

The NCVDLS REPORT



Accredited by the American
Association of Veterinary
Laboratory Diagnosticians

Veterinary News and Information From North Carolina's Diagnostic Laboratories

From The State Veterinarian by David T. Marshall, DVM

What a busy past four months it has been! An AAVLD site accreditation review, General Assembly initiatives, renovation projects at several facilities, end of the fiscal year budget activities, and the continued variety of interesting cases have kept things quite challenging within our laboratory system.

I write this message in a new role, as I am pleased to announce that Dr. Karen Post assumed the role of Laboratory Director as of May 1, 2008. I could not be more pleased at this appointment, as Dr. Post has provided invaluable support to me over the past three years while serving as Assistant Director in addition to her duties as head of our bacteriology and bacterial serology sections. She has extensive knowledge of the veterinary diagnostic laboratory arena, is nationally recognized and respected in her field of expertise, has an in-depth knowledge of QA/QC, and exhibits a tremendous work ethic with good finishing skills. Her impact on the system in her 16 years of employment with us has been significant, and this new role will only allow her to positively impact the system more effectively. Please join me in welcoming Karen to this new position.

During the week of May 12th, we hosted a four member AAVLD site review team as part of the accreditation review process. The members included three current or former directors of other diagnostic laboratories, and the QA manager from the California system. The site visit involved a detailed review of our facilities, standard operating procedures, the Quality System, case reports, safety program, LIMS system, and interviews with our employees and selected clients. In addition, members traveled to each of our four branch lab facilities. While we haven't received our final report at this time, the committee was highly complimentary on all aspects of the review, and specifically mentioned the significant improvement from the previous review conducted in 2004. I would expect a final decision later this year of nothing less than full accreditation. Thanks to all of our employees who were so integral to the success of this review and the improvements that have been made over the past several years.

As of this writing, the General Assembly is in conference trying to hammer out differences between the House and Senate versions of the short session budget. One of our initiatives, a new incinerator for the Rollins lab, is included in both versions of the budget. The renovation funding to convert an unused section of the of the Rollins facility to BSL2+ space for expanded PCR capabilities was in neither version, but I am told that other avenues (Repair and Renovation funding) are a distinct possibility for that project. A third request, funding for a comprehensive study of the laboratory system, was included in the House budget but not the Senate. We are working to have it favorably approved and included in the final budget during conference negotiations.

Please accept my thanks for the privilege of working with a great group of clients. Feel free to contact Dr. Post, me, or any of our employees if we can be of assistance.

Regards,
David T. Marshall



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

Holiday Closings...

July 4, 2008

September 1, 2008

Our laboratories will be closed on the
above listed days.

Please e-mail
NCVDL@ncmail.net with any
comments and/or suggestions
concerning The NCVDLS
Report
Editor - Dr. Tim McComb

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Feature Article

North Carolina Hosts “Operation Flock Together” Exercise

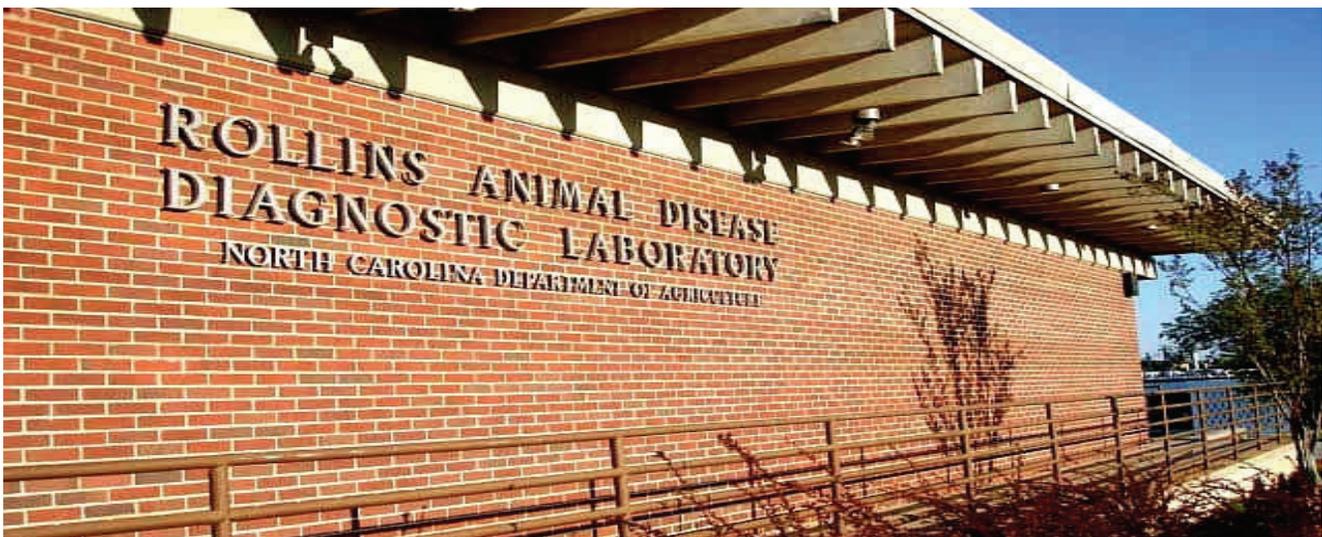
by Dr. Tim McComb

At the end of April the NCVDL and NCDA&CS Veterinary Division field forces worked alongside a multitude of local, state, and federal agencies in “Operation Flock Together”, a program designed to simulate an outbreak of Highly Pathogenic Avian Influenza in North Carolina. Participating agencies included the state departments of Public Health, Wildlife Resources, Environment and Natural Resources, and the Emergency Programs division of our department. Also playing an essential role in the exercise were members of the poultry industry, and faculty from the College of Veterinary Medicine and Agriculture and Life Sciences departments at North Carolina State University. Two field locations were chosen, in Sampson and Alexander counties, with about 60 participants present at each site and the incident command structure was divided between the Rollins laboratory and the State Agriculture building in downtown Raleigh.

The simulation began with a discussion guided by powerpoint slideshow outlining the details of the initial detection of the outbreak. At this stage, all locations were connected via conference call, and emphasis was placed on industry field representatives as they responded to the scenario play. After the slideshow, the exercise allowed the site teams and ICS to work in real time establishing organizational structure, delegating responsibilities, gathering information and executing action plans according to the North Carolina Response and Containment Plan for Highly Pathogenic Avian Influenza. With some initial encouragement from the exercise director, the ICS took shape loosely as outlined in the containment plan with cooperation among the various participating departments and industry members. The overall purpose of the drill was to “evaluate current response concepts, plans and capabilities for a response to an avian influenza event in North Carolina”. It was not intended to place any individuals under scrutiny, rather focus on the “processes and decision making....coordination, integration of capabilities, communication, and problem identification”.

Specimens had been stockpiled over the previous weeks to challenge the capacity of the Rollins laboratory to handle testing on such a large scale as quickly as possible. A huge part of the success of the drill was identifying weaknesses in the response and containment process, of which there were plenty. A “hotwash” session was held the following days to review the perspectives of all involved and develop a comprehensive list of strengths and weaknesses. Another meeting is scheduled for June where an action plan will be finalized to address these areas for improvement.

Two technological highlights of the exercise were North Carolina’s Multi-Hazard Threat Database (MHTD) and the USDA’s Emergency Management Response System (EMRS). The MHTD is an online database designed to track information regarding disease threats or natural disasters. Clinical case information is entered, and the program is able to generate a map displaying the location and timeline of the occurrences. The maps are also used to scrutinize the affected region to analyze for other impacts any threat may have. For this drill, the maps were generated for the two site locations and used to identify other poultry facilities within a two mile radius so that further health surveillance of surrounding flocks and employees could be rapidly initi-





Feature Article (Continued)

ated. More information on the MHTD system can be found at <http://www.agr.state.nc.us/oep/MHTD/index.htm>. The EMRS, a program of the USDA, is designed to assist with the “management and investigation of animal disease outbreaks in the United States”. The intention is to streamline and automate routine tasks involved with an outbreak investigation as well as provide documentation of the many steps taken along the way. More information on the EMRS can be found at <http://www.aphis.usda.gov/vs/ceah/ncahs/nsu/outlook/issue5/EMRS.pdf>. Representatives from state and federal level commented that both of these systems are under-utilized, and they are working hard to increase awareness of the benefits that can be gained when employing the MHTD and EMRS.

This step towards preparing for an actual FAD event is something that few other states have organized. The ongoing cooperation and participation among so many different agencies, departments and industry partners is to be commended.

Client Corner

Neurologic and Musculoskeletal Cases Require a Team Effort

by Dr. Jennifer Haugland

Animals with neurological clinical signs are often presented for necropsy examination because an etiology could not be determined prior to death. Finding a diagnosis in the field or veterinary hospital often requires radiographs, complete blood work, and sometimes a referral to a specialty hospital for CT or MRI scans. Often the owner is unable to afford advanced diagnostics or the animal dies before the tests can be done. Just as it can be difficult to diagnose the disease in the hospital it can also be difficult to diagnose the disease at the diagnostic laboratory. Although the intact nervous system is presented to the laboratory, it is not practical or realistic to grossly and histologically examine the system in its entirety from the central nervous system to peripheral nerves. This is when the veterinary diagnosticians rely on findings from a *complete* neurological examination to help localize the lesion so that a careful examination is done of the area that matches the clinical findings. These findings should be written down and presented to the laboratory when the animal is submitted. We cannot rely on the owner to remember and accurately relay this type of information. The following is a list of questions that should be answered by a complete neurological examination.

1. Mentation – Abnormal mentation suggests the lesion is within the cranial cavity.
2. Seizures – Please describe the seizure and the behavior between seizures. Remember most animals will seize or appear neurologically impaired just before they die.
3. Head tilt or cranial nerve abnormality – Indicate the direction of the head tilt. Be sure to run through each cranial nerve to accurately localize the affected nerve(s) and the correct side of the brain. A full cranial nerve exam can take less than 5 minutes.
4. Ataxia – Suggests the lesion is in the brain stem and/or cerebellum. Evaluate for any differences between legs. Weakness from systemic disease, malnutrition, and anemia can also appear like ataxia.
5. Paresis – Evaluate the strength of each leg. It is especially important in horses to evaluate the gait for evidence of ataxia, paresis, and dysmetria by walking, trotting, backing, circling, pulling the tail, lifting the head, and walking up and down a curb and a hill. Also evaluate any muscle atrophy, skin sensation, tail/anal tone, and for the presence of cervical pain.
6. Conscious proprioceptive – Test each leg and evaluate if there is a difference in severity between the legs. Again, for horses this is very crucial.
7. Paralysis – Be sure to check for motor, reflexes, and deep pain and note the differences between legs. For large animals try to determine if the animal is truly unable to stand up (but tries to) due to musculoskeletal problem or is unwilling to stand up because there is nervous system problem.
8. Rule out musculoskeletal disease. See next paragraph.



Client Corner (Continued)

Animals with lameness or signs suggestive of intervertebral disc disease are often submitted for necropsy examination with little previous diagnostic testing. Although it seems plausible that a bone or joint disease or a small fracture could be easily found on gross examination, that is not the case. The skeleton of the animal cannot be extracted from the rest of tissues without the aid of chemicals or beetles. There is abundant muscle and tendon attachment to the bones that do not easily cut away making lytic bone lesions difficult to find unless a physical exam and radiographs have localized the lesion. In the cases of back problems in small animals localization of the lesion by neurological examination and radiographs can help us determine if this a primary spinal cord problem or a skeletal disorder. Depending on how large the animal is, we often have to decide whether to preserve the spinal cord or the vertebrae because we may not be able to do both when cutting down the back with a bandsaw or the stryker saw. In such cases radiographs are an invaluable diagnostic tool and often the necropsy examination is incomplete without them. In some musculoskeletal cases, a necropsy examination will not provide any additional information. For instance, laminitis is diagnosed by physical exam and radiographs and thus a necropsy is not warranted. Other causes of limb lameness in large animals are best diagnosed with physical examination, radiographs, and/or ultrasonography rather than necropsy examination.

As many of these cases are complicated, a phone call to the diagnostic laboratory is always welcomed.

Case Submission Tips

Scours in ruminants, swine, and horses is enzootic on many farms. When faced with an outbreak, producers occasionally present the laboratories with animals that have been treated for several days. Etiological agents recovered from such animals often represent secondary infections and may mislead the practitioner with respect to the initiating cause. For accurate diagnosis, it is important to submit fresh feces from untreated animal(s) in early stages of the disease to the laboratory. The best samples are those collected from the animal before the feces have contact with the ground. Submission directly to the laboratory or overnight on ice is recommended for best results in cases of viral, bacterial, or cryptosporidial diseases. If cryptosporidiosis is suspected, feces should be submitted in 10% formalin at 1 part feces to 1 part formalin.

Dr Peter Moisan

Acidosis from grain overload continues to be a nagging problem in North Carolina ruminant operations. If performing a field necropsy on suspected cases, we recommend submission of formalin-fixed rumen, abomasum, small intestine (several sites), and liver, as well as any other grossly abnormal tissues. Freezing back rumen contents may be helpful in the event of a toxicity event. The pH of the rumen should also be measured. If rumen contents are below about pH 5.4, the condition is highly suggestive of acidosis, especially in a poorly adapted animal. The pH of rumen contents after death slowly approaches neutrality, however, acidosis can still be diagnosed with pH paper 18-36 hours after death. When submitting animals to the Diagnostic Laboratory for necropsy, remember that acidosis can cause rapid putrefaction of an animal. Immediate field necropsy may be preferable to a delay in transit.

Dr. Peter Moisan

Short Cuts

Companion Animal

From January 1 through May 31, 2008, the most common diagnosis reported from Canine and Feline necropsy submissions were Parvoviral enteritis and Feline Infectious peritonitis, respectively.

Canine

The Rose Hill branch laboratory has recently reported two diagnoses of **hepatic lipidosis** in unrelated toy breed dogs with a clinical history consistent with hypoglycemia. This occurs most often in toy breed dogs less than

three months of age and Yorkshire terriers seem to be especially prone to this disorder. Metabolic demand for energy from the organs outpaces the ability of the disproportionately small liver and pancreas to maintain the blood glucose levels. The risk of developing the condition reduces with age as the metabolism is better able to keep up with demand.

Dr. Tim McComb

The Western Animal Disease Diagnostic Laboratory received a 6 year old male Yorkshire Terrier-mixed breed dog with a history of **abdominal distention** which



Companion Animal

was non-responsive to treatment. The dog was potbellied, had mild ascites and abdominal alopecia. The liver was grossly enlarged and was mottled in appearance. The pancreas was thickened with saponification of the surrounding omental tissue. The adrenal glands were grossly enlarged, and a small mass was identifiable in the area of the pituitary gland. The dog was diagnosed with a pituitary gland carcinoma. Because the tumor was endocrinologically active, secondary adrenal gland cortical hyperplasia, steroid hepatopathy, and pancreatitis resulted.

Dr. David Drum

A 9 year old mixed breed female dog with a history of **intervertebral disc disease** between T3 and L3 that responded to NSAID therapy became ataxic in the rear limbs. The dog had proprioceptive and hopping deficits. The dog was treated with carprofen and the fentanyl patch. The dog began vomiting and became listless a day later and then died the following day. At necropsy, mucous membranes were pale and there were dark red masses in the cerebrum, right atrium, lung, liver, right kidney, serosa of the small intestine, perirenal, mesenteric and omental fat, and skeletal muscle of the right hindleg, right axilla, and the epaxial muscles.

Hemangiosarcoma was confirmed in all the aforementioned locations by histopathology. Although, hemangiosarcoma is a common tumor diagnosed at necropsy, this case was unusual because of the numerous organs that were affected. It was particularly unusual to find it in the skeletal muscles.

Dr. Stacy Robinson

Lymphocytic thyroiditis was diagnosed in a six year old male neutered Siberian Husky, which was euthanized after developing acute ataxia and decreased proprioception of the right thoracic and pelvic limbs several days after being boarded at a kennel. The dog was known to have diabetes and hypothyroidism. Gross lesions included a hypermature cataract, renal and corneal lipidosis, severe atherosclerosis of the coronary arteries, and a hypoplastic left thyroid gland (the right thyroid gland was not identified). Regionally extensive myelomalacia with spheroids, gitter cells, and extramedullary intravascular lipid emboli and encephalomalacia with granulomatous choroid plexitis were identified histologically. Long term and severe hypothyroidism can result in secondary extrathyroidal lesions, including atherosclerosis, renal and corneal lipidosis, and spinal cord necrosis. Veterinary literature reports that Siberian Huskies are predisposed to hypothyroidism.

Dr. Mahogany Wade

Exotics

A female **Fancy Goldfish** was presented to the Western Animal Disease Diagnostic Laboratory because it had been lethargic, anorexic and had shallow respiratory efforts. The fish had superficial, raised hematoma-like growths over the head, above the eyes, over the dorsum

and cranial to one of the pectoral fins. Aerobic culture of the kidney was positive for *Aeromonas hydrophila*. *Aeromonas hydrophila* causes a disease in fish which is commonly referred to as either "Motile Aeromonas Septicemia" (MAS), "Hemorrhagic Septicemia," "Ulcer Disease," or "Red-Sore Disease." The many synonyms of this disease are descriptive of the lesions caused by this bacterium, including lesions of septicemia when the bacteria or bacterial toxins are present within numerous organs and ulcers of the fish's skin. *Aeromonas hydrophila* is commonly isolated from fresh water ponds and is also a normal inhabitant of the gastrointestinal tract of fish. The disease primarily affects freshwater fish such as catfish and bass, and many species of tropical or ornamental fish. Fish infected with *Aeromonas hydrophila* may have many different clinical signs. These range from sudden death in otherwise healthy fish to inappetence, swimming abnormalities, pale gills, bloat and skin ulcerations. The skin ulcers may occur at any site on the fish and often they are surrounded by a bright red rim of tissue.

Dr. David Drum

A 8 year old female **Boa constrictor** was presented to the Western Animal Disease Diagnostic Laboratory. The snake had a history of thick white mucus from the mouth for a couple days, which later turned green in color. The snake also appeared to have lost weight. On post mortem examination a thick yellow mucopurulent exudate originating from the esophagus filled the mouth. The exudate continued to the proximal intestine. There was slight thickening of the gastric mucosa. The wall of the proximal intestine was thickened. The intestinal mucosa had a terry cloth appearance. The exudate in the intestine had an unusually foul odor. The liver had a nutmeg pattern of discoloration. Histopathology revealed a regionally extensive fibrinonecrotizing and ulcerative gastroenteritis was present, along with a macrovacuolar hepatopathy. Additionally, intracytoplasmic inclusion bodies were present in all tissues examined. The snake was diagnosed with Inclusion Body Disease. This disease is believed to be caused by a retrovirus. The way it affects boas and pythons is slightly different but the disease is always terminal in animals who exhibit clinical disease. Signs of infection in boas include central nervous system disorders such as paralysis, being unable to right itself when turned over, "star-gazing", inability to strike or constrict. Other signs include chronic regurgitation, extreme weight loss, respiratory infections, and poor shedding due to the inability to control body movements enough to rub off the old skin. In pythons, the disease progresses much more rapidly than in boas. Along with the above symptoms (excluding the chronic regurgitation), pythons also tend toward infectious stomatitis ("mouth rot"), heightened or exaggerated reflex responses, disorientation and loss of motor coordination. The snake mite, *Ophionyssus natricis*, has been found in collections in which IBD has occurred but it is not implicated in all cases of infection. Since the disease is believed to be a viral entity, it may spread through physical contact or through airborne aerosolized secretions.

Dr. David Drum



Companion Animal (Continued)

Feline

A 12 year old DSH male neutered cat was diagnosed with **Lymphangiosarcoma**. One month prior the owner had reported to the referring veterinarian that the cat was "lactating". The cat had a clear discharge from the skin in the region of the caudal mammary glands. The cat was euthanized. This is the third diagnosis of lymphangiosarcoma by the Laboratory system thus far this year. The first case was another feline necropsy case and the second was a canine biopsy case. Lymphangiosarcoma is a tumor of the lymphatic endothelium and is quite rare. These tumors are usually found along the ventral midline. They often exude a clear serous fluid. Local infiltration is usually seen though metastasis is rare.

Dr. Stacy Robinson

Feline rhinotracheitis virus (FHV-1) infection was diagnosed in a 3 week old DSH kitten. At least one other sibling in the foster home died. Mild chemosis, ocular discharge, mucoid nasal discharge, and pneumonia were seen grossly. Histological lesions included interstitial pneumonia with necrotizing bronchiolitis, rhinitis, keratitis and hepatitis with occasional intranuclear inclusion bodies. Lung sections were positive for this herpes virus by fluorescent antibody tissue section technique (FATST). This is the third confirmed case of feline herpes virus this year. Several other young kittens have had gross and histological changes suggestive of feline herpes virus but were not confirmed by fluorescent antibody testing or lacked inclusion bodies in the histological sections.

Dr. Stacy Robinson

A 2 year old DSH cat was diagnosed with **Cryptococcosis** after a 2 week history of respiratory clinical signs and a later development of ataxia and nystagmus. The necropsy findings included multifocal to coalescing white pulmonary granulomas, tan colored granulomas in the kidneys, and enlarged popliteal lymph nodes. An impression smear of the pulmonary lesions stained with Diff-Quick revealed numerous yeasts consistent with *Cryptococcus*. Histologically, there was granulomatous meningitis, uveitis, optic nerve neuritis, lymphadenitis, nephritis, and pneumonia with yeasts in all tissues. *Cryptococcus neoformans* was isolated from the lung.

Dr. Jennifer Haugland

Cytauxzoonosis was diagnosed in 6 unrelated cats between April 14 and May 28. The Rose Hill lab received cases from Jacksonville, Wilmington and Warsaw,

while the Rollins lab received two cases from Chatham County and one from Orange County. The duration of clinical signs ranged from 2 to 14 days and consisted of anorexia (5), anemia and leukopenia (4), hyperbilirubinemia (2), fever (2), and icterus (1). Gross lesions included slight to marked splenomegaly (4), petechial hemorrhages of the lung (2) heart (2) and urinary bladder (1), and hydro or hemothorax (3). Systemic intrahistiocytic protozoal schizonts consistent with *Cytauxzoon felis* were identified in all cats. Organs commonly infected included lung (6), liver (5), and spleen (4). Other organs occasionally infected were brain, lymph node, heart, kidney, and bone marrow. Inflammation associated with the parasitism was rare. One cat had only cholangiohepatitis. Another cat that was treated for 10 days had lymphohistiocytic to granulomatous meningitis, cholangiohepatitis, lymphadenitis, and splenitis.

Cytauxzoonosis is a serious, often fatal protozoal disease affecting domestic cats in the south central and southeastern portions of the United States. The North American bobcat is the natural reservoir and the *Dermacentor variabilis* tick is considered the most likely vector. The prepatent period is 2-3 weeks. Schizonts develop within macrophages and the phagocytes become huge and numerous, line the lumens of vessels within almost all organs, and often occlude the vessel lumen. This rapid tissue phase is responsible for the sudden onset of severe illness seen in domestic cats. The schizonts develop buds (merozoites) and the merozoites invade erythrocytes and produce late stage parasitemia that is detected on blood smears, usually 1-3 days before death. Infected cats appear to die from a shock like state.

Drs. Jennifer Haugland and Carlton Rouse

A 3 week old male DSH feline was presented to the referring veterinarian for lethargy, dehydration, abdominal distention and diarrhea. He was unresponsive to antibiotic, anthelmintic and fluid therapy. Yellow foci of necrosis ~ 0.5 mm were disseminated throughout the hepatic parenchyma. Histopathology indicated a histiocytic and neutrophilic hepatitis with intralesional bacilli and histiocytic and neutrophilic encephalitis. A silver stain identified bacilli clusters along the periphery of the necrotic hepatic zones yielding a diagnosis of **Tyzer's disease**, a fatal condition caused by *Clostridium piliforme*. More commonly, the lesion is seen in foals and is rare in cats and dogs. Clinical signs are: (1) variable and may include anorexia, diarrhea, depression, recumbency and icterus and (2) acute in onset and rapidly progress to death within 24-48 hours. This disease primarily affects young, stressed animals.

Dr. Mahogany Wade

Livestock

From January 1 through May 31, 2008, the most common diagnosis reported for Cattle was *Manheimia haemolytica* pneumonia, followed by Blackleg. For adult horses it was colitis while in foals it was septicemia, with bacteria confirmed in four cases (*Actinobacillus sp.*, *Klebsiella pneumoniae* (2), and *Streptococcus equi* sp. *Zooepidemicus*). PRRS viral pneumonia was most common in swine submissions, while listeriosis and coccidiosis were the top diagnoses for goats. In poultry the top commercial chicken diagnoses were Infectious Laryngotracheitis and *Staphylo-*

siella pneumoniae (2), and *Streptococcus equi* sp. *Zooepidemicus*. PRRS viral pneumonia was most common in swine submissions, while listeriosis and coccidiosis were the top diagnoses for goats. In poultry the top commercial chicken diagnoses were Infectious Laryngotracheitis and *Staphylo-*



Livestock (Continued)

Coccus aureus arthritis.

Equine

On May 13, 2008, a state veterinary diagnostic laboratory in Virginia informed our State Veterinarian of a potential **Brucella** case involving an equine. The horse was a 19 year old Thoroughbred gelding located in the northeastern part of North Carolina, and had been examined by a licensed Virginia veterinarian for "poll evil." Serum and cultures were obtained and forwarded to the state laboratory in Ivor, VA. The serum tested positive for *Brucella* by the Buffered Acidified Plate Antigen (BAPA) presumptive test which is used primarily by a state-federal laboratory to classify animals negative on surveillance samples collected at slaughter or at livestock markets, on routine samples collected on farms, and on tests of suspicious and infected herds. Samples were then forwarded to National Veterinary Services Laboratory (NVSL) in Ames, IA for additional serological testing and bacterial culture.

United States Department of Agriculture (USDA) and North Carolina Department of Agriculture & Consumer Services Field Veterinary Medical Officers visited the premise to investigate and issue a quarantine notice. The horse was one of five on the site. There were no cattle or other livestock in the immediate area. No horses had moved from the site since the affected horse had entered the herd. The owner was advised of the potential zoonotic threat and educated on proper biosecurity protocols.

On May 29, 2008, NVSL reported that both the particle concentration fluorescent immunoassay (PCFIA) and the fluorescence polarization assay (FPA) serological tests that are capable of distinguishing animals infected with cross-reacting microorganisms, were negative for *Brucella abortus*. In addition, bacterial culturing failed to isolate any *Brucella* species. The case was therefore considered a serological false positive and was closed with quarantine release.

Brucella abortus (*B. abortus*), and less commonly *Brucella suis*, have been isolated from the equine bursitis conditions commonly known as "fistulous withers" and "poll evil". In regions where the prevalence of brucellosis is low, brucellae are rarely isolated from horses with these lesions. Other bacteria that may cause these conditions include *Actinomyces bovis* and *Streptococcus equi* subsp. *zoepidemicus*.

Although there is no formal equine brucellosis eradication program, standards for diagnosis of *B. abortus*-associated bursitis conditions have been established as a means to monitor possible bovine brucellosis and to protect the public from exposure to this zoonotic agent. The USDA has mandated that specimens be obtained and submitted to a federally accredited laboratory for bacteriologic culture. Because brucellae may be difficult to isolate, serum should also be tested for evidence of antibodies to *B. abortus* by more specific assays.

Positive results from a brucellosis card test should not be considered diagnostic because this test method has poor specificity with frequent false-positive results. The plate agglutination test is considered to be more sensitive and

specific with titers greater than or equal to 1:50 being considered as positive. More recent investigators have proposed plate agglutination titers of 1:100 or 1:160 or less to be negative for *Brucella* infection.

The major antigen that is useful in diagnosing brucellosis is the smooth lipopolysaccharide (LPS) of the outer cell membrane. All serological brucellosis tests show to a different extent cross-reactivity with LPS antigens from other Gram negative bacteria, such as, *Yersinia enterocolitica* 0:9, *E. coli* O157:H7, *Ochrobactrum* spp., *Francisella tularensis*, *Vibrio cholerae*, *salmonellae* and *Afipia* spp. Therefore it is possible in many *Brucella*-seropositive horses with fistulous withers and poll evil that their conditions are not caused by *B. abortus*.

Drs. David Marshall and Karen Post

An approximately 30 year old mixed breed pony mare was diagnosed with **Multiple Endocrine Like Syndrome** based on the presence of a pheochromocytoma, a C-cell carcinoma, and a pars intermedia adenoma. Multiple endocrine neoplasia syndrome (MEN) is well described in humans and there are a few reports in bulls, horses, and a few other domestic animals. In humans, the syndrome is characterized by the presence of benign or malignant proliferations within two or more endocrine glands. There are 2 reports of multiple endocrine proliferations in equines. In a report by De Cock and MacLachlan¹, a 22 year thoroughbred mare was diagnosed by post-mortem to have a unilateral malignant pheochromocytoma, bilateral adrenal medulla hyperplasia, and unilateral C-cell adenoma (parathyroid glands, pancreas, and pituitary gland were not evaluated). The other report² describes an 18 year old Irish warmblood with a unilateral pheochromocytoma, and a pituitary adenoma of the pars intermedia.

¹ De Cock HE, MacLachlan NJ: Simultaneous Occurrence of Multiple Neoplasms and Hyperplasias in the Adrenal and Thyroid Gland of the Horse Resembling Multiple Endocrine Neoplasia Syndrome: Case Report and Retrospective Identification of Additional Cases. *Vet Pathol* 36:633-6, 1999.

² Germann SE, Rutten SB, et al: Multiple endocrine neoplasia-like syndrome in a horse. *Vet Record* 159: 530-532, 2006.

Dr. Jennifer Haugland

Bovine

Bacterial infections caused by **Salmonella** continue to cost the cattle industry through morbidity, mortality, and poor-performing animals. *Salmonella enterica* serovar Newport (SN) strains are increasingly isolated from cattle and are responsible for septicemic illness in humans. According to the United States National Antimicrobial Resistance Monitoring System for enteric bacteria, an increasing number of SN isolates are multi-drug resistant, with the proportion of isolates resistant to 9 or more antimicrobial agents increasing from 1% in 1998 to 26% in 2001.

We have recently diagnosed an outbreak of salmo-



Livestock (Continued)

nellosis on a central North Carolina dairy farm. Twelve fecal specimens were submitted to the Rollins Laboratory from adult dairy cows with scours between March and May, 2008. Group C2 *Salmonella* was recovered from all. The isolates showed *in vitro* resistance to ampicillin, sulfisoxazole, and tetracycline. They were submitted to the National Veterinary Services Laboratory (NVSL) in Ames, Iowa for serotyping with final results characterizing the bacteria as SN.

NVSL listed SN as one of the top ten most frequently identified *Salmonella* serotypes from U.S. cattle from July 1998 through June 1999. SN causes significant clinical disease in cattle, especially adult dairy cows. The most common clinical signs are fever and diarrhea, although weakness, dyspnea, abortion and sudden death may also occur. Outbreaks must be differentiated from bovine viral diarrhea and "winter dysentery". The disease may become endemic for years on a farm, as bacteria rapidly spread among livestock and into the environment, potentially causing prolonged illness within the herd. The organisms are maintained by carrier animals, infected animals, rodents, and contaminate the environment, making it difficult to eliminate. Farming practices such as intensive rearing of livestock, movement of cattle between farms and the overuse of antimicrobial agents have probably contributed to the emergence of multi-drug-resistant SN. Due to the multi-drug resistance, these strains pose a public health threat to humans who might become infected and have need for antimicrobial intervention.

Dr. Karen Post

Listeriosis was diagnosed at the Western Animal Disease Diagnostic Laboratory in two adult cattle during the month of May, 2008. The first animal was a two year old female Angus-cross heifer who reportedly would continuously circle to the point of exhaustion. The animal also had tremors, was hyperexcitable and disoriented. The second animal was a 9 year old female Holstein who had a head tilt and would circle to the side of the head tilt. Both animals were negative when tested for Bovine Spongiform Encephalitis (BSE) and Rabies. The animals had a histological diagnosis of brain stem encephalitis, with perivascular lymphohistiocytic inflammation, neuronal necrosis, and gliosis. *Listeria* was isolated from brain tissue in one case, but only after a month in enrichment culture. While spoiled silage is often blamed in outbreaks of Listeriosis in dairy herds, the

source of infection in beef cattle is often unapparent. Brain stem tissue is the tissue of choice for bacterial culture.

Dr. David Drum

Caprine

A 5 month old female boer goat kid was diagnosed with ***Bibersteinia trehalosi* bronchopneumonia** and **Listeriosis** concurrently. The kid was found down and wheezing by the owner. Her head was turned towards her back. The goat was treated with oxytetracycline, and oral and parenteral fluids by the owner but did not improve. The kid was euthanized by the veterinarian. Bronchopneumonia was identified in the cranioventral lungs and caudal lung lobes involving 40% of the total lung area. Histologically, there was a meningoencephalitis that was confined to the brain stem. A few colonies of *Listeria monocytogenes* were isolated from the brain stem. Severe suppurative bronchopneumonia was identified microscopically in sections of lung and 2+ *Bibersteinia trehalosi* was isolated from the lungs in routine aerobic culture. *Bibersteinia trehalosi* (previously known as *Pastuerella trehalosi*) is a common cause of bronchopneumonia in small ruminants.

Dr. Stacy Robinson

A six year old caprine doe was euthanized after several intermittent episodes of star gazing and recumbency over a 7 month period. Initially, the animal was responsive to antibiotic therapy, however in the final episode, the pet remained recumbent with alert mentation. The necropsy revealed a 4 x 3 cm in diameter caudal mediastinal lymph node, a pancreatic mass with a mildly hemorrhagic core, and multifocal, firm coalescing proliferative masses ranging from 2 cm to 9 cm in diameter occupying approximately 85-90% of the liver. The larger masses were cystic and contained yellow-tinged, transparent fluid. **Cholangiocarcinoma** of the liver, lymph node and pancreas was diagnosed. These tumors are malignant neoplasms of biliary epithelium, which may metastasize. Cholangiocarcinomas occur in all species. The tumor is responsible for the progressive nature of the clinical signs observed in this case.

Dr. Mahogany Wade





Surgical Biopsy

From January 1 through May 31, 2008, the most common diagnosis reported from Canine and Feline skin biopsy submissions were Mast Cell Tumor and Fibrosarcoma, respectively.

In the past two months we have been noticing an increased number of **Osteosarcomas** that originate from the cranium and jaw in mostly dogs and occasional cats. Osteosarcomas of the axial skeleton are uncommon (4 fold less) compared to the limbs, however, their metastatic potential is still high, especially in the dog.

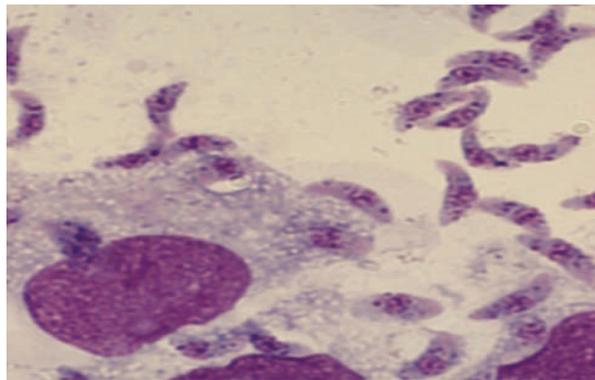
Dr. Steven Rushton

In the past three months there has been an increased number of **Cutaneous Lymphosarcomas** seen in the dog and cat. These tumors, unlike more common lymph node lymphosarcomas, do not respond to chemotherapeutic agents and often spread to other sites on the skin and in the visceral organs.

Dr. Steven Rushton

A necropsy performed by a small animal practitioner revealed a case of systemic **toxoplasmosis** in a puppy. The dog was 14-weeks-old and was presented initially with lethargy, inappetance, and markedly elevated liver enzymes. *Toxoplasma gondii* cysts were located in sections from the liver, lung, and pancreas. Feline species are the definitive hosts of *T. gondii*, though most other species, including humans, are susceptible. Infections of this severity are seldom seen in dogs. Infection was most likely due to ingestion of asexual stages of the organisms from feline feces.

Dr. Peter Moisan



Departmental News

ROLLINS LABORATORY

Histopathology... **Sharon Weber**, a registered histotechnologist, has recently started employment. Her husband is also employed with the State at the Murdock Center. **Mary Horne**, Histopathology supervisor recently received her 5 year service award.

Serology... **Jennifer Pruitt**, Serology supervisor, recently received her 30 year service award.

Bacteriology... **Angie Murphy** recently received her 10 year service award.

Virology... **Kim Howle** recently received her 15 year service award.

Quality Assurance... **Jeremi Clark** has been selected as the qualified candidate for the QA/QC assistant position. Previously she had been a technician in the Virology department and recently served as editor of the NCVDL newsletter.

Receiving... **Judy Liverman** is proud to announce her son Bobby Liverman will be joining the ranks of state employees with the NCDOT. He received his degree in Civil Engineering on May 10, 2008.

Safety... **Kathy Schmidt**, NCVDL Safety Officer, recently received her 10 year service award.

Necropsy... **Dr. Jennifer Haugland** recently received her 5 year service award. **Casey Pearce**, a graduate of NCSU, joins the Rollins Lab as a Necropsy Assistant.



MONROE LABORATORY

Carrie Rowell has joined the Monroe laboratory as Med Lab Assistant II. She received her degree in Chemistry from NCSU in 2007.

ELKIN LABORATORY

John Byrd, Medical Laboratory Technician, has retired after 30 + years of State service.

ARDEN LABORATORY

Delores Bane, Histology Technician, retired on March 31, 2008 after serving on the Western Animal Disease Diagnostic Lab staff for over 26 years. **Mary Swanson, DVM** has recently been promoted to Medical Laboratory Technician. WADDL staff and clientele mourned the loss of **Sandye Carpenter** who died unexpectedly at her home on the morning of April 2, 2008. As a temporary employee, Sandy had worked regularly over the previous 5 years at the Western Animal Disease Diagnostic Laboratory initially as a histology technician and most recently in the area of administrative support. She loved working at WADDL and often would introduce members of the staff as her "second family".

CE attendance

Dr. Jennifer Haugland attended the 33rd Eastern Fish Health Workshop in Atlantic Beach, NC and presented a case titled, Circling and Cloudy Eyed Tilapia.

Drs. Peter Moisan and **Steven Rushton** recently attended the Southeast Veterinary Pathology Conference in Tifton, GA

Employee of the Quarter

Congratulations Earlene



NCVDLS recognized Earlene Allen as the Spring 2008 Employee of the Quarter. In a letter of nomination, it was stated that Earlene "goes above and beyond to do the best in her job" and "her work ethic is impeccable and admired". Earlene is a Medical Laboratory Technologist in the Rollins Virology section and has been employed here since 1984. She is very active in her church and volunteers her time as an examination proctor at West Johnston High School. Congratulations!



Directory

Rollins Laboratory (919) 733-3986

Director

Dr. Karen Post

Veterinary Pathologists

Dr. Tahseen Abdul-Aziz

Dr. Peter Moisan

Dr. Steven Rushton

Veterinary Diagnosticians

Dr. Jennifer Haugland

Dr. Stacy Robinson

Dr. Mahogany Wade

Veterinary Microbiologists

Dr. Gene Erickson

Dr. Karen Post

Laboratory Section Supervisors

Kim Bennett—Virology

Sandy Murphy—Bacteriology

Mary Horne—Histopathology

Jennifer Pruitt—Serology

Beverly Wood—Molecular Diagnostics

Western Laboratory

PO Box 279 Arden, NC 28704

Phone: (828) 684-8188

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Director

Dr. Richard Oliver

Veterinary Diagnostician

Dr. David Drum

Northwestern Laboratory

PO Box 70 Elkin, NC 28621

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Director

Dr. Darrell Rector

Veterinary Diagnostician

Vacant

Griffin Laboratory

PO Box 2183 Monroe, NC 28111

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Fax: (704) 283-9660

Director

Dr. Kim Hagans

Veterinary Diagnostician

Dr. Reg Ridenhour

Rose Hill Laboratory

PO Box 37 Rose Hill, NC 28458

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Fax: (910) 289-2070

Director

Dr. Carlton Rouse

Veterinary Diagnostician

Dr. Tim McComb

Diagnostic Laboratory Advisory Committee

Dr. Jim Floyd	NCSU- College of Veterinary Medicine
Mr. Larry Wooten	N.C. Farm Bureau
Dr. Richard Kirkman	Private Veterinary Practitioner
Dr. Gene Erickson	NCDA&CS Veterinary Diagnostic Laboratory System
Dr. Rick Sharpton	Perdue, Inc
Dr. Shannon Jennings	Nash Johnson Farms
Dr. Leslie Wolf	DHHS- State Public Health Laboratory
Dr. Karen Post	NCDA&CS Veterinary Diagnostic Laboratory System
Dr. Eric Gonder	Goldsboro Milling
Dr. Mary Ann McBride	NCDA&CS Veterinary Division
Dr. David Marshall	NCDA&CS Veterinary Division
Dr. Randy Jones	Livestock Veterinary Services
Dr. Jennifer Haugland	NCDA&CS Veterinary Diagnostic Laboratory System
Dr. Betsy Sigmon	Creature Comforts Animal Hospital