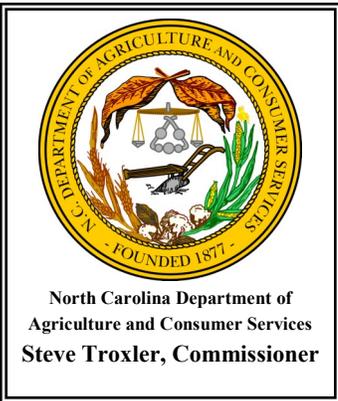


The NCVDLS REPORT



Veterinary News and Information From North Carolina's Diagnostic Laboratories



North Carolina Department of Agriculture and Consumer Services
Steve Troxler, Commissioner

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Holiday Closings...

July 4, 2013

September 2, 2013

November 11, 28 & 29, 2013

Our laboratories will be closed on the above listed days.

Please e-mail NCVDL@ncagr.gov with any comments and/or suggestions concerning The NCVDLS Report

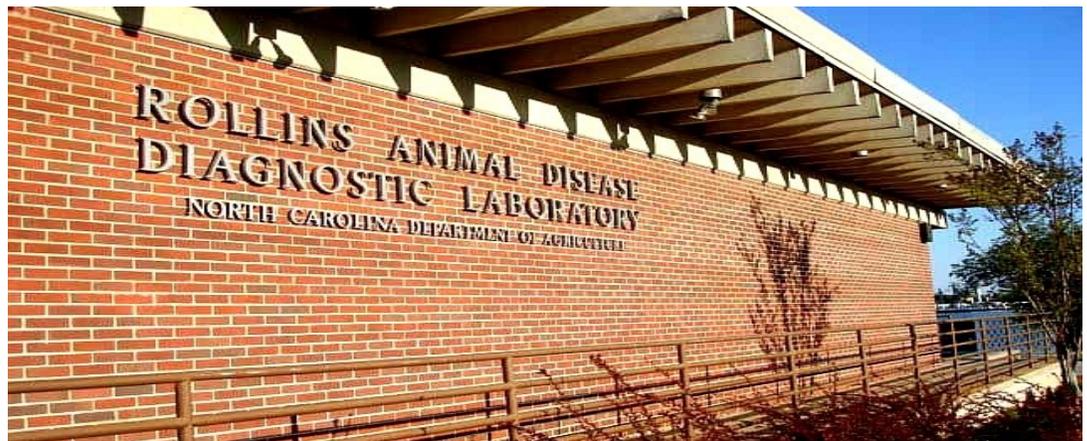
Message from the Director

After a year of planning and preparation, a new back-up generator is finally on-site at the Rollins facility and is ready to be load-tested just in time for the start of Hurricane season! The 350kw diesel unit was purchased with funds from the Department of Homeland Security and has been designed to run the main Rollins Laboratory in the event of a power outage to maintain full continuity of operations.

Funds from another Homeland Security Grant were used to renovate the Receiving Section of the laboratory. This renovation was recently completed and has resulted in both enhanced security and bio-security. Laboratory specimens are now being processed in a confined space in order to prevent any potential disease dissemination. Access control security doors and an inter-com/video system have also been installed to address security deficits. Instructions for client access have been posted. A button is pushed to alert staff and request access.

Respectfully,

Karen W. Post DVM, MS



Feature Article

Canine Acanthamoebiasis

Alison Tucker, MA, VMD, Dipl ACVP

Acanthamoeba are microscopic, free living protozoal organisms that are ubiquitous in soil and water. In rare cases these organisms cause disease in humans and animals. There have been 3 unrelated cases of canine amoebiasis caused by *Acanthamoeba* sp diagnosed over a 3 year period (2009-2012) at the North Carolina Veterinary Diagnostic Laboratory System.

In case #1, the dog was a 2 year old neutered female Labradoodle that presented for fecal and urinary incontinence and lumbar pain with eventual progression to nystagmus and cranial nerve V and VII deficits. There was no response to therapy that included Clindamycin, glucocorticoids and azathioprine and due to worsening condition, euthanasia was performed. At necropsy, there were hemorrhagic and malacic areas in the cerebrum and lumbosacral spinal cord. In addition, there were disseminated, variably sized soft tan to hemorrhagic areas in the lung, liver, kidney, spleen and subcutaneous tissue. The histologic changes in all organs were necrosis with pyogranulomatous inflammation and with myriad intralesional 20 – 30 mm diameter protozoal organisms. The protozoa had granular eosinophilic cytoplasm with large, prominent karyosomes. *Dr. Mahogany Caesar and Dr. Alison Tucker*

In case #2, the dog was an 11 month old intact female border collie that died suddenly with only slight weight loss noted prior to death. Another dog in the household had died 10 days previously with a history of head tilt, circling, fever and anorexia. At necropsy, there was a jejunal intussusception that could not be reduced and there was hemorrhagic fluid in the abdomen. In addition, there were multiple hemorrhagic and firm tan foci in the lungs and there were petechia throughout the adrenal gland. Histopathologic changes included necrotizing pneumonia, necrotizing gastritis and adrenalitis all with intralesional protozoal organisms similar to those described above. *Dr. Stacy Robinson and Dr. Peter Moisan*

In case #3, the dog was a 1.5 year old intact female mixed breed dog that presented to the referring veterinarian with pneumonia four weeks after extended exposure to canine distemper virus. A poor prognosis was warranted and euthanasia was performed. At necropsy, there were diffuse expansion and increased firmness of the lungs and there were multiple 2 – 4 cm tan or black nodules within the lungs.

Histopathologic changes included pyogranulomatous bronchointerstitial pneumonia with epithelial intracytoplasmic inclusions (consistent with distemper infection) and with intralesional protozoal organisms and granulomatous hepatitis with necrosis and with intralesional protozoal organisms similar to those described above. Immunoreactivity to canine distemper virus was detected with immunohistochemistry. *Dr. Jennifer Haugland and Dr. Alison Tucker*

Immunohistochemistry was performed at the California Animal Health & Food Safety Laboratory System and immunoreactivity to *Acanthamoeba* sp was detected in all three cases.

According to the CDC (<http://www.cdc.gov/parasites/acanthamoeba/>), *Acanthamoeba* can cause infections of the eye, skin, and central nervous system in humans. Most people will be exposed to *Acanthamoeba* during their lifetime, but very, very few will become sick from this exposure. The three diseases caused by *Acanthamoeba* in humans are:

Acanthamoeba keratitis – An infection of the eye that typically occurs in healthy persons and is associated with the use of contact lenses.

Granulomatous Amebic Encephalitis (GAE) – A serious infection of the brain and spinal cord that typically occurs in persons with a compromised immune system.

Feature Article continued

Disseminated infection – A widespread infection that can affect the skin, sinuses, lungs, and other organs independently or in combination. It is also more common in persons with a compromised immune system.

Neurologic disease and respiratory tract disease are the most common presenting complaints in dogs. Disseminated infection was present in all cases presented here, and GAE was present in one of the cases. Clinical disease is most commonly seen in younger dogs. There is no established treatment protocol in veterinary medicine and all reported cases with significant clinical signs have been fatal. Immunosuppression is thought to play a role but a cause of immunosuppression has not been identified in all cases. In the cases described above, administration of glucocorticoids was considered a factor in the first case, and co-infection with canine distemper was considered a factor in the third case.

Because the organism is common in the environment and has been found in heating and cooling systems, fresh and brackish water, swimming pools, and soil, contact can not reasonably be avoided. However, for dogs with a competent immune system, the likelihood of disease is very rare. For further information on acanthamoebiasis, please see the CDC website (<http://www.cdc.gov/parasites/acanthamoeba/>).

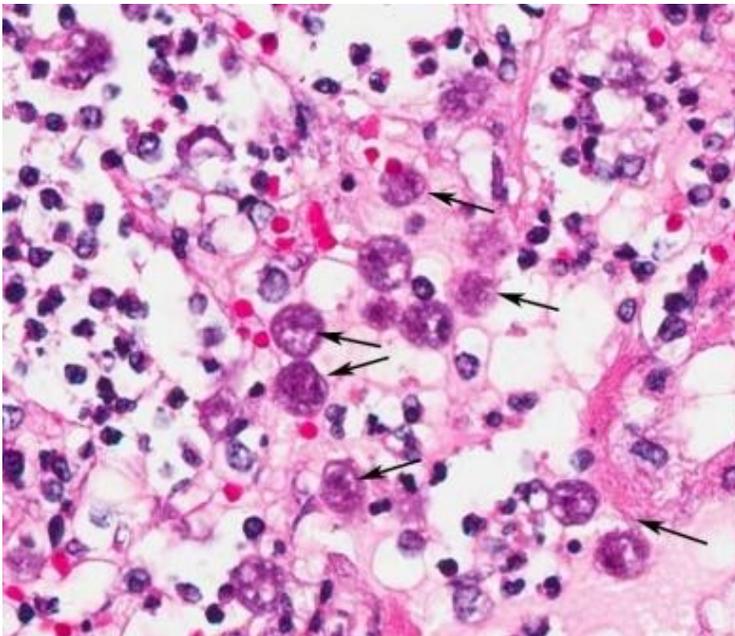


Figure 1: Lung of a dog with inflammation, edema and numerous protozoal organisms (black arrows) H & E 40 X.

Short Cuts

COMPANION ANIMAL

Canine

Sixteen cases of canine cardiac hemangiosarcoma were found when all the cases seen at the Western Animal Disease Diagnostic Laboratory between June 1, 2011 and June 1, 2013 were surveyed. The vast majority of the cases had a solitary tumor in the right atrium, while two cases had additional tumors elsewhere in the heart (ventricular septum or left ventricular wall).

The Golden Retriever breed was the most represented breed with six of the sixteen cases. The next most prevalent breed was the German Shepherd Dog with two cases. The following dog breeds had one case reported: Rat Terrier, Rottweiler, Labrador Retriever, Petit Basset Griffon, Scottish Terrier, Dalmatian, Sheep Dog and Mixed breed dog.

The majority of the dogs were nine years of age or older, with individual age breakdown being the following: Six years- one case, Eight years- two cases, Nine years- three cases, Ten years- six cases and four cases were over the age of ten.

The most prevalent clinical sign observed by the owner was sudden / unexpected death (ten cases). Six dogs had signs of dyspnea prior to death. Vomiting was observed in two cases and seizures were observed in two cases. In four cases where the onset of signs of illness was more progressive, thoracic radiographs showed questionable pulmonary lesions.

On post mortem examination, one of the most consistent gross lesions was cardiac tamponade (twelve cases). One case had hemoabdomen instead due rupture of a splenic tumor. Histological evidence of hemangiosarcoma in at least one additional organ of the body was present in fourteen of the cases.

Based upon the results of our retrospective case survey, we would recommend that veterinarians consider hemangiosarcoma of the right atrium to be a possible differential when presented with a case of sudden death in an older large breed dog.

Dr. David J. V. Drum

Feline

A 1-year-old male neutered domestic shorthair was euthanized due to a 2-month duration of weight loss and a 2-day duration of vomiting and lethargy with a painful abdomen. Gross examination findings revealed thin body condition, severe dehydration, and moderate plication of approximately 95% of the small intestines. A black thread was wrapped around the base of the tongue and extended to the distal jejunum (12 inches oral to the ileocecal junction). Multifocal linear mucosal ulcers that occasionally extended to the serosa were identified in the small intestine. The colon contained very firm, dehydrated feces covered with moderate amounts of blood. The clinical signs in this feline resulted from the gastrointestinal **linear foreign body**.

COMPANION ANIMAL, CONTINUED

Cats are often diagnosed with linear foreign bodies due to ingestion of string or thread; whereas dogs are usually diagnosed with nonlinear foreign bodies. Clinical signs may include inappetence, lethargy, depression, drooling, vomiting, inability to retain food or water, lack of feces production, and distended/painful abdomen. This case serves as a reminder for practitioners to check the base of the tongue in any cats with a history of gastrointestinal signs, especially vomiting.



Figure 1. Plication of small intestine



Figure 2. Linear foreign body at tongue base

Dr. Mahogany Caesar

Why does it seem that so many kittens are dying this spring? This is a common question among individuals submitting kittens to our laboratory. They not only want to know the cause of death in their kitten but want to know the “culprit” in other kitten deaths. During April and May 2013, fourteen kittens ranging from 5 days to 8 weeks of age were submitted to Rollins Laboratory for necropsy. Histopathology and bacterial cultures were requested for each case accession. Ancillary tests (ie. immunohistochemistry, viral isolation, electron microscopy) were requested based on the provided history and initial diagnostics performed. The following table provides a summary of diagnoses.

Number of kittens / cases	Diagnoses
4	Feline viral rhinotracheitis (herpesvirus)
3	Feline enteric coronavirus
1	Feline viral rhinotracheitis (herpesvirus) and cerebellar hypoplasia associated with feline panleukopenia in-utero infection
1	Calicivirus
1	Calicivirus, Bronchopneumonia (<i>Pasteurella multocida</i> and <i>Mycoplasma</i>) and Feline leukemia virus
1	Septicemia (beta-hemolytic <i>E. coli</i>)
1	Bronchopneumonia with pleuritis (Beta-hemolytic <i>E. coli</i> and <i>Streptococcus canis</i>)
1	Malnutrition
1	Starvation

COMPANION ANIMALS, CONTINUED

Of the 14 cases submitted, thirteen were submitted directly from a Wake County animal shelter/rescue agency and one from a private practitioner in Wake County. Three of the kittens diagnosed with feline herpesvirus were littermates. Two of the kittens diagnosed with feline enteric coronavirus were housed in separate groups from the same rescue agency.

So what's killing the kittens? Nothing new, just the same common infectious diseases seen in kittens year after year after year.

Dr. Mahogany Caesar

LIVESTOCK

Equine

A 227 kg, 3 year-old Quarterhorse gelding is presented for necropsy. The horse had a long history of being thin, and in poor condition. The horse was observed grazing early in the morning, and was then found deceased that afternoon. On necropsy, the horse was very thin, mildly dehydrated, and had mild tissue autolysis. There was a noted lack of adipose tissue surrounding the heart, and the abdominal viscera on initial examination. Significant lesions were found in the kidneys, which were both swollen, and on cross section, contained numerous calculi that ranged in size from 0.25-2.5cm in diameter. The calculi were dark brown in color, had roughened edges, and were found throughout the medullae, and within the renal pelvis of both kidneys. The urinary bladder contained 10-15mL of light red urine. There were no uroliths found in the urethra. A sample of bone marrow was collected, and had a light yellow color, and gelatinous texture. On histopathology, the bone marrow showed adipocyte atrophy, which was severe, diffuse, and chronic. The kidneys had corticomedullary sclerosis, severe, diffuse and chronic with tubular ectasia, proteinuria, oxalate crystals, and glomerular senescence. In addition, there was some tissue in the kidneys which appeared to be embryonic in nature, which could suggest renal dysplasia in this horse. **Renal dysplasia** is an abnormality in which the structure of the kidneys is altered during nephrogenesis, and is likely a genetic anomaly. The changes in the kidneys are consistent with long-term, chronic renal failure, which likely caused the poor appetite in this horse, and its ultimate demise.

Dr. Brad Barlow

A 5 year old intact male miniature horse weighing 136 kg was presented for necropsy with a history of not feeling well the previous few days. On physical examination by the veterinarian, the horse was depressed, dehydrated and had a temperature of 105.5 degrees Fahrenheit. The horse was treated with phenylbutazone and ceftiofur. A couple of days later the horse was recumbent as his front legs were stiff and he was unable to use his back legs. The horse developed agonal breathing and died.

LIVESTOCK, CONTINUED

On gross necropsy there were multifocal dark red foci in the mid to caudal thoracic spinal cord on cut surface, multifocal petechiae in the myocardium, and diffusely pink lungs that were spongy to slightly rubbery in consistency. Occasional dark purple/red areas were in the capsular surface of the spleen. There was an approximately 2 cm x 1 cm wide perforation in the esophagus near the tracheal bifurcation. A hematoma was between the esophagus and aorta subjacent to the perforation in the esophagus. A few linear cavitations were present in the gastric mucosa. Multifocal petechiae were in the serosa of the small intestine, large colon, and cecum. Multifocal dark red areas were in the mucosa of the small intestine, large colon, and cecum with the large colon and cecum affected more than the small intestine. A few tapeworms were present in the intestine. A focal red raised area was in the wall of the jejunum. The perirenal and mesenteric lymph nodes were reddened on their serosal surfaces

Histological findings by Dr. Alison Tucker included:

1. Multifocal neutrophilic meningomyelitis with vasculitis, necrosis and hemorrhage and with intravascular bacteria and plant material.
2. Multifocal acute nephritis with vasculitis, necrosis and hemorrhage and with intravascular bacteria and plant material.
3. Mild multifocal neutrophilic and lymphoplasmacytic portal hepatitis with multifocal random hepatic abscesses.
4. Multifocal intestinal erosions and ulcers with hemorrhage and with intravascular bacteria with segmental hemorrhagic colitis.
5. Multifocal gastric erosions and ulcers with hemorrhage and with intravascular bacteria.
6. Marked focally extensive subacute ulcerative esophagitis with transmural and adventitial necrosis, vasculitis, and multifocal thrombosis.
7. Focal splenic vascular thrombosis with intralesional bacteria and plant material.
8. Multifocal adrenal vascular thrombosis with intralesional bacteria, plant material and hyphal organisms and multifocal necrosis with hemorrhage (infarct).

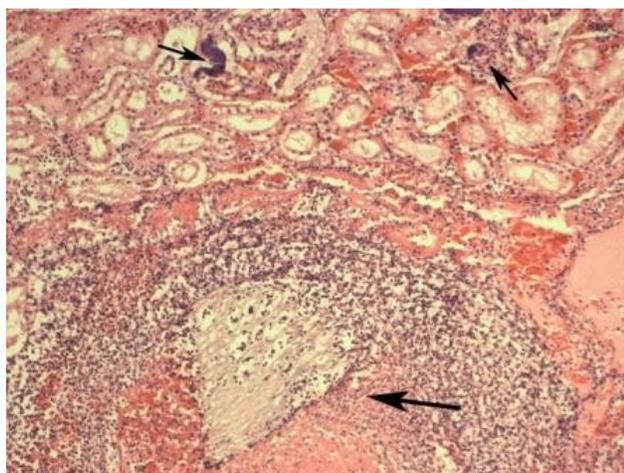


Figure 1: Kidney from a horse with a plant embolus within an arcuate vessel (large arrow) and with multiple bacterial emboli in glomerular capillaries (small arrows). H & E 10X. (Photomicrograph by Dr. Alison Tucker).

LIVESTOCK, CONTINUED

Routine aerobic cultures: One colony of *Actinobacillus* sp. resembling *Actinobacillus arthritidis* was isolated from the heart. One colony of *Streptococcus equinus (bovis)* was isolated from the spleen and a few colonies of *Streptococcus equinus (bovis)* were isolated from the kidney.

Diagnosis: **Intravascular plant emboli**, vascular thrombosis and bacterial septicemia secondary to esophageal ulceration/perforation and/or gastrointestinal ulceration

Comment: Intravascular plant emboli have never been seen at this laboratory before to our knowledge. The plant material with the fungi and bacteria likely entered the blood stream secondary to either the esophageal ulceration or the gastrointestinal ulceration. As the fungi were associated with the plant material only, they were considered to most likely be plant fungi. The *Actinobacillus arthritidis* and *Streptococcus equinus (bovis)* may have been involved in the septicemia but recent antibiotic treatment may have prevented us from isolating other bacteria that may have been involved in the septicemia.

Dr. Stacy K. Robinson

The chief complaints in a 2-year-old American Miniature Horse mare were lethargy, inappetence, arrhythmias and diffuse muscle fasciculations. The mare was febrile and tachycardic with purple mucous membranes and signs of colic. Noteworthy serum chemistry findings included elevated lactate and creatinine kinase (2000+ mg/dL). On necropsy, there were multifocal pinpoint hemorrhages along the colonic mucosa and moderate numbers of whipworms in the colon. A suppurative enteritis with bacilli and erosive colitis with bacilli were identified on histopathology. A single Oleander bush was found approximately 20 feet from the pasture. A diagnosis of **oleander toxicosis** was made based on the detection of oleandrin in the gastrointestinal contents submitted to the veterinary toxicology laboratory at the University of California Davis. Another miniature horse from the same pasture died the previous week; blood from that animal also tested positive for oleandrin.

Oleandrin is a toxic glycoside found in the plant oleander. The finding of oleandrin is consistent with exposure to *Nerium oleander*. All parts of the plant, both dried and fresh, are highly toxic. Oleander toxicosis can cause diarrhea, cardiac arrhythmias, and death. Oleander shrubs or trees have leaves that grow in whorls and are prominently, finely, pinnately veined beneath. Their flowers are showy, white to deep pink.



Oleander photograph from Merck Veterinary Manual 10th edition (online)

Dr. Mahogany Caesar

LIVESTOCK, CONTINUED

Camelid

A 101 kg, 5 year-old female llama is presented for necropsy. The llama was found deceased without any previous signs of clinical disease. The llama was in good body condition, was mildly dehydrated, and had mild tissue autolysis. On gross examination, there was a significant amount of wet, muddy grass found in the oral cavity, and distal esophagus. The cranial lung lobes were dark purple, and were very wet and rubbery on palpation. The caudal lung lobes were light pink to purple in color, and were wet and rubbery to touch. The C1 stomach compartment contained grass/hay ingesta, and the rumen pH was 8.0. The intestines have a tan to light red serosal surface, and contain brown liquid ingesta. The colon and rectum contain formed fecal pellets. The brain had diffuse mild cloudiness present in the meninges. There were no other lesions in any other organ system. Rabies testing was performed, and was negative. On histopathology, the brain had neuronal necrosis, segmental to regional, acute to subacute, moderate, with perivascular lymphohistiocytic inflammation, gliosis, and spheroids. These changes are consistent with **Polioencephalomalacia**, a degenerative neurologic disease of ruminants. This is a condition in which the tissue in the outer layer of the brain dies, and causes neurological signs such as blindness, and ataxia. Polio has been associated with vitamin B1 (thiamine) deficiency and with high dietary sulfates, which may be found in feed or water sources. Polio has also been observed in llamas that have undergone a sudden dietary change, consumption of feeds with high molasses content, rumen acidosis, and overdoses of Amprolium, which is used to treat coccidiosis. The other differential causes in this case would be lead toxicity, or salt water ingestion, which were both confirmed by the owner not to be a problem on the farm.

Dr. Brad Barlow

Caprine

A 2 month old intact male mixed breed goat weighing 6.0 kg was submitted for necropsy. The goat had a history of chewing on his hind legs and tail for the previous 10 days. During the last few days prior to death, the goat walked slower and was stiff legged in the hind legs. He also exhibited a shifting leg lameness in his hind legs and would occasionally kick his hind legs out. The goat also isolated himself from the rest of the goats. Seizures and possible “walking in circles” were reported. The goat died the next day. The history indicated that the goat had an encounter with a skunk 4 to 6 weeks prior to the goat’s death. On gross examination of the animal, alopecic, rough and thickened skin was in the perineum with a few small ulcerative areas on the ventral surface of the tail. The rest of the gross necropsy was unremarkable.

Histopathology findings by Dr. Peter Moisan consisted of:

1. Encephalitis, moderate, subacute, lymphocytic and perivascular, regionally extensive, with neuronal necrosis and glial nodules.
-

LIVESTOCK, CONTINUED

The brain was **positive** for Rabies via Direct Fluorescent Antibody test (DFA) as tested by the State Laboratory of Public Health.

Diagnosis: Rabies Viral Encephalitis

Comment: According to the 2nd edition of Goat Medicine by Mary Smith and David Sherman, in experimental rabies infections, goats infected with the virus exhibited a wide range of symptoms early in the course of disease which included pruritus with self -mutilation and standing off in corners in addition to various other symptoms. Later in the disease process of these experimental cases, frothy salivation, staggering, incoordination, muscle tremors, circling, torticollis inability to eat, and protrusion of the tongue were reported. Near the time of death animals were in lateral recumbency, paddling and had nystagmus, pupillary dilatation and posterior paralysis. In reports of natural infections in goats in South Africa aggressive behavior (the most common symptom reported), excessive bleating, salivation, and paralysis were observed in the goats. The duration of illness is reported to be usually between 1 to 5 days with the course of disease ending in death.

Reference:

Smith MC and Sherman DM: Goat Medicine, 2nd ed. Wiley-Blackwell, Ames, Iowa., 2009; pp171-174.

Dr. Stacy K. Robinson

Two Nubian mix breed caprine goat kids were presented for necropsy. These were the 2nd and 3rd newborn goat kids that were born recently and were never able to stand. Head and body tremors as well as head bobbing were seen in the kids. All of the kids were from different does but a new buck that had been purchased was the sire of all three kids.

A gross necropsy was performed on both kids. Kid 1 was an 8 day old intact male (4.0 kg) and kid 2 was a 5 day old intact male (3.5 kg). Both kids were in normal hydration status. Kid 1 was in good to slightly thin body condition. Kid 2 was in mildly thin body condition. Mucous membranes of the kids were pale pink to white. In Kid 1 the left side of the cerebrum was red and the left side of the cerebellum was red on the surface. A cross section of the brain stem was also reddened. The brain did not fluoresce under the wood's lamp in either goat. Kid 1 had bilaterally, severely enlarged thyroid glands. The thyroid glands in kid 2 were slightly enlarged.

LIVESTOCK, CONTINUED

Histopathology findings by Dr. Peter Moisan included:

1. Brain, spinal cord; neuronal and astrocytic intracytoplasmic vacuolar change.
2. Liver; bile duct and hepatocyte intracytoplasmic vacuolar change.
3. Kidney; tubular intracytoplasmic vacuolar change.
4. Small intestine, colon; ganglioneuronal intracytoplasmic vacuolar change.
5. Adrenal gland; cortical cellular intracytoplasmic vacuolar change.
6. Thyroid gland, follicular cell intracytoplasmic vacuolar change.
7. Paraganglion; ganglioneuronal intracytoplasmic vacuolar change.

Special stains were performed on neural tissue and tissue from the thyroid gland. The toluidine blue did not greatly enhance the vacuoles. PAS stain caused enhancement of the vacuoles due to the presence of sugar moieties within the storage product.

Diagnosis: Lysosomal Storage Disease- Consistent with Beta Mannosidosis

Comment: The history, clinical signs, and histopathology findings were most consistent with the storage disease in goats known as Beta Mannosidosis. Beta mannosidosis in goats is heritable and at this time has been seen only in Nubian and Nubian crosses. According to Goat Medicine 2nd edition by to Dr. Mary Smith and Dr. David Sherman, the condition is transmitted as an autosomal recessive trait. Animals with this condition are deficient in a catabolic lysosomal hydrolase. This deficiency results in accumulation of a substance in the lysosomes of cells. This substance would be broken down in normal animals that are not deficient in the hydrolase. The accumulation of this product results in the formation of vacuoles and destruction of cells.

Reference:

Smith MC and Sherman DM: Goat Medicine, 2nd ed. Wiley-Blackwell, Ames, Iowa., 2009; pp. 238-239.

Dr. Stacy K. Robinson

POULTRY

Two recent necropsy submissions to the Griffin Animal Disease Diagnostic Laboratory were unusual in the findings of viruses seldom reported in North Carolina.

The first case involved the examination of 6 Muscovy ducks found dead without indication of illness. The 4 male and 2 female birds were in good general body condition. Hemorrhage and necrosis of the intestinal mucosa as well as swollen spleens and livers were noted in the birds. Histopathology findings included mucosal hemorrhage and necrosis of the intestine, hepatic necrosis, and hemorrhage and necrosis of the spleen. Eosinophilic intranuclear inclusion bodies were seen in sections from the intestines, livers and spleens. These findings were consistent with Duck Viral Enteritis. Duck Viral Enteritis (DVE), also known as Duck Plaque is caused by a herpesvirus and may cause disease and high mortality in ducks, geese and swans. The infection may become latent and asymptomatic waterfowl may spread the disease.

POULTRY, CONTINUED

The second case involved 2 lambs which were reported to have a dry cough and diarrhea for about 1 week before death. Other lambs on the farm had been similarly affected in the previous 1 to 2 weeks. The lungs were dark red and slightly firm in a cranioventral distribution in one lamb and mildly reddened in the other lamb. Watery, green intestinal content was present in both lambs. Histopathology findings included bronchiolitis and mild suppurative enteritis. Intranuclear inclusion bodies were observed in lung sections. Lung and intestinal sections were positive by immunohistochemistry for adenovirus. Adenovirus is reported to cause respiratory infection and diarrhea, primarily in young lambs. The severity of a typical adenovirus infection may vary and more serious disease may depend upon the presence of other disease agents or stress factors. Conclusive reports of adenovirus infection in sheep and goats in North Carolina are lacking.

Dr. Reg Ridenhour

DEPARTMENTAL NEWS

ROLLINS LABORATORY

Rollins Lab New Hires

Melissa Waller, Medical Lab Technologist III (Molecular Diagnostics)

Paul Hutter, NCVDLS Safety Officer

Rollins Lab Resignations

Laura Tweed, Medical Lab Technologist II (Bacteriology)

Eileen Floyd, Medical Lab Technologist II (Bacteriology)

Rollins Lab Retirement

Doug Carroll, Maintenance Mechanic, April, 2013

NORTHWESTERN LABORATORY

Northwestern Lab Resignation

Dr. Darrell Rector, Veterinarian, April, 2013

GRIFFIN LABORATORY

Griffin Lab New Hire

Deirdre Mahaffey, Vet Lab Assistant

Griffin Lab Retirement

Maggie Nelson, Vet Lab Assistant

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[Dr. Richard Mock](#)

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[Dr. Tahseen Abdul-Aziz](#) (Avian)

[Dr. Peter Moisan](#) (Anatomic)

[Dr. Steven Rushton](#) (Anatomic)

[Dr. Alison Tucker](#) (Anatomic)

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[Dr. Stacy Robinson](#)

[Dr. Mahogany Caesar](#)

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