytic oophoritis with follicular resorption
- 3) Kidney: Mild, multifocal, chronic, lymphocytic interstitial nephritis
- 4) Liver: Mild, diffuse, vacuolar change (lipid type)

**REMARKS:**

On 2/10/2017 By ANC

2/10/17: The cause of death is acute bacterial pneumonia. Ovarian inflammation is of unknown significance. Although some resorption of yolk material is occurring, the florid and mixed nature of the infiltrate are suggestive of more than follicular atresia/resorption alone. Renal and hepatic lesions are considered less clinically significant.

Cartoceti

PROSECTOR

CARTOCETI

PATHOLOGIST

2/10/2017

DATE COMPLETED

Printed on: 8/21/2017 9:29:13 AM

CARES MED v2.119

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2017-0009

Death Date: 1/14/2017

Necropsy Date: 1/14/2017

DASYPROCTA LEPORINA (no subsp)    Gender: Female  
Red rumped agouti    Age: 0Y 0M 0D  
Name:

Accession No.: 115449

Birth: 14 Jan 2017

Acquired:

Removed: 14 Jan 2017

SEX: Female

AGE: 0Y 0M 0D

WEIGHT: 170.1 gm

STAY: &lt;= 30 Days

MANNER OF DEATH:Died

INTERVAL:0 6 hours

TIME OF DEATH:10:00A

XRAYED:False

DEATH LOCATION:WHS

DISPOSITION:INCINERATE

SUBMITTOR:Jess Siegal Willott

PROSECTOR:Cartoceti

OWNER/ANIMAL DEPT:DOM    SMH

**HISTORY AND CLINICAL OBSERVATIONS:**

## KEEPER OBSERVATIONS:

On By

## CLINICIAN OBSERVATIONS:

On 1/14/2017 By JSW

Agouti "B" (no accession number yet)

One of two born 1/14/17 to dam 115185. Noted AM check, mostly laying on side and minimally responsive.

Vet visual confirmed observations. Discussed with curator (SS) elected to give female time to tend to pups and reassess in a couple of hours.

Later pup no longer responsive, no movements noted, cool to touch. Transported to hospital for triage/ER care.

Exam: weight 100g. Non responsive, no heartbeat, no respirations. Administered 3 rounds of CPR including chest compressions, one dose epinephrine into tongue, 2 doses intracardiac. No response. Spontaneous death.

Obtained post mortem RADs and submitted for necropsy.

## GROSS DESCRIPTION:

On 1/18/2017 By ANC

Received is a 170.1 gram, neonate, female, red rumped agouti (designated pup B) for necropsy on 14 January 2017 after being found dead shortly after birth. The carcass is in good postmortem condition and fair nutritional condition with moderately well fleshed muscles and small amounts of subcutaneous and intra abdominal adipose. The carcass has a crown to rump length of 16 cm, is fully furred and has eyelids that are still closed. Along the right and left sides of the muzzle and the ventral perineum and groin, there are multiple patches of reddened skin. The tip of the umbilicus is dark red purple and dry. The thoracic and abdominal cavities and pericardial sac contain abundant, thick, frank blood mixed with blood clots. The lungs are partially inflated (float in formalin), diffusely have prominent interlobular septa, and are reddened along the cranioventral margins of the right and left cranial lobes. Along the dorsal aspect of the right caudal lung lobe, there is a 0.5 cm diameter focus of reddened parenchyma. The liver is slightly friable and is mottled dark red to pale red. The right medial and lateral lobes are darker red than the left, and there are multiple, short, shallow, linear fissures in the capsule. The stomach contains a moderate amount of thin, mucoid, clear fluid. The small and large intestines contain dark green brown, pasty material (meconium). The leptomeninges is dark red over the right and left cerebellar hemispheres. The oral cavity, trachea, esophagus, heart, kidneys, adrenal glands, spleen, urinary bladder and reproductive tract are grossly unremarkable.

## GROSS DIAGNOSIS:

By ANC

Hemoabdomen, hemothorax and hemopericardium

Meningeal hemorrhage

Multifocal dermal erythema/excoriations

## LABORATORY STUDIES:

## TISSUE STATUS:

SHELVED: False

TRIMMED: True

FROZEN: False

ULTRAFROZEN: True

Tissues Ultrafrozen: Brain, lung, liver, spleen, kidney, jejunum and ileum

SPECIAL REQUESTS:

On By

HISTOLOGY:

On 2/16/2017 By ANC

1. LUNG; KIDNEY; ADRENALS; SPLEEN; PANCREAS; THYMUS; LYMPH NODE, RENAL: There is acute hemorrhage into the renal capsule. In the lungs, approximately 50% of alveoli are collapsed. At the margins of some lobes, there is acute hemorrhage into alveolar lumina and septa, subpleural spaces and around large blood vessels. There are scattered eosinophils in the thymus and lymph node cortices and medullas.
2. HEART; LIVER; GALL BLADDER: Throughout hepatic sinusoids, there are abundant erythroid precursors and fewer megakaryocytes and myeloid precursors. Hepatocytes have many small, clear, discrete, cytoplasmic vacuoles (presumptive microvesicular lipidosis).
3. TONGUE; THYROID; THYMUS; LYMPH NODE; TRACHEA; ESOPHAGUS; SCIATIC NERVE; SKELETAL MUSCLE; UMBILICUS; URINARY BLADDER: There is acute hemorrhage into the adventitia and surrounding soft tissue of the umbilical vessels. There are scattered eosinophils in the thymus and lymph node cortices and medullas.
4. STOMACH; PANCREAS; DUODENUM; JEJUNUM; ILEUM; CECUM; COLON, DESCENDING AND SPIRAL: WNL.
5. RECTUM; VAGINA; URETHRA; PERINEUM: There is acute hemorrhage into the subepithelial stroma of the perineum and superficial blood vessels are congested.
6. BRAIN, CEREBRUM, THALAMUS, MIDBRAIN: Multifocally, there are abundant free erythrocytes in the leptomeninges.
7. BRAIN, CEREBRUM, CEREBELLUM, BRAINSTEM: There are small amounts of free erythrocytes in the leptomeninges.

MORPHOLOGIC DIAGNOSIS:

- 1) Thoracic, abdominal and pericardial cavities: Moderate to severe, acute hemorrhage (gross diagnosis)
- 2) Thoracic, abdominal and pericardial cavities: Moderate to severe, acute hemorrhage (gross diagnosis)
- 3) Liver: Extramedullary hematopoiesis and microvesicular lipidosis

REMARKS:

On 2/16/2017 By ANC

2/14/17: Histology did not provide any additional information and hemorrhage remains the cause of death. In the absence of evidence supporting other etiologies of hemorrhage, perinatal trauma is still considered the most likely cause. Anticoagulant rodenticides were not detected in pooled samples of liver from this pup and a litter mate (N17 0010, 115448). Agoutis are not susceptible to dietary hypovitaminosis C (scurvy) and congenital coagulopathies are rare in rodents.

Cartoceti  
PROSECTOR

CARTOCETI  
PATHOLOGIST

2/16/2017  
DATE COMPLETED

Printed on: 8/21/2017 9:29:58 AM

CARES MED v2.119



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

**PATH # N2017-0010**

Death Date: 1/14/2017  
Necropsy Date: 1/14/2017

DASYPROCTA LEPORINA (no subsp)    Gender: Female  
Red rumped agouti    Age: 0Y 0M 0D  
Name:

Accession No.: 115448  
Birth: 14 Jan 2017  
Acquired:  
Removed: 14 Jan 2017

SEX: Female	AGE: 0Y 0M 0D	WEIGHT: 183.7 gm	STAY: <= 30 Days
MANNER OF DEATH: Died			INTERVAL: 0 6 hours
TIME OF DEATH: 12:40A			XRAYED: False
DEATH LOCATION: WHS			DISPOSITION: INCINERATE
SUBMITTOR: Jess Siegal Willott			PROSECTOR: Cartoceti
OWNER/ANIMAL DEPT: DOM    SMH			

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On By

**CLINICIAN OBSERVATIONS:**

On 1/14/2017 By JSW

Agouti "A" (no accession number yet)  
One of two born 1/14/17 to dam 115185. Noted AM check, mostly laying on side and minimally responsive.  
Vet visual confirmed observations. Discussed with curator (SS) elected to give female time to tend to pups and reassess in a couple of hours.

Later pup no longer responsive, no movements noted, cool to touch. Transported to hospital for triage/ER care.

Exam: weight 176g. Administered supportive care, warmth, with some improvement. Began hand feeding at ~11:30am animal consumed ~2mL formula. At ~12:40 noted to be agonal, with hemorrhage at rectum. Heartbeats and normal respirations ceased. Multiple rounds of CPR (chest compressions, intracardiac epinephrine and dopram) administered without success.

**GROSS DESCRIPTION:**

On 1/18/2017 By ANC

Received is a 183.7 gram, neonate, female, red rumped agouti (designated pup A) for necropsy on 14 January 2017 after dying under supportive care shortly after birth. The carcass is in good postmortem condition and fair nutritional condition with moderately well fleshed muscles and small amounts of subcutaneous and intra abdominal adipose. The carcass has a crown to rump length of 17 cm, is fully furred and has eyelids that are still closed. The fur around the mouth is crusted with dried milk. Along the right and left sides of the muzzle and groin, there are multiple patches of reddened skin. The anus is dark red purple and there is blood staining of the fur on the perineum and hindlegs. The subcutis along the left flank is wet, pale yellow and gelatinous (presumptive fluid administration). The thoracic cavity contains abundant (~1 2 mL), thin, watery, dark red blood and few blood clots. The lungs are partially inflated (float in formalin), diffusely have prominent interlobular septa, and are reddened along the cranioventral margins of the right and left cranial lobes. The abdominal cavity contains a small amount (0.5 mL) of thin, watery blood. The liver is slightly friable and is mottled dark red to pale red. The umbilical arteries and veins are segmentally discolored dark red purple (hemorrhage), proximal to their transition into the umbilicus. The distal most 0.5 cm of the rectal wall is discolored dark red purple. The stomach contains congealed milk. The small and large intestines contain small amounts of dark green brown, pasty material (meconium). The trachea, esophagus, heart, kidneys, adrenal glands, spleen, urinary bladder and reproductive tract are grossly unremarkable.

**GROSS DIAGNOSIS:**

By ANC

Hemoabdomen and hemothorax  
Intramural and intraluminal rectal hemorrhage  
Multifocal dermal erythema/excoriations

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED:	False
TRIMMED:	True
FROZEN:	False
ULTRAFROZEN:	True



Tissues Ultrafrozen: Brain, lung, liver, kidney

SPECIAL REQUESTS:

On By

HISTOLOGY:

On 2/16/2017 By ANC

1. LUNG; KIDNEY; ADRENALS; SPLEEN; PANCREAS: In the lungs, approximately 50 to 75% of alveoli are collapsed. At the margins of some lobes, there is acute hemorrhage into alveolar lumina and septa and subpleural spaces.
2. HEART; LIVER; GALL BLADDER: Throughout hepatic sinusoids, there are abundant erythroid precursors and fewer megakaryocytes and myeloid precursors. Hepatocytes have many small, clear, discrete, cytoplasmic vacuoles (presumptive microvesicular lipidosis).
3. TONGUE; THYROID; THYMUS; TRACHEA; ESOPHAGUS; UMBILICUS: There is acute hemorrhage into the adventitia and surrounding soft tissue of the umbilical vessels.
4. RECTUM; VAGINA; URETHRA; PERINEUM: There is acute hemorrhage into the rectal lumen and subepithelial stroma of the perineum, vagina and rectum.
5. STOMACH; PANCREAS; DUODENUM; JEJUNUM; ILEUM; CECUM; COLON, DESCENDING AND SPIRAL: WNL.
6. BRAIN, CEREBRUM, THALAMUS, MIDBRAIN: There are small amounts of free erythrocytes in the leptomeninges.
7. BRAIN, CEREBRUM, CEREBELLUM, BRAINSTEM: There are small amounts of free erythrocytes in the leptomeninges.

MORPHOLOGIC DIAGNOSIS:

- 1) Thoracic and abdominal cavities: Moderate to severe, acute hemorrhage (gross diagnosis)
- 2) Lungs, leptomeninges, umbilicus, vagina, rectum, perineum: Mild to moderate, multifocal, acute hemorrhage
- 3) Liver: Extramedullary hematopoiesis and microvesicular lipidosis

REMARKS:

On 2/16/2017 By ANC

2/14/17: Histology did not provide any additional information and hemorrhage remains the cause of death. In the absence of evidence supporting other etiologies of hemorrhage, perinatal trauma is still considered the most likely cause. Anticoagulant rodenticides were not detected in pooled samples of liver from this pup and a litter mate (N17 0009, 115449). Agoutis are not susceptible to dietary hypovitaminosis C (scurvy) and congenital coagulopathies are rare in rodents.

Cartoceti

CARTOCETI

2/16/2017

PROSECTOR

PATHOLOGIST

DATE COMPLETED

Printed on: 8/21/2017 9:30:59 AM

CARES MED v2.119

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2017-0011

Death Date: 1/17/2017  
Necropsy Date: 1/17/2017

ATHENE CUNICULARIA HYPUGAEA  
Western burrowing owl  
Name:

Gender: Female  
Age: 11Y 9M 4D

Accession No.: 216354  
Birth: 13 Apr 2005  
Acquired: 25 Feb 2015  
Removed: 17 Jan 2017

SEX: Female

AGE: 11Y 9M 4D

WEIGHT: 157.2 gm

STAY: &gt; 30 Days

MANNER OF DEATH: Euthanasia

INTERVAL: 0 6 hours

TIME OF DEATH: 11:55

XRAYED: False

DEATH LOCATION: vet hosp

DISPOSITION: INCINERATE

SUBMITTOR: JCS

PROSECTOR: T. Walsh

OWNER/ANIMAL DEPT: DOO

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On By

**CLINICIAN OBSERVATIONS:**

On 1/17/2017 By JCS

Physical exam on 1/16/17 showed lethargy, tachypnea, multi focal areas of severe subcutaneous hemorrhage, 2/9 BCS, and suspected intracoelomic mass associated with the liver. Due to concerns for quality of life euthanasia performed via intravenous injection of euthasol and potassium chloride mixed 1:1. Suspect severe coagulopathy due to liver failure from hepatic neoplasia.

**GROSS DESCRIPTION:**

On 1/17/2017 By TFW

A 157.2 gram, 11 yr old female Burrowing Owl is necropsied following euthanasia 17 Jan 2017. The left leg has a metal band "WAP 8 33". No transponder is detected. The carcass is in excellent postmortem condition. The plumage is in good condition. There is significant pectoral muscle loss with a very prominent keel but with adequate subcutaneous and visceral adipose tissue stores. There is extensive subcutaneous and perivascular hemorrhage along the left side of the neck merging with a discrete thinly encapsulated 2.5 x 1.5 cm red black mass in the right thoracic inlet. This fluctuant mass exudes red brown flocculent fluid with larger red brown black aggregates of material (presumptive organizing hematoma). The left thyroid is mildly enlarged and mottled yellow brown and red black. The right thyroid is not seen (likely obscured by previously mentioned mass). The celomic wall is firmly adhered to the underlying celomic adipose tissue, liver, and intestines. A small amount of clear yellow tinged fluid is in the caudal celom. The liver has a multinodular contour with rounded margins and is adhered to the ventriculus, pericardium, and thoracic airsacs. The airsacs and serosal membranes are opaque. A discrete 2-3 mm light yellow nodule is in the crevice between the left pericardium and liver. Bilaterally thoracic airsacs are distended with offwhite opaque fluid. The lungs are mildly congested and exude blood tinged fluid when removed. The heart is subjectively, moderately enlarged. Atrioventricular valves are grossly normal. A 1 cm diameter spherical, off white to light pink, firm but fluctuant mass obscures and depresses the left cranial kidney lobe. The right cranial lobe is disrupted by an approximately 1 cm diameter tan mass occupying 2/3 the cranial kidney lobe. Numerous hard tan flecks are throughout the mass but concentrated in the center. Numerous, small, tan to yellow foci are scattered throughout the rest of the kidney. The oviduct is small (<2 mm width) and the ovary inconspicuous. The ventriculus contains a scant amount of grit and is stained green (bile). The mid pancreas has a less than 1 mm slightly grey pink focus. The distal colon contains black contents as seen through the wall (not opened). The left stifle has subjectively thickened joint capsule and reduced synovial fluid. Right stifle is grossly normal. The eyes, brain, esophagus, proventriculus, small intestines, and ceca are grossly normal.

**GROSS DIAGNOSIS:**

By TFW

1. Severe hydrothorax (air sacs), opaque fluid
2. Multifocal, subacute to chronic celomitis, airsacculitis, and serositis
3. Mild to severe, multifocal, fibrosing nephritis (presumptive) with renal gout
4. Severe acute perivascular hemorrhage (left jugular)
5. Focal moderate organizing hematoma (presumptive) right thoracic inlet
6. Focal, moderate, ovarian cyst (presumptive) with renal compression
7. Focal airsac/ celomic granuloma (adjacent to left cranial liver)
8. Moderate diffuse hepatopathy
9. Moderate cardiomegaly (presumptive)
10. Moderate pectoral muscle atrophy

**LABORATORY STUDIES:**

CULTURE:           Left celom  
                      Right thoracic air sac cloudy fluid

**TISSUE STATUS:**

False

SHELVED:

TRIMMED: False  
FROZEN: False  
ULTRAFROZEN: True

Tissues Ultrafrozen: liver x2, kidney including mass, lung, duodenum

SPECIAL REQUESTS:

On By

HISTOLOGY:

On 2/22/2017 By TFW

Slide 1. BRAIN (Cerebrum, rostral Cerebrum, Optic Lobes, midbrain, caudal Cerebellum): In the three cross sections there are scattered discrete clear vacuoles. Occasionally these vacuoles have peripheral condensed nuclei suggestive of intracytoplasmic location while others distend small capillaries. There are rare multifocal hemorrhages (cerebellum, and white matter of optic lobe) with mild disruption of neuropil. Rare aggregates of pyknotic erythrocytes and/or platelets are in areas of hemorrhage.

Slide 2. BRAIN (Cerebrum, Midbrain, Cerebellum). As above with scattered vacuoles and rare hemorrhages.

Slide 3. BRAIN (Brainstem, Cerebellum),. As above. There is a small aggregate of vacuoles in the cerebellum and scattered vacuoles in the brainstem some of which are surrounded by either macrophages or glial cells. LUNG: Numerous vessels contain dense rafts of medium to large round to ovoid cells (neoplasia). These cells have moderate amounts of amphophilic to faintly eosinophilic cytoplasm occasionally displacing nuclei to one side. The large nuclei are predominantly ovoid, reniform, or molded by adjacent cells. The chromatin is vesicular to coarsely clumped often with numerous small nucleoli. Airways frequently contain fibrillar proteinaceous material occasionally mixed with foamy macrophages, rare heterophils, and erythrocytes. Numerous discrete clusters of histiocytes with birefringent and pigmented material are along the larger airways (pneumoconiosis). Small fragments of metaplastic bone are scattered throughout.

Slide 4. LUNG: In addition to the changes noted above one section of lung continuous with adipose tissue and skeletal muscle has a regional proliferation of spindle cells greatly elevating the air sac. The lining of this section varies from single cuboidal to crowded multilayered cells blending into the underlying spindle cells. An additional lung section has a densely cellular papillary proliferation within a superficial airway and continuous with respiratory epithelium. Moderate numbers of heterophils are disbursed throughout this tissue. ARTERY. The aorta has loss of the uniform myofibers and stromal fibers in the tunica media and replacement by finely granular mineral and fibrillar stroma. LIVER: A segment of the capsule has fibroblastic proliferation thickening the capsule and merging with a large attached lobule of foamy macrophages and adipose tissue which also attached to a subtly layered aggregate of protein, macrophages, spindle cells, and rare vessels (organizing celomic coagulum). Many portal regions contain prominent aggregates of granulocytes (extramedullary hematopoiesis). Scattered portal areas have mild increases in collagen and multiple bile ducts. There are scattered aggregates of pigmented macrophages and numerous individual pigmented macrophages along the sinusoids. Hepatocytes occasionally contain fine green brown granules especially along the canaliculi. SPLEEN: There are moderate populations of granulocytes (extramedullary hematopoiesis) and small to moderate amounts of brown pigment (hemosiderin). Occasional vessels have fibrillar to globular mural mineralization and pigment.

Slide 5. SPLEEN: as above PANCREAS: Islet cells are prominent and numerous. There are mild multifocal lymphoid aggregates. LIVER: as above with prominent fibroplasia thickening the capsule. The capsular surface has a mildly undulating to rounded silhouette. There are rare areas with vacuolated hepatocytes. GALL BLADDER: nsl.

Slide 6. KIDNEY, OVARY, ADRENAL: In a section through the cranial lobes of both kidneys including the intervening adrenal and ovary, one kidney is almost completely replaced by an encapsulated, expansile mass of renal tubules. The tubules and acini are either back to back or have intervening populations of granulocytic hematopoiesis. Many large aggregates of multinucleate giant cells surrounding acicular clefts (classic gout tophi) obscure or fill the tubular lumina. The single layer of tubular epithelium varies from uniform cuboidal cells to giant polygonal cells with abundant pink cytoplasm. The nuclei similarly vary from small and round with dense chromatin to giant ovoid and vesicular with one or more prominent nucleoli. No mitotic figures are found in ten 400x fields. A small nonencapsulated mass of this tissue with gout tophi is just exterior to the thick capsule. An additional small dense nodule of tubules lacking the gout is on the opposite side of the main mass. The compressed renal tissue peripheral to these masses has moderate cystic distension of tubules containing proteinaceous material or lightly basophilic material. Scattered glomeruli have dilated Bowman's capsules and compressed/atrophied glomeruli. There are mild populations of interstitial hematopoietic cells. Section of the opposite kidney has scattered cystic tubules and glomeruli but lacks any expansile nodules. There are very rare gout tophi in this section compared to within the tubular mass. The intervening adrenals have multifocal disruption of the normal alternating cords with both proliferation of areas of cortical type cells and alternatively more basophilic medullary type. In this latter area there is moderate variation in nuclear size and shape. Within the adjacent adipose tissue is a sheet of infiltrative neoplastic cells (as in vessels of the lung). The small section of ovary lacks significant follicular development. LIVER: as above.

Slide 7. KIDNEY: Slides 7 and 8 contain sections through the cranial kidney and associated masses.

Between the two kidneys is a large, encapsulated, densely cellular mass abutting and compressing the renal tubular mass with gout (as described above). This second mass is composed of a solid sheet of round cells or shapes molded by adjacent crowded cells. In some areas there is subtle "packetting" of small groups of the cells. There is minimal to no discernible supporting stroma. The cells have small to moderate amounts of amphophilic to lightly eosinophilic cytoplasm. Nuclei are predominantly ovoid but also molded by adjacent cells. Chromatin pattern is open with occasional dense granules or multiple small nucleoli. Mitotic rate is up to 10 figures per 400x field. A sheet of these cells is also infiltrating the adjacent fat. The kidney, compressed by the two masses, has mild to severe multifocal cystic tubules.

Slide 8. Kidney and masses as above: A few rafts of the densely cellular neoplasm is within the vessels/lymphatic of the kidney.

Slide 9. OVIDUCT, URETER: Lymphatics contain neoplastic cells and one segment of the oviduct is severely infiltrated by neoplastic cells obscuring most of the mural structure. DUODENUM, PANCREAS: The pancreas has multifocal mild areas of ductular proliferation and rare ductules distended with secretion. Villi in the duodenum are congested. KIDNEY: As above.

Slide 10. SMALL INTESTINE, COLON, PANCREAS: 18 sections of intestine. As is along all celomic surfaces there are areas of fibroplasia, epithelial proliferation, and occasionally macrophage and heterophil infiltrates. Many of the mural and mesenteric lymphatics contain neoplastic cells.

Slide 11. CLOACA, VENT, OVIDUCT, SKIN: Intravascular neoplasia otherwise No significant lesions (nsl). ILEOCOLIC JUNCTION: nsl.

Slide 12. PROVENTRICULUS, VENTRICULUS, ESOPHAGUS: nsl.

Slide 13 and 14. THYROID: One thyroid is severely enlarged with numerous small to giant cysts. The cysts are variably filled with lightly eosinophilic colloid or large amounts of hemorrhage. Those with hemorrhage frequently also contain abundant macrophages, multinucleate giant cells, and heterophils. Many of the macrophages contain yellow to brown pigment (hemosiderin formation). Most of small cysts are lined by a uniform cuboidal epithelium. Rarely the cyst lining is crowded, multilayered or papillary. A trabeculae of THYMUS is incorporated into the capsule along one segment. The other thyroid is typically small but also with multifocal cysts, inspissated colloid and infiltrates of foamy macrophages, hemosiderin, and rare interstitial granulocytic hematopoiesis.

Slide 15. HEART: Rare myocytes contain discrete darkly eosinophilic homogeneous material displacing normal striated sarcoplasm. Many nuclei throughout the sections are giant and vesicular (karyomegaly). Interstitial cells are often prominent. The epicardium is thickened with numerous fused areas to the pericardium. Epicardial and pericardial tissues have increased cellularity with prominent fibroblasts, mesothelial cells, and mild to moderate multifocal infiltrates of macrophages, heterophils and rare lymphocytes.

Slide 16. SKELETAL MUSCLE: One of two pieces (presumptive pectoral) has diffusely prominent interstitial cells, one area of myocyte degeneration with histiocytic infiltrate and one site of lymphohistiocytic infiltrate. Myocytes are subjectively reduced in size. An additional section (leg muscle) is grossly normal. TRACHEA, ESOPHAGUS, VESSELS, THYMUS: Sections from the neck have extensive acute hemorrhage surrounding structures in the neck. Rarely there are mild infiltrates of macrophages occasionally with erythrophagocytosis. TONGUE, CHOANAE: Muscle within the center of the tongue contain a sarcocyst. There is a prominent lymphoid population associated with mucosal surfaces (likely mucosal associated lymphoid tissue). AIR SAC GRANULOMA: The grossly noted structure is an encapsulated mass of degenerate adipocytes and foamy macrophages and not an inflammatory granuloma.

Slide 17 and 18. HEART, ATRIA, GREAT VESSELS, BRONCHI, AIR SACS: As in all sections of the air sacs / celomic serosa there are areas of fibroplasia and inflammation. Many of the larger veins have moderate euthanasia artifact. There is multifocal mineralization of vessels and heart valves

#### MORPHOLOGIC DIAGNOSIS:

- 1) Neoplasia, malignant "round cell" tumor: kidney, lung, oviduct, vessels, celomic serosa
- 2) Neoplasia, renal tubular adenoma with myeloid hematopoiesis and severe urate tophi
- 3) Neoplasia, cystadenoma, thyroid with chronic intracyst hemorrhage
- 4) Celomitis / air sacculitis chronic, with multifocal, severe spindle cell proliferation and mesothelial hyperplasia
- 5) Ascites / hydrothorax, severe chronic
- 6) Kidney, renal tubular cysts, multifocal, mild to severe with glomerular atrophy
- 7) Heart: cardiomyopathy, with multifocal cytoplasmic inclusions with multifocal severe karyomegaly
- 8) Heart: mild to moderate, chronic epicarditis and pericarditis with multifocal adhesions
- 9) Pneumoconiosis, multifocal, moderate
- 10) Arteriosclerosis, multifocal, mild to moderate
- 11) Adrenal: multifocal, mild adrenocortical and medullary hyperplasia (presumptive)
- 12) Hemosiderosis mild, liver, spleen, thyroid
- 13) Skeletal muscle: degeneration and atrophy, multifocal moderate (presumptive pectoral muscle)
- 14) Pancreas: mild, multifocal, ductular proliferation and interstitial fibrosis
- 15) Brain: multifocal, mild vacuolation and multifocal mild hemorrhage
- 16) Parasitism, tongue, sarcocystis sp focal
- 17) Hemorrhage, perivascular (jugular), acute to subacute, moderate to severe
- 18) Extramedullary hematopoiesis: spleen, kidney, liver, thyroid



## REMARKS:

On 2/22/2017 By TFW

The cell of origin for the large malignant neoplasia is not clear. Grossly this mass appeared well encapsulated and was thought to represent an ovarian cyst due to location and fluctuant nature. Primary differential diagnoses include neuroendocrine carcinoma, poorly differentiated carcinoma (such as solid renal cell carcinoma), mesothelioma, or other round cell tumor such as histiocytic or hematopoietic origins. Additional diagnostics including immunohistochemistry will be pursued in an attempt identify a likely tissue of origin for the malignant neoplasia though these may prove unhelpful as many of the assays are not optimized or proven to work in exotic birds. It is uncommon to have two different neoplasms together as in the kidney. Renal tumors in birds are most common in budgies. In this renal tubular tumor, the extensive urate / gout tophi within the neoplasm but not in the kidney is striking. The severe ascites may have resulted from multiple factors including compression by the masses, vascular / lymphatic obstruction with metastasis, cardiac compromise, and progressive serositis. It is possible that some of the proliferative areas along the celomic surfaces may also represent progression to mesothelioma if not directly related to the primary malignant tumor. While the celomic inflammation and tissue reactions could be attributed to longstanding ascites, a subclinical or prior infection /air sacculitis cannot be completely excluded. Aerobic culture of the fluid did not result in any growth. The thyroid tumor at the right thoracic inlet has significant amounts of hemorrhage within many of individual cystic follicles often associated with chronic reactive inflammation, erythrocyte breakdown and hemosiderin formation all contributing to the dark hemorrhagic appearance grossly. The location of this mass speculatively may also have caused compression on significant anatomic structures. Pneumoconiosis (inhaled particulate matter) is prominent in this individual but not unexpected for older individuals from dusty environments. Other changes noted are generally considered incidental or secondary to other chronic lesions and often more common in aged individuals.

T. Walsh

PROSECTOR

T. Walsh

PATHOLOGIST

2/22/2017

DATE COMPLETED

Printed on: 8/21/2017 9:31:38 AM

CARES MED v2.119

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2017-0019

Death Date: 1/31/2017

Necropsy Date: 1/31/2017

DENDROBATES TINCTORIUS

Gender: Unknown Sex

Accession No.: 306308

Dyeing poison frog

Age:

Birth:

Name:

Acquired: 20 Oct 1992

01 Jul 2016

SEX: Unknown Sex

AGE: ADULT

WEIGHT: 5.4 gm

STAY:

MANNER OF DEATH: Found Dead

INTERVAL: 0 6 hours

TIME OF DEATH: 09:00A

XRAYED: False

DEATH LOCATION: BioLab Holding 8

DISPOSITION: FORMALIN

SUBMITTOR: Donna Stockton

PROSECTOR: Cartoceti

OWNER/ANIMAL DEPT: DOA

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 1/31/2017 By DS

Found dead in tank this morning.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 1/31/2017 By ANC

Received is a 5.4 gram, adult, female Powder blue poison dart frog for necropsy on 31 January 2016 following being found dead. The carcass is in good postmortem condition and fair nutritional condition with prominent bony prominences and small fat bodies. The eyes are sunken and the corneas are slightly cloudy. Small amounts of thin, light brown skin slough from the feet and ventrum. The coelomic organs are wet and the pericardial sac is translucent white and slightly distended. The gall bladder is distended (6 mm diameter) and filled with clear, green brown bile. The oral cavity, lungs, heart, liver, gastrointestinal tract, kidneys, ovaries and fat bodies are grossly unremarkable.

**GROSS DIAGNOSIS:**

By ANC

Gall bladder distension

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False

TRIMMED: True

FROZEN: False

ULTRAFROZEN: True

Tissues Ultrafrozen: Liver, hindfoot, bile

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 4/7/2017 By ANC

1. HEART; LUNG; SPLEEN; KIDNEY, OVARY; OVIDUCT; FAT BODY: Portions of some organs are autolyzed, characterized by diffuse eosinophilia/loss of differential staining. In the kidney, there is marked variation in tubule diameter. Some tubules are dilated and filled with proteinaceous fluid while others are shrunken and surrounded by excess fibrous connective tissue. Tubular epithelium is occasionally piled and cells are cytomegalic with an enlarged and bizarre nucleus. Some glomeruli are shrunken with sclerotic mesangium.

2. LIVER; PANCREAS; TRACHEA; ESOPHAGUS; STOMACH; INTESTINE: In the liver, melanomacrophages are markedly enlarged, coalescing and comprise ~90% of the parenchyma. In some areas, there is increased density of bile ductules. In the lumen of the intestine, there is a ~100 um diameter nematode worms with lateral alae.

3. HEAD; TONGUE: In the lumen of one naris, there is granular eosinophilic debris mixed with bacteria and viable and ghosts of epithelial cells. GMS: The desired piece of cranium is no longer in section.

4. BODY WALL: WNL.

5. HINDLEG; FEET: WNL.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Liver: Severe, diffuse melanomacrophage hyperplasia with hepatocellular atrophy
- 2) Kidney: Mild to moderate, multifocal tubular proteinosis, atrophy and regeneration with peritubular fibrosis and glomerular sclerosis
- 3) Kidney: Mild to moderate, multifocal tubular proteinosis, atrophy and regeneration with peritubular fibrosis and glomerular sclerosis

**REMARKS:**

On 4/7/2017 By ANC

4/7/17: Postmortem autolysis precludes a more detailed histologic evaluation of some organs (gastrointestinal tract, kidney, lung). Renal changes are suggestive of a protein losing nephropathy which may be the cause of the grossly observed pericardial effusion. Melanomacrophage hyperplasia in the liver is a non specific change that can be caused by seasonal variation, chronic antigenic stimulation and emaciation. There is no evidence of cholestasis or cholangitis in the liver and, as such, gall bladder distension is considered physiologic rather than pathologic.

Cartoceti

PROSECTOR

Cartoceti

PATHOLOGIST

4/7/2017

DATE COMPLETED

Printed on: 8/21/2017 9:32:19 AM

CARES MED v2.119



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2017-0020

Death Date: 1/31/2017

Necropsy Date: 2/1/2017

TRAGULUS NAPU (no subsp)  
Greater Malayan chevrotain  
Name: Brandon

Gender: Male  
Age: 4Y 0M 2D  
Chip: 012\*360\*629

Accession No.: 115129  
Birth: 29 Jan 2013  
Acquired: 16 Oct 2014  
Removed: 31 Jan 2017

On loan from NEW YORK ZOOLOGICAL PARK, BRONX

SEX: Male

AGE: 4Y 0M 2D

WEIGHT: 2.61 kg

STAY: &gt; 30 Days

MANNER OF DEATH: Found Dead

INTERVAL: 6 24 hours

TIME OF DEATH: 21:30

XRAYED: False

DEATH LOCATION: WHS

DISPOSITION: INCINERATE

SUBMITTOR: KLH

PROSECTOR: Cartoceti

OWNER/ANIMAL DEPT: DOM SMH

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On By

**CLINICIAN OBSERVATIONS:**

On 2/2/2017 By KLH

1/20: presented with mild chemosis and purulent discharge along ventral right eyelid. Treated with topical solutions, meloxicam, and long acting ceftiofur.

1/25: examined for large abscess below right eye, and severe conjunctivitis, corneal edema and corneal ulcerations. abscess was flushed, eye was treated with subconjunctival antibiotics, and was able to place a tarsorrhaphy on 1/26 in effort to preserve eye. Radiographs and investigation of abscess did not clearly indicate dental disease as primary cause. Oral exam was WNL. Injectable antibiotics, antiinflammatories given. Oral antibiotics (doxycycline, enrofloxacin) and analgesics were attempted for 2 days with poor compliance. Appetite decreased and stool became soft. As of 1/29, animal stopped passing stool and although he was still interested in eating he was dropping lots of food in water bowl. Fluids and injectable analgesics were given

1/31: Exam under anesthesia animal was noted to be hunched when walking prior to procedure. At exam, eye still edematous, but improving, and chemosis nearly resolved. Oral exam revealed the last molar in each upper arcade was loose and removed. Radiographs showed full rumen, and moderate amount of gas in intestines. Animal received fluids, antibiotics, metoclopramide, and was tubed with conspecific fecal slurry.

Blood work showed increased white cell count (25,000), hypoglycemia (17), increased BUN (72) and increased CK (3000). Recovery was prolonged and poor animal reanesthetized to administer additional fluids, dextrose, antibiotics, steroids, oral peptobismol. Placed an IO catheter in left tibia and set up on IO LRS+2.5% dextrose drip. PM blood work showed worsening renal values, severe increase in CK (23,000). At last check at 5:30PM, animal was eating some and seemed more appropriate, though still lying down. At 9PM animal found deceased.

**GROSS DESCRIPTION:**

On 2/2/2017 By ANC

Received is a 2.61 kilogram, adult, male Greater Malayan chevrotain (Avid Transponder 012360629) for necropsy on 1 February 2016 after being found dead following recovery from an anesthetic procedure. Also submitted are the left and right maxillary teeth in formalin. The carcass is in good postmortem condition and fair nutritional state with well fleshed musculature but minimal subcutaneous or intra abdominal adipose stores. There is an intravenous catheter in the left cephalic vein and an intraosseous catheter in the left tibia. There are patches of shaved skin on the left antebrachium, left hip, left stifle, right periocular skin, right ventral neck and right ventral abdomen. Bilaterally, the hind hooves are slightly overgrown, curling dorsally. The hoof wall of the right and left medial hind digits are irregularly eroded/worn.

The cranial third of the right cranial lung lobe is dark red and slightly rubbery (~5 to 10% of total lung volume). The lumen of the trachea contains scant fibrous green ingesta and the tracheal mucosa is diffusely mildly hyperemic with injected vessels. Few strands of fibrin are loosely attached to the cranial surface of the right and left ventricular epicardium.

The oral cavity and esophagus are filled with large amounts of moderately coarse, fibrous, green material (ingesta). The last maxillary molar is absent on the right and left and the adjacent gingiva is mildly reddened and swollen. The molars and premolars have even wear and a small amount of dental calculus. The rumen and reticulum contain abundant, moderately coarse, dark to pale green, fibrous ingesta. The abomasum contains a moderate amount of pale tan, fine, fibrous ingesta mixed with mucus. The fundic mucosa has dozens of 1-2 mm diameter, dark red discolorations. The small intestine is multifocally dilated and filled with small amounts of pasty to watery, thin, dark brown fluid. The cecum is filled with abundant, thick, pasty green feces. The colon contains scant soft, pale green, unformed feces. The urinary bladder is filled with ~50 mL of clear, dark yellow urine.



The right eyelids are sutured closed and there is a 2 mm diameter puncture wound in the skin of the lower lid (lanced abscess site). The palpebral and bulbar conjunctiva of the right eye is slightly wet and swollen. A small amount of friable pale tan to red material lines the inner and outer aspects of the ventral portion of the bony orbit. The adjacent masseter muscle is slightly reddened. The cornea is diffusely cloudy. In the subcutis along the bridge of the nose, there is a ~5 x 3 cm area of acute hemorrhage. The right and left dorsal nasal turbinates are discolored brown (presumptive regurgitation).

The remaining organs are grossly unremarkable.

**GROSS DIAGNOSIS:**

By ANC

Eye (right): Moderate, diffuse corneal edema with conjunctivitis and periocular cellulitis  
Lung (right cranial): Mild, acute, cranioventral pneumonia (presumptive aspiration)  
Trachea: Diffuse mucosal hyperemia with intraluminal feed material (presumptive aspiration)  
Abomasum: Mild, multifocal, acute, mucosal petechial hemorrhage  
Pericardial sac: Mild acute fibrin exudation  
Subcutis (dorsorostral skull): Mild to moderate, focal, acute hemorrhage  
Fair body condition with minimal adipose stores

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED:	False
TRIMMED:	True
FROZEN:	False
ULTRAFROZEN:	True

Tissues Ultrafrozen: Lung, liver, kidney, small intestine, colon

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 3/9/2017 By ANC

1. BRAIN, CEREBRUM, BRAINSTEM; PITUITARY GLAND: There are multiple small mineral concretions in the pars distalis.
2. BRAIN, CEREBRUM, THALAMUS: WNL.
3. BRAIN, HIPPOCAMPAL, MIDBRAIN: WNL.
4. BRAIN, MIDBRAIN: WNL.
5. BRAIN, CEREBELLUM, BRAINSTEM: WNL.
6. LUNG, RIGHT CRANIAL, ACCESSORY: Many bronchi and bronchioles are filled with neutrophils, fewer macrophage, erythrocytes, mixed bacteria, keratinized squamous epithelium and foreign plant material. Surrounding alveoli are flooded with neutrophils, macrophages and proteinaceous fluid. Respiratory epithelium in affected airways is multifocally denuded. Alveolar septal capillaries are congested and interlobular septa have increased clear space (interlobular edema).
7. LUNG, RIGHT CAUDAL, LEFT CRANIAL, LEFT CAUDAL: Small amounts of foreign plant material are present in airways accompanied by inflammation as previously described.
8. KIDNEY; ADRENAL GLANDS: The mesangium of many glomerular tufts is segmentally expanded by homogeneous pale eosinophilic material. Rare glomerular tufts are shrunken and sclerotic and few tubules are dilated and filled with protein casts.
9. LIVER; GALLBLADDER; SPLEEN: In the liver, many hepatocytes have small amounts of pale brown cytoplasmic pigment. Few lymphocytes infiltrate portal tracts.
10. HEART: Epicardial adipocytes are atrophic.
11. RUMEN; RETICULUM: The lamina propria contains small mineral concretions and few scattered lymphocytes.
12. ABOMASUM; DUODENUM; PANCREAS: WNL.
13. JEJUNUM; ILEUM: WNL.
14. CECUM; SPIRAL COLON: WNL.
15. URINARY BLADDER; ACCESSORY SEX GLANDS; URETHRA; TESTIS: There is active spermatogenesis and mature spermatis in the epididymis.
- 16 A. EYELIDS, RIGHT: The palpebral conjunctival epithelium is broadly ulcerated and the underlying stroma is thickened due to deposition of granulation tissue. Granulation tissue is infiltrated by large numbers of neutrophils and fewer macrophages, lymphocytes and plasma cells and has widespread hemorrhage. The exposed stroma is overlain by necrotic cell debris, viable and degenerate neutrophils, streaming nuclear debris and mixed bacteria. The surrounding palpebral conjunctiva is infiltrated by neutrophils. Blood vessels are often cuffed by many lymphocytes and plasma cells. The epidermis of the palpebra is multifocally necrotic and infiltrated by neutrophils.
- 16 B. TONGUE; TRACHEA; ESOPHAGUS; THYROID: The tracheal mucosa is variably absent, edematous or infiltrated by few neutrophils. The lumen contains neutrophils, mucus, cellular debris and foreign plant material.
17. EYE, RIGHT: The superficial corneal stroma lacks artifactual clefting and is infiltrated by

neutrophils, fewer macrophages, karyorrhectic debris and spindloid to stellate cells. Peripherally, the corneal stroma contains small caliber blood vessels. Segmentally, the corneal epithelium is attenuated or absent. The adjacent conjunctiva is multifocally infiltrated by neutrophils. Blood vessels in the iris leaflets are occasionally surrounded by few plasma cells.

18. EYE, LEFT: WNL.

19. MAXILLARY MOLAR TOOTH, LEFT (EXTRACTED): There is only a small section of dense fibrous connective tissue and gingival epithelium.

20. MAXILLARY MOLAR TOOTH, RIGHT (EXTRACTED): WNL.

21. NASAL TURBINATES: WNL.

22. RIGHT MAXILLARY MOLAR: Dorsal, medial and lateral to the maxillary alveolar bone, large numbers of macrophage, lymphocytes, plasma cells and fewer neutrophils infiltrate edematous and hemorrhagic fibrous connective tissue and skeletal muscle. Dorsal to this, there is a layer of inflamed granulation tissue as described in the periocular tissues. Focally, there is a dense aggregate of epithelioid macrophages and intact and degenerate neutrophils surrounded by lymphocytes and plasma cells within the medullary cavity of the maxillary bone and abut the dentin of a tooth. The cortical alveolar bone adjacent to inflamed regions often has resorption or periosteal new bone formation. There is hemorrhage surrounding large blood vessels adjacent to the periodontal ligament.

23. RIGHT MAXILLARY MOLAR: There is similar but less intense inflammation as previously described within the soft tissues surrounding the alveolar bone

24. RIGHT MAXILLARY MOLAR: An empty alveolus (tooth extraction site) is filled with fragments of necrotic bone and gingival, hemorrhage, foreign plant debris, bacteria and mixed inflammatory cells (predominantly neutrophils). The adjacent periodontal ligament, alveolar bone and surrounding soft tissues are inflamed as previously described. There is marked new periosteal bone formation on the adjacent maxillary bone and gingival hyperplasia.

#### MORPHOLOGIC DIAGNOSIS:

1) Maxilla, right: Moderate, focally extensive, chronic, pyogranulomatous osteomyelitis, cellulitis and myositis with bone remodelling and granulation

2) Palpebra, lower right: Moderate, chronic, suppurative conjunctivitis and cellulitis with ulceration, granulation tissue and abscessation

3) Eye, right: Moderate, chronic, diffuse keratitis with erosion and ulceration

4) Eye, right: Mild, chronic, plasmacytic anterior uveitis

5) Lung: Moderate, multifocal, acute, suppurative bronchopneumonia with intraluminal plant material (aspiration pneumonia)

6) Trachea: Mild, acute, suppurative tracheitis with intraluminal plant material (aspiration)

7) Kidney: Mild, multifocal tubular proteinosis

8) Kidney: Mild, focal, segmental mesangial glomerulopathy

#### REMARKS:

On 3/9/2017 By ANC

3/9/17: Examination of the right maxilla revealed marked chronic inflammation that involved the tooth root and surrounding alveolar bone. Based on the chronicity of this lesion and the associated bone remodelling, an ascending tooth root infection is likely to have preceded and subsequently caused the periocular abscessation. Histology confirmed aspiration of feed material as the cause of pneumonia. Based on the acute nature of inflammation in the lungs, aspiration likely occurred closer to the second, more recent anesthetic event. Death is attributed to a combination of maxillary and periocular infection and aspiration pneumonia. The results of blood and lung culture are suggestive of sepsis; however, there is little histologic evidence (multisystemic hemorrhage, thrombosis, necrosis) to support this.

Cartoceti

PROSECTOR

CARTOCETI

PATHOLOGIST

3/9/2017

DATE COMPLETED

Printed on: 8/21/2017 9:33:02 AM

CARES MED v2.119

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # N2017-0021

Death Date: 2/1/2017  
Necropsy Date: 2/1/2017

PHOCA VITULINA (no subsp)  
Harbor seal  
Name: Squeegee

Gender: Male  
Age: 31Y 11M 0D

Accession No.: 114859  
Birth: 01 Mar 1985  
Acquired: 16 Oct 2012  
Removed: 01 Feb 2017

SEX: Male

AGE: 31Y 11M 0D

WEIGHT: 119.545 kg

STAY: &gt; 30 Days

MANNER OF DEATH: Died

INTERVAL: 0 6 hours

TIME OF DEATH: 03:15P

XRAYED: False

DEATH LOCATION: American Trail

DISPOSITION: INCINERATE

SUBMITTOR: KLH

PROSECTOR: Cartoceti

OWNER/ANIMAL DEPT: DOM    Beaver Valley

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On By

**CLINICIAN OBSERVATIONS:**

On 2/1/2017 By KLH

Geriatric seal with 1 month history of hematuria, 1 year history of nail bed infections on front flippers, and chronic ocular disease (controlled glaucoma).  
Anesthesia today for diagnostic work up. Animal was stable throughout anesthesia, but had prolonged recovery that was progressing (increased tone and mild responsiveness), but after about 45 minutes animal became bradycardic. Atropine and additional reversals administered and animal responded appropriately. Blood gas values at that point indicated respiratory acidosis. Continued positive pressure ventilation with continuous breaths, and heat and additional fluids administered as well. Acupuncture, dopram, and additional reversals given, and after about 4 hours animal woke fairly quickly and displayed rhythmic excitatory side to side movements for a few minutes. Then calmed down and was breathing intermittently on his own, but did not regain vision and continued to have less frantic side to side movements. After another few minutes, he relaxed and was observed to be breathing for about 5 minutes, at which point he took a few shorter breaths and then appeared to arrest. Cardiopulmonary resuscitation was instituted immediately with several rounds of IM, IV, and intratracheal epinephrine, atropine, and dopram, but animal did not recover.

**GROSS DESCRIPTION:**

On 2/2/2017 By ANC

Received is a 119.5 kilogram, intact male, adult harbor seal for necropsy on 1 February 2017 following death during recovery from an anesthetic procedure. Also submitted are portions of nail in formalin. The carcass is in good postmortem condition and good nutritional state with well fleshed muscles and abundant subcutaneous adipose. The blubber layer measures 4 cm thick over the spine of the scapula, 3.5 cm over the dorsal thoracic spine, 4 cm over the ribs, 3.5 cm over the hip joint and 2.2 cm over the tail base. Multifocally in the blubber layer, there are linear tracts of red to white discoloration of the fat (presumptive injection sites). There are multiple circular to linear tracts of alopecia and slightly thickened, irregular, raised skin along the ventral abdomen (dermal scars). The keratin layer of the digits of the forelimbs is variably cracked and flaking, exposing the underlying nailbed.

A small amount of mucus is present in the larynx and there are bilaterally symmetric foci of red discoloration with central pallor along the medial aspects of the right and left arytenoid cartilages (presumptive intubation artifact). The tracheal mucosa is moderately hyperemic and there are small amounts of slightly cloudy mucus (presumptive intubation artifact) in the lumen. Multifocally in the lungs, there is subpleural gas accumulation (presumptive resuscitation artifact). Several lobules along the periphery of lung lobes are pale pink and the remaining pulmonary parenchyma is red to dark red. The tracheobronchial lymph node is darkly pigmented. The heart is subjectively enlarged, with dilated and flaccid right and left ventricular free walls and a rounded apex. The valve circumferences are 18 cm tricuspid valve, 14 cm mitral valve, 10.5 cm aortic valve and 12 cm pulmonic valve.

Within both kidneys, the calyces of many lobules are dilated and filled with one or more, round to oblong, smooth contoured, pale tan liths. The largest lith measures ~1.5 cm x 0.5 cm in diameter, is branching and spans adjacent renal calyces. The urinary bladder contains ~12 mL of dark red, watery urine. The mucosa of the urethra at the level of the pelvic flexure is mildly reddened.

The stomach contains a small amount of orange brown mucus and squid beaks. The small intestine contains scant, pasty, grey ingesta. The colon contains scant, soft, pale brown feces.

The right and left corneas are diffusely mildly translucent white with few small caliber blood vessels. There is a central depression in the cornea of one eye (presumed left). The lenses of both eyes have irregular branching white opacities.

Throughout the dura mater, there are innumerable, <1 to 2 mm diameter, firm, pale tan nodules (presumptive meningeal fibrosis).

There is mild to moderate wear of the incisor and canine teeth.

The remaining organs are grossly unremarkable.

## GROSS DIAGNOSIS:

By ANC

Kidneys: Moderate, bilateral, multifocal renolithiasis with hematuria  
Eyes: Moderate, bilateral, chronic keratitis  
Eyes: Moderate, bilateral lenticular cataracts  
Digits, forelimbs: Moderate, multifocal paronychia (presumptive)

## LABORATORY STUDIES:

## TISSUE STATUS:

SHELVED: False  
TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: True

Tissues Ultrafrozen: Liver (2), kidney, lung, toenail, tracheobronchial lymph node, heart, urine

## SPECIAL REQUESTS:

On By

## HISTOLOGY:

On 3/13/2017 By ANC

1. BLUBBER: Multifocally, groups of adipocytes are replaced by granular eosinophilic material admixed with erythrocytes and clear cholesterol clefts.
2. LYMPH NODE, TI(?); URINARY BLADDER; PROSTATE: In the lymph node, macrophages in medullary cords have abundant black cytoplasmic granules. Medullary sinuses contain erythrocytes.
3. TONSILS: WNL.
4. HEART, RIGHT AV VALVE, INTERVENTRICULAR SEPTUM, LEFT AURICLE: WNL.
5. HEART, LEFT PAPILLARY MUSCLE: WNL.
6. HEART, LEFT AV VALVE: WNL.
7. HEART, INTERVENTRICULAR SEPTUM: WNL.
8. HEART, INTERVENTRICULAR SEPTUM, LEFT PAPILLARY MUSCLE: WNL.
9. HEART, SA NODE SECTION: WNL.
10. LUNG: Multifocally, there are large empty cystic spaces in the subpleural connective tissue (presumed resuscitation artifact). Interlobular septa have increased clear space (edema). Many alveolar capillaries are congested. Small numbers of lymphocytes surround medium caliber blood vessels adjacent to bronchi and bronchioles. Scattered perivascular macrophages contain black, granular, cytoplasmic pigment.
11. LUNG: WNL.
12. THYROID; PARATHYROID; LYMPH NODE, AXILLARY: In the thyroid, many follicles lack colloid and are lined by cuboidal epithelium. Multifocally, there are small, well demarcated, unencapsulated nodules that subtly compress the surrounding tissue and are composed of enlarged follicles of varying size lined by cuboidal epithelium that occasionally folded forming papillary projections into the lumen (multinodular hyperplasia).
13. LYMPH NODE, TRACHEOBRONCHIAL; LUNG: Macrophages in subcapsular sinuses and medullary cords contain abundant black, granular cytoplasmic pigment. The lung is as described previously. There is a dense focus of mineral surrounded by thin rim of fibrous connective tissue.
14. ESOPHAGUS; STOMACH, CARDIA: WNL.
15. TESTIS; EPIDIDYMIS: There is active spermatogenesis and mature spermatids in the epididymis.
16. TRACHEA: The tracheal mucosa is focally ulcerated and the exposed stroma is infiltrated by neutrophils. The ulceration is overlain with mucus admixed with neutrophils.
17. LARYNX: The mucosa is multifocally eroded and infiltrated by neutrophils.
18. LIVER; GALL BLADDER: In the liver, many hepatocytes and Kupffer cells contain small amounts of granular, pale brown pigment (presumptive hemosiderin). Few hepatocytes have lipid type vacuolation. Few lymphocytes, macrophages and plasma cells infiltrate some portal tracts.
19. SPLEEN; ADRENAL: In the adrenal gland, there are two foci of acute hemorrhage in the zona fasciculata. Focally, there are cords and acini of cortical epithelium embedded within the adrenal capsule. Many red pulp macrophages contain abundant granular, pale brown pigment (presumptive hemosiderin).
20. KIDNEY WITH LITH: Urinary spaces of calyces are expanded with clear space or contain laminar concretions of mineral. The transitional epithelium lining calyces varies from 4 cells thick to absent and the underlying connective tissue is expanded by clear space. Few erythrocytes are occasionally present in the urinary space, epithelium or subepithelial stroma (hemorrhage). Collecting ducts at the renal papillae are occasionally replaced by granular mineral. Rare glomeruli are obsolescent.
21. KIDNEY WITHOUT LITH: As described previously.
22. URETHRA; URETERS: Small numbers of lymphocytes and fewer plasma cells infiltrate the urethral mucosa.
23. STOMACH: Segmentally, there is a band of diffuse eosinophilia and loss of differential staining within the superficial gastric mucosa (autolysis?). In this area, surface and glandular epithelium is predominantly absent.
24. STOMACH; COLON: The stomach is as described previously in four discrete foci. In the colon, blood



vessels in the mucosa and submucosa are often dilated and contain rafts of fibrin with enmeshed neutrophils in their lumina.

25. DUODENUM; PANCREAS; BILE DUCT; LYMPH NODE, PERIPANCREATIC; ILEUM: In the wall of the common bile duct, sacculi of Beale and periductal glands are numerous and are surrounded by abundant fibrous connective tissue and smooth muscle that is multifocally infiltrated by lymphocytes.

26. COLON; CECUM; LYMPH NODE, MESENTERIC: In the colon, few lymphocytes and plasma cells infiltrate below crypts.

27. PITUITARY GLAND; DURA MATER: Multifocally, the dura mater is thickened by excess dense, mature, fibrillar collagen.

28. BRAIN, CEREBRUM: There is widespread scattered microhemorrhages in the grey matter and less so in the white matter tracts (agonal hemorrhage). Few psammoma bodies are present in the leptomeninges.

29. BRAIN, CEREBRUM, THALAMUS: As previously described.

30. BRAIN, CEREBRUM, THALAMUS: As previously described.

31. BRAIN, CEREBRUM THALAMUS: As previously described. Hemorrhage is more severe in the cerebrum.

32. BRAIN: As previously described.

33. BRAIN: As previously described.

34. BRAIN: As previously described.

35. BRAIN: As previously described.

36. BRAIN: As previously described.

37. BRAIN: As previously described.

38. BRAIN: As previously described.

39. BRAIN: As previously described.

40. EYE, LEFT: In the vitreous, there are many small aggregates of granular basophilic material (asteroid hyalosis). The superficial corneal stroma contains small blood vessels, increased numbers of spindle cells. Centrally, the corneal stroma is thinned. The corneal epithelium is multifocally folded. Few plasma cell infiltrate near the limbus. Few lymphocytes and plasma cells surround blood vessels in the bulbar conjunctiva. There is an empty capsular bag in the vitreous.

41. EYE, RIGHT: As described in the left eye. There are small aggregates of plasma cells in the iridocorneal drainage angle beneath the trabecular meshwork. There is an empty capsular bag between the iris leaflets.

42. LENS, LEFT AND RIGHT: The lens lacks an obvious capsule or epithelium. Lens fibers are histologically unremarkable.

43. NAIL: The slide contains only small fragments of compact, orthokeratotic keratin that are occasionally lined by granular basophilic debris and few erythrocytes.

44. NAILBED: Within the subepithelial connective tissue of the nailbed and surrounding skin, blood vessels are surrounded by loose fibrous connective tissue that is infiltrated by many lymphocytes, plasma cells and fewer macrophages.

45. NAIL BED: As previously described. Focally in the nailbed sulcus, there are aggregates of fragmented keratin colonized by non parallel walled fungal hyphae with large bulbous projections. The adjacent epidermis is eroded and infiltrated by many neutrophils.

46. ETHMOID TURBINATES: WNL.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Kidneys: Moderate, multifocal, renolithiasis with transitional cell hyperplasia and ulceration and hematuria
- 2) Eyes: Moderate, bilateral, chronic keratitis
- 3) Nailbeds, forelimbs: Moderate, multifocal, chronic active, suppurative, perionychitis with keratin fragmentation and intralesional fungal hyphae
- 4) Kidneys: Mild, multifocal glomerular obsolescence
- 5) Urethra: Mild, chronic, lymphoplasmacytic urethritis
- 6) Adipose, blubber layer: Mild, multifocal, acute fat necrosis and hemorrhage
- 7) Lung, tracheobronchial lymph node: Anthracosis
- 8) Larynx, trachea: Mild, multifocal, acute catarrhal and neutrophilic tracheitis and laryngitis with ulceration (presumed endotracheal intubation)
- 9) Common bile duct: Mild, multifocal, chronic, lymphocytic cholangitis
- 10) Eye, right: Minimal, chronic, plasmacytic anterior uveitis

**REMARKS:**

On 3/13/2017 By ANC

3/13/17: Histology did not reveal any additional underlying diseases that might have contributed to poor anesthetic recovery. Aside from hemorrhage into the urinary space, renolithiasis appears to have elicited minimal inflammation or degeneration within the kidneys. Renoliths are 100% ammonium urate. The lenses in both eyes were quite abnormal, consisting of shrunken, orange lens fibers that were still intact and not cataractous (i.e. still transparent). This may represent the unresorbed nuclear center of previously cataractous lenses. Oddly, this remnant lens fiber material was found separate from an empty capsular bag in each eye. Capsular rupture typically results in both severe uveitis and cataract formation, so this finding is likely artifactual. Fungal infection of the nailbeds was confirmed; morphologically fungi appear to be of the Zygomycota type. Acute blubber necrosis and hemorrhage is suspected to be due to either agonal trauma or injections. The remaining diagnoses are considered mild and less clinically significant.

Cartoceti  
PROSECTOR

CARTOCETI  
PATHOLOGIST

3/13/2017  
DATE COMPLETED



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # W2016-0060

Death Date: 10/1/2016

Necropsy Date: 10/2/2016

SCIURUS CAROLINENSIS (no subsp)    Gender: Female  
Eastern grey squirrel    Age:  
Name: W16 0060

Accession No.: y02888

Birth:

Acquired:

SEX: Female	AGE: ADULT	WEIGHT: 510.9 gm	STAY:
	MANNER OF DEATH: Found Dead		INTERVAL: 24 48 Hours
	TIME OF DEATH:		XRAYED: False
	DEATH LOCATION: Beavers		DISPOSITION: Incinerate
	SUBMITTOR: SS		PROSECTOR: T. Walsh
	OWNER/ANIMAL DEPT: OUT		

**HISTORY AND CLINICAL OBSERVATIONS:**

## KEEPER OBSERVATIONS:

On 10/1/2016 By

Found dead in beaver exhibit

## CLINICIAN OBSERVATIONS:

On By

## GROSS DESCRIPTION:

On 10/3/2016 By TFW

An adult, 510.9 gram (missing body parts), female wild grey squirrel found 1 Oct is necropsied 2 Oct 2016. The carcass is in poor postmortem condition with small to minimal adipose tissue stores. The pelt is wet and covered with dirt/mud and a cluster of fly eggs is on the abdomen. Two skin defects (approximately 2.5 cm diameter) are over the right pectoral/axillary region and right cranial sternum. The right humerus and most of the sternum are missing beneath the defects. All of the thoracic organs are missing and a portion of the stomach and liver is pulled through the diaphragm into the chest. The neck is crushed / fractured as is the caudal thoracic vertebrae with little overt hemorrhage. The abdominal organs are variegated grey, brown with scant pink. The stomach contains pasty tan ingesta. The colon has rare dark soft fecal pellets. The meninges are congested with significant hemoglobin imbibition.

## GROSS DIAGNOSIS:

By TFW

1. Predation / scavenging
2. Autolysis, moderate to severe
3. Reduced adipose tissue stores

## LABORATORY STUDIES:

## TISSUE STATUS:

SHELVED:            True  
TRIMMED:           False  
FROZEN:            False  
ULTRAFROZEN:      True

Tissues Ultrafrozen: liver, colon, spleen, kidney

## SPECIAL REQUESTS:

On By

## HISTOLOGY:

On By

**MORPHOLOGIC DIAGNOSIS:**

- 1) Predation / scavenging
- 2) Autolysis, moderate to severe
- 3) Reduced adipose tissue stores

## REMARKS:

On 10/3/2016 By TFW

Unfortunately the degree of autolysis and scavenging / predation hinders evaluation. There is little hemorrhage associated with fractured vertebrae indicating these likely occurred postmortem but any hemorrhage associated with the thoracic tissues could be obscured by loss and postmortem discoloration. The ingesta would be consisted with macerated acorns or other tan material. Samples of tissues (fixed and frozen) were collected for holding but due to the poor preservation status histopathology will not be pursued unless deemed necessary due to status of exposed collection animals.

T. Walsh  
PROSECTOR

T. Walsh  
PATHOLOGIST

10/3/2016  
DATE COMPLETED

Printed on: 8/21/2017 9:35:06 AM

CARES MED v2.119



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # W2016-0061

Death Date: 10/31/2016

Necropsy Date: 10/31/2016

LASIONYCTERIS NOCTIVAGANS

Gender: Unknown Sex

Accession No.: y02889

Silver haired bat

Age:

Birth:

Name: W2016 0061

Acquired:

SEX: Unknown Sex

AGE: ADULT

WEIGHT: 15.6 gm

STAY:

MANNER OF DEATH:Euthanasia

INTERVAL:0 6 hours

TIME OF DEATH:01:45p

XRAYED:False

DEATH LOCATION:Hill near Lion Tiger

DISPOSITION:FORMALIN

SUBMITTOR:JCS

PROSECTOR:Andrew Cartoceti

OWNER/ANIMAL DEPT:OUT

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 10/31/2016 By JCS

Down adult little brown bat found on lion tiger hill between carousel and lion tiger building. No known visitor exposure. Keeper picked up bat with gloves. Due to rabies concern euthanasia performed under anesthesia with intracardiac euthasol.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 11/1/2016 By ANC

Received is an adult, suspected female, 15.6 g, silver haired bat (submitted as a little brown bat) for necropsy on 31 October 2016. The carcass is in good postmortem condition and good nutritional state with adequate subcutaneous and intra coelomic adipose stores. A small amount of blood is present around the nares and in the oral cavity (presumed euthanasia artifact). There is a small (~1 cm diameter) region of dark red discoloration in the musculature and subcutis over the dorsal aspect of the left shoulder joint and scapula. The thorax is filled with watery, dark red brown fluid with flecks of friable dark brown red material (presumed euthanasia artifact). The abdominal cavity contains a small amount of dark red watery fluid (presumed euthanasia artifact). The stomach is filled with pasty grey brown ingesta. The remaining organs, including the intestinal tract, liver, kidney and spleen, are grossly unremarkable.

**GROSS DIAGNOSIS:**

By ANC

Mild subcutaneous and muscular hemorrhage (left shoulder)  
Good body condition

**LABORATORY STUDIES:**

OTHER: Rabies FA negative (see attached result)

**TISSUE STATUS:**

SHELVED: False

TRIMMED: True

FROZEN: False

ULTRAFROZEN: True

Tissues Ultrafrozen: Liver

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 12/9/2016 By ANC

1. TONGUE; LIVER; KIDNEY: Hepatocytes occasionally exhibit binucleation and anisokaryosis. There is a focus of mineralization in the renal papilla.

2. HEART; LUNGS; LARYNX; TRACHEA; ESOPHAGUS; PECTORAL MUSCLE; TONGUE; SKIN, NOSE: Few neutrophils infiltrate the mucosa of the larynx. Pericardial adipocytes are robust. Multifocally, alveoli are flooded with proteinaceous fluid or erythrocytes. Adjacent to the skeletal muscle section, there is a raft of neutrophils (unknown source).

3. TRACHEA; ESOPHAGUS; STOMACH; DUODENUM; PANCREAS; JEJUNUM; COLON; MESENTERIC LYMPH NODES: In the lumen of the stomach, there is a ~250 um diameter nematode with a thick cuticle and a reproductive

tract containing embryonated eggs and spermatozoa. Body wall musculature and intestinal tract are not distinguishable due to poor preservation. The stomach lumen also contains few small (~25 um diameter) nematodes. In the lumen of the small intestine, there is a cestode and two trematodes. Few eosinophils infiltrate the lamina propria of the small and large intestine.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Intestine: Mild, diffuse, eosinophilic enterocolitis with intraluminal cestode and trematodes
- 2) Stomach: Parasitism, intraluminal nematodes
- 3) Subcutis and skeletal muscle, left shoulder: Mild to moderate, acute, regional hemorrhage (gross diagnosis)

**REMARKS:**

On 12/9/2016 By ANC

12/9/16: Histology revealed intestinal parasitism (nematodes, cestodes and trematodes) that is likely incidental. Acute trauma remains the proximate cause of death and no significant comorbidities are noted. Rabies testing of the brain was negative.

Andrew Cartoceti

A. Cartoceti

12/9/2016

PROSECTOR

PATHOLOGIST

DATE COMPLETED

Printed on: 8/21/2017 9:36:10 AM

CARES MED v2.119

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # W2016-0062

Death Date: 11/5/2016

Necropsy Date: 11/7/2016

ACCIPITER COOPERII  
Cooper's hawk  
Name: W2016 0062

Gender: Female  
Age:

Accession No.: y02890  
Birth:  
Acquired:

SEX: Female

AGE: ADULT

WEIGHT: 537.5 gm

STAY:

MANNER OF DEATH: Found Dead

INTERVAL: 48 72 Hours

TIME OF DEATH: 12:00P

XRAYED: False

DEATH LOCATION: Great Ape

DISPOSITION: INCINERATE

SUBMITTOR: Ed Bronikowski

PROSECTOR: Andrew Cartoceti

OWNER/ANIMAL DEPT:

**HISTORY AND CLINICAL OBSERVATIONS:**

KEEPER OBSERVATIONS:

On 11/5/2016 By EB

CLINICIAN OBSERVATIONS:

On By

GROSS DESCRIPTION:

On 11/7/2016 By ANC

Received is a 537.5 gram, adult, female Cooper's hawk for necropsy on 7 November 2016. The carcass is in good postmortem condition and good nutritional condition with adequate subcutaneous and intra coelomic adipose stores. There is a closed, non displaced, comminuted fracture of the last cervical vertebrae with associated hemorrhage into the epaxial musculature and cervical air sacs. The oral cavity and cranial tracheal lumen contain large amounts of unclotted blood. Both the right and left lungs are diffusely mottled dark red to purple and ooze dark red fluid when incised. Attached to the right lung and right liver lobe (presumed abdominal air sac), there is a ~2 x 1 x 0.5, firm, dark yellow, irregularly contoured mass covered by a thin white capsule (chronic granuloma). The remaining organs are grossly unremarkable.

GROSS DIAGNOSIS:

By ANC

Syndrome, window strike  
Acute cervical vertebral fracture  
Right abdominal airsac, chronic granuloma

LABORATORY STUDIES:

TISSUE STATUS:

SHELVED: True  
TRIMMED: False  
FROZEN: False  
ULTRAFROZEN: True

Tissues Ultrafrozen: Liver, lung, kidney, colon

SPECIAL REQUESTS:

On By

HISTOLOGY:

On By

**MORPHOLOGIC DIAGNOSIS:**

- 1) Syndrome: Window strike
- 2) Vertebra, cervical: Severe, acute, comminuted, non displaced fracture with hemorrhage
- 3) Air sac: Mild, focal, chronic granuloma

REMARKS:

On 11/7/2016 By ANC

See gross comment.

Andrew Cartoceti  
PROSECTOR

A. Cartoceti  
PATHOLOGIST

11/7/2016  
DATE COMPLETED

Printed on: 8/21/2017 9:37:53 AM

CARES MED v2.119



Pathology Module Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # W2016-0063

Death Date: 11/6/2016  
Necropsy Date: 11/7/2016

SCIURUS CAROLINENSIS (no subsp) Gender: Female  
Eastern grey squirrel Age:  
Name: W2016 0063

Accession No.: y02891  
Birth:  
Acquired:

SEX: Female	AGE: JUVENILE	WEIGHT: 242.7 gm	STAY:
MANNER OF DEATH:Euthanasia	TIME OF DEATH:03:30p	INTERVAL:6 24 hours	XRAYED:False
DEATH LOCATION:Asia Trail	SUBMITTOR:Kendra Bauer	DISPOSITION:INCINERATE	PROSECTOR:Andrew Cartoceti
OWNER/ANIMAL DEPT:OUT			

HISTORY AND CLINICAL OBSERVATIONS:

KEEPER OBSERVATIONS: On By

CLINICIAN OBSERVATIONS: On 11/6/2016 By KB

Animal found moribund in Asia trail area and submitted to DAH for euthanasia. Due to rigidity of fore and hind limbs and recumbency, suspect cervical spinal trauma. Euthanized intracardiac with euthasol and KCl. Full necropsy not required.

GROSS DESCRIPTION: On 11/7/2016 By ANC

Received is a 242.7 gram, juvenile, female, Eastern grey squirrel in good postmortem condition and fair to poor body condition with moderately well fleshed musculature but minimal subcutaneous or intra abdominal adipose stores. There is mild pale brown crusting in the fur around the mouth. The lungs have a subtle reticular pattern (presumed euthanasia artifact). A small amount of clotted blood is present in the caudal abdominal cavity (presumed euthanasia artifact). The kidneys are diffusely pale red brown. The liver is pale yellow brown with red mottling. The stomach contains scant brown to white mucoid material. The small intestine contains scant pasty pale brown ingesta and the colon contains formed feces. The remaining organs are grossly unremarkable.

GROSS DIAGNOSIS: By ANC

Cause of death undetermined  
Fair to poor body condition with minimal adipose stores

LABORATORY STUDIES:

TISSUE STATUS:

SHELVED: False  
TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: True

Tissues Ultrafrozen: Brain, liver, lung, kidney, colon

SPECIAL REQUESTS: On By

HISTOLOGY: On 12/15/2016 By ANC

1. LUNG; PANCREAS; LYMPH NODE: WNL.
2. LIVER; GALLBLADDER; SPLEEN; KIDNEY; ADRENALS: WNL.
3. STOMACH; DUODENUM; JEJUNUM; ILEUM; CECUM; COLON: WNL.
4. HEART; SKIN; SKELETAL MUSCLE; SCIATIC NERVE: WNL.
5. BRAIN, CEREBRUM, THALAMUS: WNL.
6. BRAIN, MIDBRAIN, CEREBRUM: WNL.
7. BRAIN, CEREBELLUM, BRAINSTEM: WNL.
8. TONGUE; TRACHEA; ESOPHAGUS; LARYNX; THYMUS: Focally, the surface epithelium of the tongue is absent (ulcerated) and the exposed muscle is infiltrated by many neutrophils.



9. TRIGEMINAL GANGLIA, PITUITARY GLAND: WNL.

**MORPHOLOGIC DIAGNOSIS:**

1) Tongue: Mild, acute, focal, ulcerative glossitis

**REMARKS:**

On 12/15/2016 By ANC

12/15/16: Histology did not reveal any significant lesions to suggest a cause for this animal's neurologic signs. Covert trauma, idiopathic neurologic diseases and tetanus cannot be ruled out as possible etiologies, although there were no wounds to support trauma or C. tetani inoculation. Rabies testing was not performed per the discretion of the public health laboratory; there were no histologic lesions of rabies in the brain.

Andrew Cartoceti

A. Cartoceti

12/15/2016

PROSECTOR

PATHOLOGIST

DATE COMPLETED

Printed on: 8/21/2017 9:38:58 AM

CARES MED v2.119

Pathology Module Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # W2016-0066

Death Date: 11/15/2016  
Necropsy Date: 11/16/2016

SCIURUS CAROLINENSIS (no subsp) Gender: Female  
Eastern grey squirrel Age:  
Name: W2016 0066

Accession No.: y02893  
Birth:  
Acquired:

SEX: Female	AGE: ADULT	WEIGHT: 562 gm	STAY:
MANNER OF DEATH:Euthanasia			INTERVAL:24 48 Hours
TIME OF DEATH:11:30A			XRAYED:False
DEATH LOCATION:American trail			DISPOSITION:INCINERATE
SUBMITTOR:Kendra Bauer			PROSECTOR:Andrew Cartoceti
OWNER/ANIMAL DEPT:OUT			

**HISTORY AND CLINICAL OBSERVATIONS:**

KEEPER OBSERVATIONS:

On By

CLINICIAN OBSERVATIONS:

On 11/15/2016 By KB

Squirrel found moribund at American Trail. Animal covered in fleas. Euthanized with euthasol and KCl intracardiac.

GROSS DESCRIPTION:

On 11/16/2016 By ANC

Received is an 562.0 g, adult, female Eastern grey squirrel for necropsy on 16 November 2016. The carcass is in good postmortem condition and fair body condition with minimal subcutaneous and intra abdominal adipose stores and adequate muscling. The fur contains many fleas. The subcutis along the ventral neck and thorax, extending from the level of the larynx to the xiphoid cartilage, is expanded by soft, pale yellow, purulent material that dissects between fascial planes and muscle bundles. This purulent material dissects through the muscle into the left axilla, around the larynx, to the ramus of the right mandible and into the region of the left palatine tonsil. The skeletal muscle surrounding purulent material is occasionally reddened and friable. The thoracic, pericardial and abdominal cavities contain abundant frank and clotted blood (presumed euthanasia artifact). Within the caudate lobe of the liver, there is a discrete, ~0.5 cm diameter region of dull, pale yellow discolored parenchyma. Both adrenal glands are subjectively enlarged (~1 cm long by 0.4 cm in diameter). The remaining organs are grossly unremarkable.

GROSS DIAGNOSIS:

By ANC

Suppurative cellulitis and myositis, ventral neck and thorax  
Focal hepatic necrosis/necrotizing hepatitis

LABORATORY STUDIES:

OTHER: Brain submitted for rabies FA.

TISSUE STATUS:

SHELVED:	False
TRIMMED:	True
FROZEN:	False
ULTRAFROZEN:	True

Tissues Ultrafrozen: Subcutaneous abscess, lung, liver, kid, spleen, colon

SPECIAL REQUESTS:

On By

HISTOLOGY:

On 12/23/2016 By ANC

1. LUNG; SPLEEN: Pulmonary blood vessels often contain fibrin thrombi, some of which have embedded colonies of bacteria. The walls of these vessels contain streaming nuclear debris and surrounding alveoli contain proteinaceous fluid, fibrin, neutrophils and few bacteria.
2. LIVER, ADRENAL GLAND: In the liver, there are coalescing tracts of portal and periportal coagulative necrosis in which the periphery of necrosis contains large colonies of bacteria and infiltrates of degenerate and intact neutrophils.
3. HEART: WNL.

4. KIDNEY; TONGUE; HINDLIMB SKELETAL MUSCLE; SCIATIC NERVE: In the skeletal muscle of the tongue, there is a single sarcocyst. In the kidney, rare tubules are dilated and contain protein casts.

5. MESENTERY; LYMPH NODE, MESENTERIC; PERIPHERAL NERVE; URINARY BLADDER; OVARY; UTERUS; PANCREAS: WNL.

6. PECTORAL MUSCLE, VENTRAL NECK/THORAX: The perimysium, epimysium and surrounding adipose between muscle groups is markedly expanded by coagulative necrosis in which there is abundant fibrin, intact and degenerate neutrophils. At the periphery of necrosis, there are many large colonies of bacteria. Neutrophils partially extend into the endomysium surrounding necrotic myofibers. In some sections, necrotic muscle and connective tissue are surrounded by streams of plump spindloid cells (fibroplasia) infiltrated by macrophages and neutrophils. Multifocally, there are large lakes of lytic necrosis with abundant cellular debris. BROWN AND HOPPS (GRAM STAIN): Necrotizing lesions contain many large colonies of Gram negative, small, coccobacilli forming chains.

7. LARYNX; SKIN; TRACHEA; ESOPHAGUS: The skeletal muscle around the larynx and subcutis and deep dermis are necrotic, inflamed and overgrown with bacteria, as previously described. A lymph node adjacent to the larynx has diffuse coagulative necrosis with many bacteria, neutrophils and fibrin within subcapsular sinuses. Other non necrotic lymph nodes are expanded by fibrin, edema and hemorrhage.

8. ESOPHAGUS; STOMACH; SMALL INTESTINE; LARGE INTESTINE: There are small numbers of coccidial oocysts in the colonic lumen.

9. LARGE INTESTINE: There are small numbers of coccidial oocysts in the colonic lumen.

10. BRAIN: WNL.

11. BRAIN: WNL.

#### MORPHOLOGIC DIAGNOSIS:

- 1) Muscle, subcutis, lymph node: Severe, subacute, regionally extensive, necrosuppurative myositis, cellulitis and lymphadenitis (continued)
- 1) with abundant Gram negative coccobacilli
- 2) Liver: Moderate, focally extensive, acute, necrotizing hepatitis with abundant intralesional bacteria
- 3) Lung: Multifocal embolic pneumonia with intralesional bacteria
- 4) Intestine: Intraluminal coccidial oocysts

#### REMARKS:

On 12/23/2016 By ANC

1/10/17 (ADDENDUM): Gram's stain of the affected tissues revealed large numbers of Gram negative coccobacilli as the causative agent. Repeat cultures of the infected subcutis and muscle did not yield any bacterial isolates. PCR for *Francisella tularensis* (tularemia) and *Yersinia pestis* (plague) were negative. This concludes all diagnostic testing.

12/23/16: Histology confirmed necrotizing bacterial infection as the cause of this animal's clinical signs. Hepatic and pulmonary lesions indicate hematogenous spread/sepsis. Thus far, aerobic cultures and Gram stains have been unsuccessful at identifying the offending agent. PCR to rule out Tularemia and Plague are pending and results will be communicated in an addendum. The Public Health Laboratory refused rabies testing based on the lack of human/animal exposure and the unlikely nature of rabies in rodent species.

Andrew Cartoceti  
PROSECTOR

A. Cartoceti  
PATHOLOGIST

12/23/2016  
DATE COMPLETED

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # W2016-0067

Death Date: 11/14/2016  
Necropsy Date: 11/16/2016

ZONOTRICHIA ALBICOLLIS  
White throated sparrow  
Name: W2016 0067

Gender: Unknown Sex  
Age:

Accession No.: y02892  
Birth:  
Acquired:

SEX: Unknown Sex	AGE: ADULT	WEIGHT: 0 gm	STAY:
MANNER OF DEATH: Found Dead		INTERVAL: 24 48 Hours	
TIME OF DEATH: 14:30		XRAYED: False	
DEATH LOCATION: Giant panda yard 3		DISPOSITION: FORMALIN	
SUBMITTOR: S. Pick		PROSECTOR: Andrew Cartoceti	
OWNER/ANIMAL DEPT: OUT			

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 11/14/2016 By SP

Bird was found dead in Bao Bao's yard in afternoon.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 11/16/2016 By ANC

Received is an unknown sex, adult, white throated sparrow for necropsy on 16 November 2016. The carcass is in poor postmortem condition and the coelomic viscera are discolored dark red and are flaccid. There is postmortem scavenging consisting of absence of the skin of the head, eyes and cerebrum. Many ants are in the cranial vault and the skin, muscles, trachea and esophagus in the cranial cervical region are torn, with no associated hemorrhage. There are maggots in the subcutis of the right flank. The carcass is in fair body condition with scant adipose stores and adequate pectoral musculature. There is a ~1 cm diameter puncture wound in the skin of the right thorax that extend through the pectoral muscle to the level of the ribs. Abundant hemorrhage is present in the subcutis and muscles. Within the coelomic cavity, there is a large blood clot between the heart and left liver lobe. The remaining organs are grossly unremarkable.

**GROSS DIAGNOSIS:**

By ANC

Puncture wound with hemorrhage, left thorax and pectoral muscle  
Hemocoelom  
Postmortem scavenging

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False  
TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: False

Tissues Ultrafrozen:

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 12/15/2016 By ANC

1. LUNG; HEART; TRACHEA: WNL.
2. LIVER; KIDNEY: WNL.
3. STOMACH; SMALL INTESTINE; LARGE INTESTINE; BURSA OF FABRICIUS: The lumen of the small intestine contains several cross sections of cestodes.
4. PECTORAL MUSCLE: There is regional acute hemorrhage into the perimysium.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Thoracic body wall, pectoral muscle: Focal puncture wound with regional acute hemorrhage



- 2) Coleomic cavity: Acute hemocoelom
- 3) Small intestine: Intraluminal cestodiasis

## REMARKS:

On 12/15/2016 By ANC

12/15/16: No significant infectious diseases that might put the pandas at risk were evident on histology.

Andrew Cartoceti

PROSECTOR

A. Cartoceti

PATHOLOGIST

12/15/2016

DATE COMPLETED

---

Printed on: 8/21/2017 9:41:25 AM

CARES MED v2.119

Pathology Module Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

**PATH # W2016-0070**

Death Date: 12/6/2016  
Necropsy Date: 12/6/2016

ODOCOILEUS VIRGINIANUS (no subsp) Gender: Female  
White tailed deer Age:  
Name: W2016 0070

Accession No.: y02899  
Birth:  
Acquired:

SEX: Female	AGE: ADULT	WEIGHT: 25.4545 kg	STAY:
	MANNER OF DEATH:Euthanasia		INTERVAL:0 6 hours
	TIME OF DEATH:07:45A		XRAYED:False
	DEATH LOCATION:Shops		DISPOSITION:INCINERATE
	SUBMITTOR:Steel		PROSECTOR:Cartoceti
	OWNER/ANIMAL DEPT:OUT		

**HISTORY AND CLINICAL OBSERVATIONS:**

KEEPER OBSERVATIONS:

On By

CLINICIAN OBSERVATIONS:

On 12/6/2016 By jcs

Female adult deer was found in the bed of one of the SI transport trucks this morning due to a suspected fall. When approached doe was alert, shocky and unable to stand with a suspected left forelimb fracture. Due to quality of life concerns euthanasia performed under telazol ketamine anesthesia. Left forelimb fracture confirmed to be an open proximal radius and ulna fracture and a fracture of the rostral mandible.

Euthanasia performed with euthasol IV in the right jugular vein.

Submitted to pathology for disposal. No necropsy needed

GROSS DESCRIPTION:

On 12/6/2016 By ANC

Received is a female, 25.4 kg, adult, white tailed deer for necropsy on 6 December 2016 after being euthanized for a fractured leg and jaw. The carcass is in good postmortem condition and fair body condition with well fleshed muscles and mild amounts of subcutaneous and intra abdominal adipose. There are closed, non displaced comminuted, transverse fractures through both the left and right mandible, approximately 3 cm caudal to the symphysis with associated hemorrhage into the surrounding soft tissues. There is an open, displaced, comminuted, transverse fracture through the proximal left ulna, with the olecranon still attached to the humerus. There is an open luxation of the left radio humeral joint with rupture of the lateral collateral ligaments and joint capsule and exposure of the radio humeral joint. There is associated hemorrhage into the muscles, subcutis and skin of the antebrachium, and three small puncture wounds in the skin lateral to the left elbow joint. Within the skeletal muscles and subcutis along the left ileum, ischium and pubis, there is abundant acute hemorrhage that tracts between muscle groups to the left of the left stifle. The forestomachs contain abundant green fibrous ingesta. The small intestine contains pasty green brown ingesta and the colon contains formed fecal pellets. The remaining organs are grossly unremarkable.

GROSS DIAGNOSIS:

By ANC

See morphologic diagnoses

LABORATORY STUDIES:

TISSUE STATUS:

SHELVED:	True
TRIMMED:	False
FROZEN:	False
ULTRAFROZEN:	False

Tissues Ultrafrozen:

SPECIAL REQUESTS:

On By

HISTOLOGY:

On By

MORPHOLOGIC DIAGNOSIS:

1) Ulna (left): Acute, transverse, comminuted, displaced, open, fracture

- 2) Radio humeral joint (left): Acute, open, luxation
- 3) Mandible (right and left): Acute, transverse, non displaced, closed fractures
- 4) Skeletal muscle and subcutis (left pelvis): Severe, regionally extensive, acute hemorrhage

## REMARKS:

On 12/6/2016 By ANC

12/6/16: The gross findings are consistent with acute trauma due to a fall from a substantial height.  
Tissues are collected in formalin and shelved for future reference.

Cartoceti  
PROSECTOR

CARTOCETI  
PATHOLOGIST

12/6/2016  
DATE COMPLETED

---

Printed on: 8/21/2017 9:42:16 AM

CARES MED v2.119

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

**PATH # W2016-0072**

Death Date: 12/8/2016  
Necropsy Date: 12/9/2016

COLUMBA LIVIA (no subsp)  
Rock dove  
Name: W2016 0072

Gender: Male  
Age:

Accession No.: y02902  
Birth:  
Acquired:

SEX: Male

AGE: ADULT

WEIGHT: 338.5 gm

STAY:

MANNER OF DEATH: Found Dead

INTERVAL: 6 24 hours

TIME OF DEATH: 14:30

XRAYED: False

DEATH LOCATION: Think Tank

DISPOSITION: INCINERATE

SUBMITTOR: Saffoe

PROSECTOR: David Lorom

OWNER/ANIMAL DEPT: OUT

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 12/8/2016 By CS

Window strike observed by visitors and pointed out to keepers

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 12/9/2016 By ANC

Received is an adult, male, 338.5 gram, pigeon for necropsy on 9 December 2016 due to death following window strike at Think Tank. The carcass is in good postmortem condition and good nutritional condition with well fleshed pectoral muscles and adequate subcutaneous and intracoelomic adipose. There is a 1 cm diameter laceration through the skin over the cervicothoracic junction extending into the crop. There is a transverse, non displaced fracture at the last cervical and first thoracic vertebrae with abundant hemorrhage into the lungs, all air sacs and the oral cavity. The liver is pale golden brown. The remaining organs are grossly unremarkable.

**GROSS DIAGNOSIS:**

By ANC

Windowstrike  
Vertebral fracture with abundant pulmonary hemorrhage  
Lacerated/rupture crop

**LABORATORY STUDIES:****TISSUE STATUS:**

No fixed tissues taken.

Tissues Ultrafrozen:

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On By

**MORPHOLOGIC DIAGNOSIS:****REMARKS:**

On 12/9/2016 By ANC

12/9/16: The gross findings are consistent with the history of window strike. Histology will not be performed.

David Lorom  
PROSECTOR

CARTOCETI  
PATHOLOGIST

12/9/2016  
DATE COMPLETED

Printed on: 8/21/2017 9:43:12 AM

CARES MED v2.119



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # W2016-0074

Death Date: 12/22/2016

Necropsy Date: 12/22/2016

PROCYON LOTOR (no subsp)

Gender: Male

Accession No.: y02904

Raccoon

Age:

Birth:

Name: W16 0074

Acquired:

SEX: Male

AGE: ADULT

WEIGHT: 2.6 kg

STAY:

MANNER OF DEATH: Found Dead

INTERVAL: 0 6 hours

TIME OF DEATH: 01:00p

XRAYED: False

DEATH LOCATION: Maned wolf

DISPOSITION: Incinerate

SUBMITTOR: Regina Blakely

PROSECTOR: DHL

OWNER/ANIMAL DEPT: OUT

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 12/22/2016 By RB

Observed wolf chewing in den. Found wolf carrying in yard shortly after. Already dead but still warm upon collection.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 12/22/2016 By ANC

Received is a 2.6 kg, adult, male raccoon submitted for necropsy on 22 December 2016 after being found dead in the maned wolf enclosure. The carcass is in good postmortem condition and good body condition with well fleshed muscles and adequate subcutaneous and intra abdominal adipose stores. On the medial aspect of the right hind foot, there is a ~1 x 1.5 cm dark brown scabbed abrasion in the skin. In the subcutis along the ventral thorax and abdomen, there is a large ~10 x 20 cm region of subcutaneous hemorrhage. There are multiple punctures wounds in the skin of the dorsal and ventral aspects of the head and neck with associated subcutaneous and muscular hemorrhage. The mandible, maxilla, cranial half of the skull and several cervical vertebrae are fractured into dozens of small fragments. The brain and skeletal muscles of the head and neck are multifocally lacerated and tattered. There is hemorrhage into the pericardial sac and the right and left lungs, multifocally. The remaining organs are grossly unremarkable.

**GROSS DIAGNOSIS:**

By ANC

Predation trauma

Fractured skull and cervical vertebrae

Dermal and muscular lacerations, head and neck

**LABORATORY STUDIES:**

OTHER: Rabies FA

**TISSUE STATUS:**

SHELVED: False

TRIMMED: True

FROZEN: False

ULTRAFROZEN: True

Tissues Ultrafrozen: Liver

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 1/31/2017 By ANC

1. LIVER; GALL BLADDER; SPLEEN: In the liver, there is a small granuloma with mineral at its core. All hepatocytes have fine, feathery, clear vacuoles in their cytoplasm. Focally, few lymphocytes and plasma cells infiltrate a portal tract.

2. KIDNEY: WNL.

3. LUNG, ADRENAL: Many alveoli are flooded with erythrocytes. Bronchi and large bronchiole walls and lumina are infiltrated by many eosinophils and fewer lymphocytes, plasma cells and macrophages. Eosinophils and alveolar macrophages are present in many surrounding alveolar lumina. One airway contains a nematode that is ~200 um in diameter and has a thin cuticle, platymyarian musculature, a gastrointestinal tract and a reproductive tract with embryonated eggs. There is a small granuloma in the lung with multinucleated giant cells and mineral at the core.

4. STOMACH, PYLORUS; DUODENUM: Diffusely, few to moderate numbers of eosinophils infiltrate the gastric and duodenal mucosa. Multifocally, fragments of hairs shafts surrounded by few macrophages and multinucleated giant cells are embedded in the gastric glands and submucosa.
5. DUODENUM; PANCREAS; SMALL AND LARGE INTESTINE: Diffusely, few to moderate numbers of eosinophils infiltrate the small and large intestinal mucosa. There is a single larval nematode (in ovo?) in the large intestinal lumen.
6. HEART: There is multifocal hemorrhage into the epicardium and myocardium.
7. BRAIN, CEREBRUM: WNL.
8. BRAIN: WNL.
9. BRAIN, HIPPOCAMPUS: WNL.

**MORPHOLOGIC DIAGNOSIS:**

- 1) Lung: Moderate, multifocal, acute hemorrhage
- 2) Heart: Mild, multifocal, acute, epicardial and myocardial hemorrhage
- 3) Lung: Mild, multifocal, chronic, eosinophilic bronchopneumonia with intraluminal adult nematodes
- 4) Stomach, small and large intestine: Mild to moderate, diffuse, eosinophilic gastroenterocolitis

**REMARKS:**

On 1/31/2017 By ANC

1/31/17: Histology did not reveal diseases of concern for the maned wolf, including rabies, canine distemper virus or leptospirosis. The brain was negative for rabies virus via fluorescent antibody. *Crenosoma globei* is the most likely lungworm infesting raccoons.

DHL	Cartoceti	1/31/2017
PROSECTOR	PATHOLOGIST	DATE COMPLETED

Printed on: 8/21/2017 9:44:03 AM

CARES MED v2.119

Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # W2017-

Death Date: 1/12/2017

Necropsy Date: 1/12/2017

TURDUS MIGRATORIUS (no subsp)

Gender: Female

Accession No.: 02905

American robin

Age:

Birth:

Name: W17 0003

Acquired:

SEX: Female

AGE: ADULT

WEIGHT: 0 gm

STAY:

MANNER OF DEATH: Found Dead

INTERVAL: 0 6 hours

TIME OF DEATH: 08:45a

XRAYED: False

DEATH LOCATION: Lemur Island

DISPOSITION: INCINERATE

SUBMITTOR: Meredith Bastian

PROSECTOR: Cartoceti

OWNER/ANIMAL DEPT: OUT

**HISTORY AND CLINICAL OBSERVATIONS:**

KEEPER OBSERVATIONS:

On 1/12/2017 By MB

CLINICIAN OBSERVATIONS:

On By

GROSS DESCRIPTION:

On 1/12/2017 By ANC

Received is an adult, female, American robin for necropsy on 12 January 2017 after being found dead on Lemur Island. The carcass in fair postmortem condition and good nutritional state with well fleshed pectoral muscles and adequate subcutaneous and intra coelomic adipose stores. There is mild blood staining of the feathers around the base of the beak. The oral cavity and proximal trachea are filled with frank blood. One to two milliliters of frank clotted blood fill the thoracic air sacs around the heart. Both lungs are mottled pink to dark red and are wet. The liver is diffusely pale yellow brown. The stomach contains yellow fibrous to gritty material and intact seeds. The small intestine contains abundant pasty pale yellow brown ingesta. The colon contains green brown soft feces and intact seeds. The brain, eyes, esophagus, heart, spleen, kidneys, ovary, oviduct, adrenal glands and gastrointestinal tract are grossly unremarkable.

GROSS DIAGNOSIS:

By ANC

Severe acute thoracic air sac and pulmonary hemorrhage  
Hepatic pallor

LABORATORY STUDIES:

TISSUE STATUS:

SHELVED: True

TRIMMED: False

FROZEN: False

ULTRAFROZEN: True

Tissues Ultrafrozen: liver, colon

SPECIAL REQUESTS:

On By

HISTOLOGY:

On By

**MORPHOLOGIC DIAGNOSIS:**

REMARKS:

On 1/12/2017 By ANC

1/12/17: Massive acute hemorrhage into the upper and lower respiratory tract was found to be the cause of death of this bird. The most likely cause of these findings is acute collision trauma (i.e. window strike), but as there were no bone fractures to confirm this suspicion, other causes of hemorrhage such as vascular disease or coagulopathy cannot be ruled out. This bird was identified as a female. Tissues are saved in formalin but histology will not be performed. Samples of liver and colon are saved at 80 C.

Cartoceti

CARTOCETI

1/12/2017

PROSECTOR

PATHOLOGIST

DATE COMPLETED

Printed on: 8/21/2017 9:45:37 AM

CARES MED v2.119



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # W2017-0004

Death Date: 1/14/2017

Necropsy Date: 1/17/2017

RATTUS NORVEGICUS (no subsp)

Gender: Unknown Sex

Accession No.: y02906

Norway rat

Age:

Birth:

Name: W17 0004

Acquired:

SEX: Unknown Sex

AGE: ADULT

WEIGHT: 337.7 gm

STAY:

MANNER OF DEATH: Found Dead

INTERVAL: &gt; 72 hours

TIME OF DEATH: 08:00A

XRAYED: False

DEATH LOCATION: Elephant Habitat #4

DISPOSITION: INCINERATE

SUBMITTOR: Debbie Flinkman

PROSECTOR: Cartoceti

OWNER/ANIMAL DEPT: OUT

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 1/14/2017 By DF

Found in outdoor elephant habitat.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 1/17/2017 By ANC

Received is a 337.7 gram (partially consumed), undetermined sex, adult, Norway rat for necropsy on 14 January 2017 following being found dead in Elephant Habitat #4. The carcass is in poor to fair postmortem condition with malodorous, friable and green discolored visceral organs, and fair body condition with well fleshed musculature and small amounts of subcutaneous and intra abdominal adipose. The tail, hindlimbs, pelvis, gonads and caudal portion of the body wall and intestinal tract are missing (predation/scavenging). There are multiple 1-3 mm diameter puncture wounds in the skin over the right and left shoulders and interscapular region. There is abundant hemorrhage into the underlying subcutis and skeletal muscle of the caudal neck, cranial thorax and both proximal forelimbs. The thoracic cavity contains abundant clotted blood. The cranial lung lobes are collapsed and dark red. The remaining organs (liver, kidneys, adrenal glands, spleen and gastrointestinal tract) are grossly unremarkable.

**GROSS DIAGNOSIS:**

By ANC

Presumptive predation trauma

Multiple puncture wounds with subcutaneous, intramuscular and intrathoracic hemorrhage

Postmortem scavenging/consumption (missing pelvis, hindlimbs, tail)

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: True

TRIMMED: False

FROZEN: False

ULTRAFROZEN: False

Tissues Ultrafrozen:

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On By

**MORPHOLOGIC DIAGNOSIS:****REMARKS:**

On 1/17/2017 By ANC

1/17/17: The gross findings are consistent with acute trauma, most likely due to predation. Limited samples of viscera are saved in formalin, but will not be trimmed due to advanced autolysis.

Cartoceti

CARTOCETI

1/17/2017

PROSECTOR

PATHOLOGIST

DATE COMPLETED



Pathology Module    Final Pathology Report  
NATIONAL ZOOLOGICAL PARK

PATH # W2017-0005

Death Date: 1/29/2017  
Necropsy Date: 1/30/2017

RATTUS NORVEGICUS (no subsp)  
Norway rat  
Name: W2017 0005

Gender: Male  
Age:

Accession No.: y02910  
Birth:  
Acquired:

SEX: Male

AGE: ADULT

WEIGHT: 203.7 gm

STAY:

MANNER OF DEATH: Found Dead

INTERVAL: 24 48 Hours

TIME OF DEATH: 08:00A

XRAYED: False

DEATH LOCATION: Wolf exhibit

DISPOSITION: INCINERATE

SUBMITTOR: American Trail

PROSECTOR: Cartoceti

OWNER/ANIMAL DEPT: OUT

**HISTORY AND CLINICAL OBSERVATIONS:****KEEPER OBSERVATIONS:**

On 1/29/2017 By AT

Keeper noticed gray wolf Crystal (114832) holding rat in her mouth when servicing exhibit. Was clearly deceased.

**CLINICIAN OBSERVATIONS:**

On By

**GROSS DESCRIPTION:**

On 1/30/2017 By ANC

W17 0005 Received is a 203.7 gram, adult, male Norway rat for necropsy on 29 January 2016 following being found dead in the Wolf exhibit. The carcass is in poor postmortem condition with most internal viscera being friable, macerated (predation/scavenging) and malodorous. The carcass is in fair nutritional condition with small subcutaneous and intra abdominal adipose stores. There are lacerations in the skin and underlying skeletal muscle along the dorsal and ventral thorax and abdomen. The affected pectoral muscles are slightly reddened. The bones of the skull, spine, ribs, pelvis and limbs are multifocally fractured and displaced. The left kidney is in the thoracic cavity and the tongue, trachea, esophagus lungs, heart and portions of the liver and intestinal tract are macerated and barely identifiable. Small remnants of the lungs are dark red to purple. The brain is crushed. The spleen, gastrointestinal tract, testes and sex glands are grossly normal.

**GROSS DIAGNOSIS:**

By ANC

Possible predation  
Intramuscular and intrapulmonary hemorrhage, presumptive

**LABORATORY STUDIES:****TISSUE STATUS:**

SHELVED: False  
TRIMMED: True  
FROZEN: False  
ULTRAFROZEN: True

Tissues Ultrafrozen: Brain, lung, liver, kidney, colon

**SPECIAL REQUESTS:**

On By

**HISTOLOGY:**

On 3/6/2017 By ANC

1. LUNG; SPLEEN; KIDNEY; ADRENAL: In the lungs, many alveoli are flooded with erythrocytes. Many adrenal cortical cells have clear cytoplasmic vacuolation.
2. HEART; LIVER: WNL.
3. STOMACH; SMALL INTESTINE; LARGE INTESTINE: WNL

**MORPHOLOGIC DIAGNOSIS:**

- 1) Lungs: Regionally extensive, acute, alveolar hemorrhage

**REMARKS:**

On 3/6/2017 By ANC

3/6/17: Histology confirmed intrapulmonary hemorrhage and predation trauma remains the most likely

cause of death. No significant concurrent diseases were found.

Cartoceti  
PROSECTOR

Andrew Cartoceti  
PATHOLOGIST

3/6/2017  
DATE COMPLETED

---

Printed on: 8/21/2017 9:47:43 AM

CARES MED v2.119