Please welcome:
Since the last newsletter was published, we have welcomed two new employees to the VDL. When you call the office you may notice a new voice on the other end of the phone. That voice belongs to Julia Van Valkenburg, our new part-time office assistant. Julia received her BFA degree in Media Arts from the University of Arizona. She started with us in October and has been a great addition to our office staff. Duan Copeland is a Research Technician in the Microbiology section of the VDL. Duan received his BS degree in Veterinary Science and spent time in the military before joining our staff. He has spent the last several months training in our quality system and laboratory technical methods. His presence has greatly improved our ability to maintain laboratory quality and workflow.

Email list:
We are trying to develop a complete email list of veterinarians in Arizona in order to more efficiently distribute newsletters, disease alerts and announcements. If you wish, we can also email laboratory results directly from our database. Please consider sending an email to our address indicating your desire to be added to the list and if you would like results sent this way in addition to other general information. Our lab email is: azvdl@ag.arizona.edu

Continuing education credits at VDL:
If our newsletter piques your interest in learning more veterinary pathology, consider attending our Friday histopathology mystery slide seminar. The seminar is based on the Joint Pathology Conference series that has an international list of contributing institutions. We do four mystery cases on Friday mornings from 8-9 AM. The mystery histopathology slides are projected so that all can view them. We discuss our thoughts on possible diagnoses and pathogenesis. The cases come with extensive reviews that we read and discuss as a group after each case is presented. The seminar is approved for one hour of CE credit by the Arizona Academy of Veterinary Practice. If you send me your email address, I will be sure to add you to the distribution list we use to announce seminar dates.

Gregory Bradley DVM, Director

In this issue:
From the director........................................page 1
Feature Article............................................page 2
Microbiology updates.................................page 3
Diagnostic cases.......................................page 4
Client Survey.............................................page 9
General Information....................................page 11
From Our Perspective

Just a reminder.

We receive the occasional animal that died during anesthesia or during recovery. These fortunately are not very frequent but they are certainly associated with a lot of distress in many cases. How do we handle them? We generally try to reassure people that there are occasional deaths associated with anesthesia regardless of the type of procedure. We then do a complete necropsy examination and sometimes find some mitigating factor such as previous heart damage or some other defect. However, most end up with no real explanation other than some animals seem to have an idiosyncrasy that makes them respond adversely. Some owners are merely looking for more information but others are openly hostile toward a veterinarian. Most become calmer and less accusatory after some time passes but some remain intent on pursuing some type of retribution. Obviously, we have to be very careful to provide objective information to the best of our ability and to make clear that we do not offer any further advice. One thing we frequently hear as part of the history is that the owners were told there was “no danger”. It is very doubtful that anyone actually told them that but they are frequently left with that perception. So, just a reminder that communications are important and people don’t always hear what we thought we said.

Bob Glock
We have implemented new antibiotic sensitivity testing (AST) panels for companion animals. Our new panels encompass a broader spectrum of drugs without increasing client costs. We now select one of two panels to test a bacteria based on the organism’s Gram Stain profile. After conducting a survey amongst area veterinarians, the following drug panels were constructed.

<table>
<thead>
<tr>
<th>Gram Positive</th>
<th>Gram Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amikacin</td>
<td>Amikacin</td>
</tr>
<tr>
<td>Amox/Clav</td>
<td>Ampicillin</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>Cefazolin</td>
</tr>
<tr>
<td>Cefovecin</td>
<td>Cefoxitin</td>
</tr>
<tr>
<td>Cefpodoxime</td>
<td>Cefpodoxime</td>
</tr>
<tr>
<td>Cephalothin</td>
<td>Cephalothin</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>Chloramphenicol</td>
</tr>
<tr>
<td>Enrofloxacin</td>
<td>Enrofloxacin</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>Gentamicin</td>
</tr>
<tr>
<td>Marbofloxacin</td>
<td>Marbofloxacin</td>
</tr>
<tr>
<td>Penicillin</td>
<td>Tetracycline</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>TMP/sulfa</td>
</tr>
</tbody>
</table>

*Tritrichomonas foetus*

**Follow-up**

*Tritrichomonas foetus* causes serious reproductive failure in cattle. Asymptomatic carrier bulls are the reservoir of infection, and removal of positive animals from herds is the primary method of disease control. Infected animals are identified by testing culture media inoculated with preputial smegma for the presence of the organism. Most commonly, samples are inoculated into InPouch™ TF test kits (BIOMED, White City, OR). Incubated media is examined microscopically or by PCR to detect *T. foetus* organisms. The same manufacturer has released TF Transit Tubes™ which are much more user friendly for both veterinarians and lab technicians. However, they are for only testing via PCR. Published experiments have demonstrated the importance of proper sample collection, processing and handling to ensure reliable detection of the organism. Storage and transport temperature greatly affects the organism’s ability to survive, and Arizona’s extreme summer temperatures must be considered when collecting and shipping samples. Temperatures exceeding 37°C (98.6°F) are detrimental and/or lethal to the organism. Veterinarians should have a cooler with ice packs available at the collection site, and samples should be shipped overnight on ice within 48 h of collection. Prior to shipment, interim samples should be kept refrigerated. Ice packs do not last for more than 24 h in the Arizona heat; 2 day or regular mail delivery does not accommodate sample quality. Use these guidelines for both culture and PCR test requests.

*Michael Anderson, PhD*
**EQUINE**

A 3 month old Arab-cross colt was found recumbent in the pasture with signs of acute head trauma. Over the next two days the foal ate and drank and was able to “sit sternally” but was unable to stand. By the third day the foal had difficulty maintaining a sternal position and was increasingly depressed and hypothermic, and was euthanized. Necropsy revealed a raised, brown, hairless, dried, scabby, rounded wound 2.5-3 cm in surface diameter in the skin over the crest of the occipital bone (poll), immediately left of the median. There was a patent puncture wound in the center of this lesion that extended to the occipital bone. Beneath the skin lesion there was a flattened cavitation formed by the rupture of subcutaneous tissue and periosteal musculature. The tissues surrounding the cavitation are infused with hemorrhage and pale yellow, serous inflammatory fluid.

A thin piece bone was slabbed off the left median aspect of the poll and the surrounding periosteum was hemorrhagic and infused with pale yellow inflammatory fluid. The atlanto-occipital joint was filled completely with fresh hemorrhage extending through the foramen magnum anteriorly and the vertebral foramen of the atlas (C1) posteriorly. There were irregular abrasions and hemorrhages along the rim of the articular surfaces of both occipital condyles. There was a large hemorrhagic area in the cartilage in the center of the right articular surface of the atlas along with multiple linear abrasions. Microscopically there were foci of degeneration and incipient necrosis characterized by vacuolization, neuropil dissolution and loss of cellularity along the ventral surface of the brain stem and in the peripheral zone of the white matter of the spinal cord. The brain itself was normal macroscopically and microscopically. Retrospectively, the owner suspected the foal had run into a concrete post in the pasture, while playing.

**SMALL RUMINANTS**

A two year-old goat was submitted with suspected **kidney failure and urinary blockage**. Multiple uroliths in the bladder and urethra were associated with urethral obstruction. The bladder in this animal was distended but not ruptured and it was thought that some urine was probably escaping around the multiple small uroliths that were obstructing urethra.

A case of **Scrapie in goats** was diagnosed in Arizona in July 2013. A 4 years old female Nigerian Dwarf goat was euthanized under the USDA Scrapie eradication program due to neurologic disease suspicious of Scrapie. The disease was confirmed by APHIS in brain, tonsils and retropharyngeal lymph nodes collected at necropsy. APHIS is now conducting epidemiological studies and eradication efforts on the case. Scrapie is a disease of adult goats and sheep, with no evidence of transmission or heath risk to humans. A degenerative disease that affects the central nervous system, it is the oldest known disease among the so called transmissible spongiform encephalopathies. The clinical disease in goats is slowly progressive taking from weeks to several months. Clinical signs include abnormalities in behavior such as aggressiveness and hyperexcitability, locomotor incoordination that progresses to recumbency, and weight loss.

*Disarticulated atlantooccipital joint: Acute hemorrhage in the vertebral canal encircling the brain stem and spinal cord (arrows).*

*Scrapie in goat*
CANINE cont.

Acute diffuse interstitial pneumonia was the apparent cause of death in two dogs. One was an eight year-old Miniature Pinscher and the other was a twelve year-old Airedale Terrier. Both dogs had a history of being ill for several days with respiratory signs. No inclusion bodies were identified in the lesions of either animal and PCR tests for canine distemper virus and influenza were negative. There are reports of so-called idiopathic interstitial pneumonias in dogs that are unexplained. That would appear to be the situation in these animals.

A three year-old, Black Mouth Cur dog became ill in the evening and died the next morning. Necropsy revealed pneumonia with foreign material in the bronchioles indicating aspiration in the anterior lobe of one lung. This aspiration lesion apparently was somewhat chronic based on the lesions observed. There were other lesions suggesting septicemia and it is thought that there was a more recent invasion of Streptococcus canis (group G streptococcus) because these organisms were found in tissues such as liver and lung.

Bilateral encephalomalacia involving the thalamus. The lesions in the brain consisted primarily of cavitations which were found bilaterally in the thalamus and not associated with any evidence of active necrosis or inflammation. The cause of these lesions was not determined but this type of lesion is thought to be familial in the Alaskan Husky breed.

Compiled by Greg Bradley, Sharon Dial, Bob Glock, Carlos Reggiardo, John Schmitz, Michael Anderson, and Laurie D'Auria
FELINE

We received a four year-old, neutered male cat with a history of paralysis that did not respond to treatment. Some blood was noted in the urine. Necropsy revealed only an acute hemorrhagic cystitis with hemorrhages throughout the bladder wall. The cause of the cystitis could not be determined. However the owner was concerned about possible poisoning and a GCMS indicated that the animal had been exposed to carbofuran (dursban). This organophosphate is a controlled chemical and no source for exposure of the cat could be found.

A severe, diffuse fibrinopurulent pneumonia that had extended to the pulmonary parenchyma and pericardium was the cause of death of a 14 year old neutered male feline. Pasteurella multocida was isolated in culture. Bacterial pleuritis in cats often follows penetrating bite wounds, migrating grass awns, or other traumas.

Sudden death in an apparently healthy but obese 6.5 years old male feline was associated with a cardiomyopathy. The condition was manifested by moderately dilated cardiac ventricles and histopathologic findings that included marked myocyte loss in the myocardium and replacement by fatty tissue. The tissue changes resembled the Arrhythmogenic right ventricular cardiomyopathy (ARVC) of Boxer dogs, a form of dilated cardiomyopathy characterized by ventricular arrhythmias, syncopes, and sudden death.

A 16 weeks old kitten with history of intermittent fevers, failure to thrive, anorexia, and an enlarged left kidney on ultrasound was received for necropsy. The kidney was enlarged by a severe, recent subcapsular hemorrhage. The hemorrhage originated from one of several large, white, firm nodules observed in the cortex in both kidneys. A few similar nodes were in the hepatic parenchyma and in the serosal surface of the intestine. The spleen was enlarged. The meninges were opaque, slightly thickened. Histopathologic examination of the kidneys revealed severe pyogranulomatous vasculitis affecting venules throughout the cortices. There was fibrinoid necrosis of the wall of an affected large vein in the site of the subcapsular hemorrhage. Similar perivasculitis and pyogranulomatous or granulomatous infiltrates were found in brain, lungs, spleen, and intestinal serosa. The lesions were characteristic of the dry or noneffusive form of Feline Infectious Peritonitis (FIP).

A 3 years old neutered male feline. It was dead on arrival to clinic. A scorpion was found in the house at the time of the onset of the symptoms. Necropsy findings included marked pulmonary congestion and congestion of the thymus and bronchial lymph nodes. Microscopically, there was marked vascular congestion of the pulmonary septa with interstitial fibrin deposits and minimal numbers of leukocytes. The thymus and lymph nodes were congested and edematous. The lesions were consistent with an anaphylactic or anaphylactoid reaction in the cat, where the lungs are the shock organ. Anaphylactic reactions to venoms of scorpions and other arachnids and insects and common in small animals, but very difficult to diagnose conclusively at necropsy given the acute and nonspecific nature of the lesions.

Vomiting, ataxia, and labored breathing were observed in a 3 years old neutered male feline. Pasteurella multocida was isolated in culture. Bacterial pleuritis in cats often follows penetrating bite wounds, migrating grass awns, or other traumas.

Sudden death in an apparently healthy but obese 6.5 years old male feline was associated with a cardiomyopathy. The condition was manifested by moderately dilated cardiac ventricles and histopathologic findings that included marked myocyte loss in the myocardium and replacement by fatty tissue. The tissue changes resembled the Arrhythmogenic right ventricular cardiomyopathy (ARVC) of Boxer dogs, a form of dilated cardiomyopathy characterized by ventricular arrhythmias, syncopes, and sudden death.

A 16 weeks old kitten with history of intermittent fevers, failure to thrive, anorexia, and an enlarged left kidney on ultrasound was received for necropsy. The kidney was enlarged by a severe, recent subcapsular hemorrhage. The hemorrhage originated from one of several large, white, firm nodules observed in the cortex in both kidneys. A few similar nodes were in the hepatic parenchyma and in the serosal surface of the intestine. The spleen was enlarged. The meninges were opaque, slightly thickened. Histopathologic examination of the kidneys revealed severe pyogranulomatous vasculitis affecting venules throughout the cortices. There was fibrinoid necrosis of the wall of an affected large vein in the site of the subcapsular hemorrhage. Similar perivasculitis and pyogranulomatous or granulomatous infiltrates were found in brain, lungs, spleen, and intestinal serosa. The lesions were characteristic of the dry or noneffusive form of Feline Infectious Peritonitis (FIP).
EXOTICS

An adult rattlesnake was found dead. The liver was observed to be mottled with small white foci as a result of *Pseudomonas aeruginosa* infection. Other lesions included epicarditis, pulmonary granulomas and renal granulomas.

Lymphocytic and granulomatous meningoencephalitis, chronic interstitial nephritis, and chronic cardiac fibrosis with congestive heart failure were the necropsy findings in a 7 years old female rabbit with a history of chronic weight loss, intermittent hematuria, and azotemia that was seropositive for *Encephalitozoon cuniculi*. Although no microorganisms were observed, the lesions and the history suggest Encephalitozoonosis. *E. cuniculi* is relatively easily observed in sections of kidney and other tissues during acute infections, but difficult to find in chronic cases.

A three years old male domestic guinea pig was found dead with no prior history of clinical disease. On necropsy, the stomach was markedly distended by a large volume of gas and a smaller volume of red-brown fluid, and was rotated clockwise about the esophagus with an angle of rotation of over 300 degrees. The pylorus and duodenum were also rotated, compressed between the esophagus and intestine. The spleen was cranial to the stomach, in a left-central position. The lesions were entirely similar to those commonly observed in *Acute Gastric Dilation and Volvulus* in dogs. The appearance of the stomach suggested that aerophagia and rapid ingestion of a large amount of water could have been the precipitating factors in this case.

A 5 years old female llama was euthanized due to severe neurologic disease with blindness. It was unresponsive to treatment with banamine, B complex, and dexamethasone. Histologic examination of the brain revealed a severe laminar necrosis of neurons of the deeper laminae. The necrotic neurons appeared shrunken, eosinophilic, often surrounded by a clear space. There was spongiosis and areas of malacia, and endothelial swelling and edema of blood vessels. The lesions were characteristic of *Polioencephalomalacia*, too advanced to expect response to treatment with thiamine. Cases in cattle are usually associated with thiamine insufficiency or excessive sulfur in the diet.

Chronic, severe pyogranulomatous pneumonia, myocarditis and constrictive pericarditis with right-sided heart failure were the cause of death of an adult female Alpaca with history of weight loss and labored breathing. *Coccidioides sp.* spherules were observed in sections of lung, thoracic lymph nodes, myocardium, and pericardium.
BOVINE
We received a young cow that died after having been sick with CNS signs for approximately two days. The cow was observed to be circling but did not appear blind. Polioencephalomalacia was identified in the occipital cortex and thalamic regions of the brain with vacuolated cells and some laminar degeneration. The cause of the polioencephalomalacia was not definitively determined but these animals were being fed grain and by products including grocery leftovers. It is suspected that some of these products may have contained high levels of sulfur. The most common cause of polioencephalomalacia in cattle is consumption of rations and/or water with combined sulfur levels above 0.4%. Sources can include water high in sulfates (usually over 2000 or 3000 ppm), sulfate containing supplements, forages grown on high sulfate soils and some distillers by-products.

AVIAN
Hepatic amyloidosis was well developed in a twenty nine year-old, Egyptian goose. The bird had no obvious illness other than some chronic arthritis prior to being found dead.

A three year-old, Ameraucana hen became less active and had some respiratory distress beginning about two weeks prior to her death. Severe ascites and peritonitis were associated with an ovarian adenocarcinoma.

Fatty liver syndrome was diagnosed in a two year-old hen. This bird had considerable abdominal fat and the liver was pale and soft with a hemorrhagic area in the right lobe. Fatty liver hemorrhagic syndrome is not fully understood but is found in birds on high energy diets and is believed to be the result of excess energy consumption.

OVINE
A two year-old crossbred ewe was diagnosed with acute mastitis. The ewe was found lying down in the morning and she had a temperature of 106.0. The right udder was severely swollen and discolored. Milk from the affected side was watery and discolored. Staphylococcus aureus was isolated from the mammary lesion. Some types of bacterial mastitis can develop rapidly and produce severe clinical disease in a very short time.
CLIENT SURVEY

This survey will be mailed to our clients soon. If you would like, please complete this page, tear out and fax to 520-626-8696 or fold and mail to the address on the back of this form. We appreciate your business!!!

Please rate the following from 1 (Poor) to 5 (excellent)

- Convenience of submitting: 1 2 3 4 5
- Customer Service: 1 2 3 4 5
- Clarity/accuracy of reports: 1 2 3 4 5
- Interpretation of results: 1 2 3 4 5
- Timeliness of results: 1 2 3 4 5
- Timeliness/accuracy of bill: 1 2 3 4 5

What new tests would you like to see instituted at AZVDL?

How many of these tests would you anticipate requesting in a one month period?

We welcome your feedback:

2014

We will be asking for emails in the coming months, to help AzVDL go Green with our communications - our newsletter will have more information.

Compiled by Sara Plevel, Greg Bradley, Laurie D’Auria
Directory of Personnel

**Director:** Greg Bradley DVM, Diplomate ACVP

**Diagnosticians:**
- Robert D. Glock DVM, PhD, Diplomate ACVP
- Sharon M. Dial DVM, PhD, Diplomate ACVP
- Carlos Reggiardo DVM, PhD, Diplomate ACVM
- Michael W. Riggs DVM, PhD, Diplomate ACVP
- John Schmitz DVM, PhD, Diplomate, ACVP

**Extension Veterinarian:**
- Peder Cuneo DVM, MS, Diplomate ABVP

**Administrative Staff:**
- Darcy Kennedy, Business Manager
- Aurora Astorga, I.T. Support Analyst, Sr.
- Sara Plevel, Quality Manager
- Laurie D’Auria, Office Specialist
- Julia Van Valkenburg, Office Assistant, Sr.

**Necropsy:**
- Ronald Roberts III, Animal Technician Senior

**Microbiology/Molecular:**
- Michael A. Anderson, PhD, Section Head
- Lori Nelson, Research Specialist
- Joelle Jacob, Research Specialist
- Duan Copeland, Research Technician

**Histology:**
- John Gaylor HT (ASCP), Histotechnologist, Sr.
- Gabriella Briseno HT (ASCP) Histotechnologist

**Immunohistochemistry:**
- Barbara Rickert, Research Specialist

**Diagnostic Services offered at AZVDL:**

Pathology: gross necropsy, histopathology, cytology, immunohistochemistry, and related diagnostic tools used to determine the cause of disease.

Microbiology: the use of microbiological techniques to identify bacteria, parasites, and other infectious agents, and their relationships to animal diseases.

Molecular Diagnostics: PCR testing for common diseases of animals

Serology: analysis of serum to monitor animals’ prior exposure to diseases

**NOTE:** Submission forms are available online at [http://cals.arizona.edu/vdl/](http://cals.arizona.edu/vdl/). If you would like a pre-printed form for your clinic, please contact the laboratory at 520-621-2356.