ARIZONA VETERINARY DIAGNOSTIC LABORATORY

Newsletter

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From the Director:

Fallout from legislative budget cuts has people on the campus and in the AzVDL a bit skittish. We expect more bad news soon and that means some hard choices at the administrative levels. We have already experienced loss of personnel and operating funds. One choice to counteract these budget cuts would be to simply eliminate more costly diagnostic procedures in favor of more profitable, high volume tests. However, that would deprive animal owners of vital services including monitoring for emerging, unusual, or foreign diseases. We only have 6.5 state funded full time technical positions and loss of any of these could severely hamper our ability to provide comprehensive services necessary to function as an accredited lab. We will try to keep our clientele informed but expect some minor changes in services and certainly in fees as we learn how severe the budget cuts will be.

As of December 20th budget concerns have also resulted in cancellation of the U of A Extension Services courier that has been helpful in transporting specimens from Phoenix, Maricopa Agricultural Center, and Casa Grande. We are working on alternatives. After December 20th, call our office for information.

Is there any good news? We have made some progress with implementation of several new procedures including routine PCR testing and, more recently, immunohistochemistry procedures that include tumor markers and a limited number of infectious agents including West Nile virus and bovine respiratory syncytial virus. These will be gradually expanded. We are also planning to make significant structural changes to improve biosecurity and pathogen control. These changes are funded entirely out of the federal Homeland Security grant specified for this purpose.

As always, if you have needs that we are not addressing please call me at (520) 621-2356.

Robert D. Glock, Director

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Diagnostic Services offered at AzVDL:

- ***Pathology:*** *gross necropsy, histopathology, cytology, or other diagnostic tools used to determine the cause of disease*
- ***Microbiology:*** *the use of microbiological techniques to identify bacteria, viruses, parasites, and other infectious agents, and their relationships to animal diseases*
- ***Toxicology:*** *identification of toxic substances (toxins) and their involvement in animal diseases*
- ***Chemistry:*** *chemical analysis of feed, forage, and body tissue samples into finite compositions*
- ***Serology:*** *analysis of serum to monitor animals' prior exposure to diseases*

Arizona Veterinary Diagnostic Laboratory
Access to the AzVDL: Take Tucson Interstate 10 to the Miracle Mile exit #255. Travel approximately 1/4 mile on the south bound frontage road between Miracle Mile and Grant Rd. Turn west onto the farm at the signed entrance.
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Featured article

Antimicrobial resistance in Salmonella from calves

Antimicrobial resistance is now a widespread problem in *Salmonella* sp. isolated from animal and human infections. Public health authorities across the world increasingly believe that most human non-typhoidal salmonellas are zoonotic in nature and become resistant in the original food-animal host before reaching humans via food-borne infections or direct contact. Some experts claim that the resistance appears to emerge as a result of the use of antimicrobials in animals. Antimicrobial resistance and particularly multiple resistance to several drugs was first recognized in *S. typhimurium* in the 1960s, becoming epidemic in the 1990s with the spread of *S. typhimurium* DT 104, resistant to ampicillin, chloramphenicol, streptomycin, sulfonamides and tetracyclines. It is now common in a number of serotypes spread to humans through contaminated food, including *S. typhimurium* (associated with cattle, pigs or poultry), *S. newport* (associated with dairy cattle), and poultry-associated strains of *S. enteritidis, S. virchow and S. hadar.* Of particular concern is the development of resistance to fluoroquinolones, often recommended as the first choice to treat human salmonellosis, and recently to extended-spectrum beta lactamases (ceftriaxone).

"Of particular concern is the development of resistance to fluoroquinolones, often recommended as the first choice to treat human salmonellosis…"

The potential for significant animal and public health problems associated with resistant salmonella infection is of concern to the livestock industry all across the nation, Arizona included. Multiple resistances to antibiotics are extremely common among salmonella isolates from young calves (mostly Holsteins) in "calf ranches" and feedlots in Arizona and the Southwest. The majority of 43 salmonellas isolated from calves during the months of July, August, and September were resistant to at least 8 of the 13 antibiotics tested in our cattle panel. Virtually all isolates were resistant to ampicillin, erythromycin, florfenicol, sulfonamides, tetracyclines, and tilmycosin. There was significant resistance (50% or more of isolates) to ceftiofur, spectinomycin, and trimethoprim – sulfonamide. Most troubling was the finding of resistance to a fluoroquinolone (enrofloxacin) in 21% of 17 *S. dublin* isolates, all of them cultured from lungs of light weight feedlot calves received from another state. *S. dublin* tends to produce disease in older calves, producing a clinical picture of pneumonia and septicemia rather than the diarrhea classically associated with Salmonellosis. Such a resistance could conceivably result from therapeutic or metaphylactic treatments that selected and amplified resistance. *S. dublin* is a serotype adapted to the bovine, and therefore less likely to be a significant human health problem, although all salmonellas have a zoonotic potential. But similar resistance to fluoroquinolones could also be developed in other serotypes common in young calves (such as *S. typhimurium* or *S. newport*) that can have a much greater zoonotic potential. With the approval of other fluoroquinolones (danofloxacin) to use in the bovine, it is imperative to limit their use to the manufacturer's indications (treatment of bovine pasteurellosis).

Carlos Reggiardo, DVM, PhD

Comments on Diagnostic Update can be directed to Dr. Greg Bradley via e-mail at: azvdl@ag. arizona.edu

Compiled by Greg Bradley, Sharon Dial, Bob Glock, Ted Noon, Barbara Pickard, and Carlos Reggiardo

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Diagnostic Update

The following are selected samples of cases submitted to the AzVDL during the months of July, August, September, October, and November.

BOVINE

Otitis media and otitis interna were diagnosed in several bovine heads that were submitted as the result of concerns at the time of slaughter. These animals were being rejected because of "head-tilt" and a "drooping ear". The concerns involved CNS disease. Our evaluation of multiple samples indicates that there were no brain lesions in the animals examined. There was extensive chronic otitis resulting in the characteristic clinical signs described as head-tilt. This is not a new concern and was well described in 1983. At that time, incidence in feedlot animals in Colorado was reported to be approximately one animal per 2000 head slaughtered. The findings other than chronic inflammation are often the isolation of *Mycoplasma bovis or Pasteurella multocida*. These same organisms are frequently identified in young dairy calves raised in so-called "calf ranches".

A four-month-old mixed breed heifer was submitted with a history of sudden death involving several animals. The finding of extensive hemorrhage and myodegeneration in the anterior ventral thoracic musculature plus isolation of numerous *Clostridium chauvoei* resulted in a diagnosis of **blackleg**. This is a sporadic but not uncommon finding in cattle in Arizona. There are fairly large numbers of cattle that are not routinely vaccinated for this disease, even though the vaccine is quite inexpensive.

Chronic, untreated **"pink eye" (infectious bovine keratoconjunctivitis)** led to blindness with a severe bilateral ulcerative keratitis with keratoconus in a two-year-old Holstein heifer. A pure culture of *M. bovis* was isolated from both eyes even after a clinical course of one-month duration.

EQUINE

Clostridial myositis was the diagnosis in a nine-year-old stallion that died within two days after receiving a routine vaccine injection. There was extensive muscle necrosis and hemorrhage in the neck musculature in the area surrounding the injection site. Numerous *Clostridium septicum* and *Clostridium novyi* were identified using fluorescent antibody tests. This is an example of a rare but unfortunate sequel that can occur following equine injections. Professional consultation may be useful in assuring that the best possible procedures with the least chance for adverse reactions can be used.

We received the head from a four-year-old Quarterhorse that died with signs of CNS disease. The tissue tested negative for rabies and subsequent evaluation indicated nonsuppurative meningoencephalitis. The State of Arizona Department of Health Services reported a positive PCR test for **Western Equine Encephalomyelitis**. This points out that this virus is common in this area and supports the need for appropriate immunizations.

We received two three-year-old Arabian fillies for necropsy. There was a history of sudden death. Gross findings were minimal, and there was little histologic change except for some very mild heart lesions in one of the horses. Subsequent testing of stomach contents and feed that was submitted indicated that these animals were exposed to **monensin**, which is an extremely toxic agent in horses. The assumption is that there was some kind of **feed contamination.** The source of that contamination is not known. It is a good idea to save feed samples collected at the time of onset of unusual clinical events so that they may be available for later testing when some specific toxin may be suspected.

Pituitary adenoma (adenoma of the Pars intermedia) was a necropsy finding in a fourteen-year-old gelding euthanized because of severe colic. Although the classical signs associated with this type of tumor (hirsutism, polyuria and polydipsia, increased appetite, and hyperhydrosis) had not been observed, the owner noted a history of "stiff neck" and gait abnormalities ("short steps"). Postural changes, muscle weakness and stiff gait are other, less commonly observed signs described in the literature.

AVIAN

Polyomavirus infection was the cause of death in an eight-week-old, Blue and Gold macaw. Crop statis was noted one day prior to death. The following day the bird made rattling sounds when breathing and trembled slightly. Death occurred two hours later.

Severe **hemosiderosis** was diagnosed in a "Haw finch" from an Arizona zoo. The bird was observed to be unable to fly and perch. There were prominent accumulations of brown, granular, iron-positive pigment in the cytoplasm of all hepatocytes.

Cryptosporidiosis was diagnosed as the cause of mortality in a flock of quail. One thousand day-old quail were received in a shipment and placed in a brooder house. They began to die at the rate of about 40 birds/day shortly thereafter. The birds were weak and had diarrhea. Many medications were tried but none were of benefit.

Lymphoid leukosis was diagnosed in a six-year-old chicken that developed ataxia, anorexia, breathing difficulties, and had a pale comb. At necropsy the bird was emaciated. Generally prominent infiltrates of neoplastic lymphoids cells that effaced normal tissue architecture were found in sections of the kidney, heart, ovary, oviduct, skeletal muscle, lung, and trachea mucosa. Mitotic figures among the neoplastic lymphocytes were common and were frequently abnormal. Follicular architecture of the spleen was obliterated by diffuse infiltrates of the neoplastic cells as well.

Avian **pasteurellosis** and ***Mycoplasma gallisepticum* infection** were diagnosed in four chickens that were part of a flock of two to three hundred in which approximately thirty birds had

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died and another thirty were ill. The owner described the following clinical signs: "Gaping, coughing, eyes swollen and sticking together, ruffled feathers, nostrils clogged up, shaking of the head". There had been no response to treatment attempts. The birds were negative for the viral pathogens of Newcastle disease, avian bronchitis, and laryngotracheitis.

Pseudomonas aeruginosa **pneumonia** was the cause of death of a captive Ground dove, weakened by a severe, disseminated mycobacterial serositis (Avian TB).

Mycobacteriosis (avian TB) was also diagnosed in a twenty-three-year-old Red Lorry Amazon with a history of weight loss, respiratory disease and a large density in the abdomen detected by X-rays. The abdominal masses were large mycobacterial granulomas of the adrenals. Smaller granulomas were also present in testicles, lungs, and intestines.

Polyoma virus infection was the cause of death of a one-year-old Caique following a short clinical course with respiratory distress. Lesions included hemorrhages and necroses in the liver and spleen, and pulmonary congestion.

A large testicular neoplasm identified as a **Sertoli cell tumor** was the cause of death of a cockatiel. The liver, kidneys, and spleen were severely compressed by the tumor.

Sunburn or **photosensitization** was suspected as the cause of dermatitis of the unfeathered skin of the head that affected 30 four-month-old turkeys.

PORCINE

A severe, diffuse, **fibrinopurulent polyserositis** due to *E. coli* infection was diagnosed in a two-week-old Yorkshire piglet. The animal had been sick for about 48 hours and then died. The sow had died during delivery of four piglets, all of which died except this one. At necropsy, there was amber colored fluid present in the abdominal and thoracic cavities. Fibrinous exudate was adherent to the serosal surface of all abdominal viscera and the pleural surfaces of lungs. Gram stain smears of the peritoneal exudate revealed moderate numbers of gram-negative bacilli that proved to be *E. coli* on culture. Failure of the piglet to acquire sufficient colostral antibody was suspected as a predisposing cause.

SMALL RUMINANTS

Osteogenesis imperfecta was diagnosed in a three-week-old male Barbados lamb. The lamb was one of a set of twins. The ewe lamb was normal. The lamb was described as extremely "hocky and had little or no control of the feet, walked on the rear of the pasterns and the front feet either folded forward or backward". The lamb ate well and appeared to be growing normally but stopped using the right front leg one week prior to presentation. On presentation, there was marked laxity of the tendons and joints of all limbs and the lamb had difficulty standing and ambulating. It was non-weight bearing on the right front limb. Necropsy lesions included multiple fractures in the ribs and a fracture of the right humerus. The bones were excessively brittle and broke easily. There were no microscopic lesions other than organizing calluses at the fracture sites. Osteogenesis imperfecta is an inherited defect in bone formation that results in increased susceptibility to bone fractures from what would normally be considered inconsequential trauma. The increased laxity of the joints and tendons is often seen with this condition. The disease has been described in Barbados black-belly sheep as an autosomal recessive trait.

A severe, necrotizing, and hemorrhagic cystitis due to mixed bacterial infection was diagnosed in a one-and-one-half-year old male lamb that was "ill for one day then died". At necropsy the abdominal cavity was full of reddish, turbid, malodorous fluid and the serosa and mucosa of the urinary bladder were diffusely hemorrhagic. The ureter was patent and there was no evidence of urolithiasis. Gram staining of urinary bladder mucosa revealed large numbers of gram-positive rod-shaped bacteria and a mixed bacterial flora was isolated in aerobic cultures. Cultures of the abdominal fluid yielded mixed flora in which Clostridial-type organisms were also found. Perforation of the urinary bladder with resealing was suspected as the source of the turbid, malodorous, septic fluid that filled the abdominal cavity.

Secondary photosensitization due to "crystal associated cholangiohepatitis" was diagnosed in a flock of Barbados-Moreno cross sheep being fed on oat hay. The sheep developed black, hard, encrusted skin of the lips, nose, eyelids and ear tips except where the skin was pigmented or covered by an ear tag. Heavily wooled areas of the body were not affected. Blood work from affected sheep demonstrated evidence of biliary obstruction characterized by elevated levels of GGT and alkaline phosphatase. Microscopic lesions consisted of coagulation necrosis of the epidermis and dermis of affected skin with multifocal necrotic keratinocytes in the epidermis and fibrinoid change in some dermal vessels. In the liver, there was diffuse periportal fibrosis and dilation of bile ducts. The ducts contained basophilic, acicular crystals sometimes surrounded by multinucleated giant cells. Scattered, individual necrotic hepatocytes were seen. "Crystal associated cholangiohepatitis" is a well recognized syndrome of photosensitization secondary to liver injury associated with the formation of crystalline material within the liver bile ducts. The material is derived from certain plants, most common are: Kleingrass (*Panicum coloratum*), *Agave lechugia*, Bear grass, and Puncture vine (*Tribulus terrestris*). There is a single mention of "moldy" green oats as a cause of this disease in some goats. The oat hay examined was not moldy and none of the mentioned plants were present in the pasture.

Two three-to-four-month-old lambs were submitted from the same source, but approximately two months apart. The diagnosis in both lambs was **acute bronchopneumonia** with *Mannheimia (formerly Pasteurella) haemolytica* isolated from the liver, lung, and lymph nodes. The clinical signs included ventral edema and there was fluid in the thorax and the pericardial sac. Anterior ventral portions of the lungs were consolidated and dark-red in color. The course of *Mannheimia* pneumonia in lambs may be very rapid.

FELINE

Bordetella bronchiseptica pneumonia was the cause of death in an eight-week-old male Persian kitten. The premises had multiple cats and had been losing at least one kitten per litter. The kittens all had fever with nasal and ocular discharge. No evidence of a predisposing viral infection was found.

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Three cases of **coccidioidomycosis** in cats were seen during this period. The first was an eight-year-old intact male domestic shorthair euthanized following a history of decreased appetite and lethargy. It presented hypothermic and dehydrated. Lesions of valley fever were found in the lungs and sternal lymph nodes. Also present was severe systemic amyloidosis that was likely related to the chronic inflammatory process. The second cat was a nine-year-old spayed female domestic shorthair presented with lesions on the eyelids and a mass on the right rear paw. The owner did not pursue diagnostics. It was treated with antibiotics and sent home. It returned with open mouth breathing. The eyelid lesions had worsened and decreased lung sounds were noted. The owners elected euthanasia. Disseminated pyogranulomas with spherules were found in the brain, mediastinum, kidney, liver, lung and a mass on the right rear foot. The third case was a seven-year-old male domestic shorthair with a scrotal swelling and multiple draining skin lesions. Pyogranulomas with spherules were seen in the skin, testicle, spleen, omentum, sternal lymph nodes and body wall.

Diffuse hepatocellular lipidosis was diagnosed in a curious case that involved a seven-year-old domestic shorthair feline that suddenly began making "strange vocalizations that got worse through the night". The cat became hyperactive and "ran into things - vocalizing and hissing". The following morning the cat died shortly after being presented to the submitting veterinarian. Rabies testing of brain tissue was negative and screening of liver tissue was negative for the following classes of drugs: antidepressants, antihistamines, barbiturates, benzodiazepines, NSAIDS, opiates, sedatives, and stimulants. Liver tissue was also negative for detectable levels of lead. The only significant lesion found was microscopic changes compatible with diffuse hepatocellular lipidosis.

Feline infectious peritonitis combined with feline immunodeficiency virus infection was diagnosed in a one-year-old neutered male domestic medium hair cat that developed "rapidly declining health, muscle wasting, and abdominal effusion." At necropsy lesions were typical of feline infectious peritonitis. Fluorescent antibody stained imprints of bone marrow and spleen were negative for feline leukemia virus but PCR testing of spleen and bone marrow was positive for nucleic acid sequences specific for feline immunodeficiency virus. Three cases of **feline infectious peritonitis** (both effusive and non-effusive forms) were recorded in this period.

Feline herpesvirus infection was diagnosed in a five-week-old stray kitten that developed chronic diarrhea and respiratory infection. The submitter reported that the cat subsequently developed neurologic signs, which included "circling, rolling, and dementia". Testing of brain tissue was reported by the Arizona State Department of Health Services Laboratory as negative for rabies (fluorescent antibody test). Microscopically there was an interstitial pneumonia with some alveolar exudation. PCR testing of lung tissue was positive for nucleic acid sequences specific for feline herpesvirus.

Cardiomyopathy, which likely resulted in acute heart failure, was diagnosed in a four year-old neutered male British shorthair feline that was being boarded. At necropsy the cadaver was very obese. Multiple foci of fatty infiltration were evident in myocardium, there was ventricular hypertrophy, and the left ventricular lumen was very small and slit-like. Microscopic changes in the heart were typical of cardiomyopathy and there were other changes that supported congestive heart failure.

Cardiomyopathy was diagnosed in a mature domestic shorthair feline that was unexpectedly found dead by its owner. Again, as with the preceding case, the animal was very obese and the heart was smaller than normal and had a hypertrophied left ventricular wall that had only a slit-like ventricular chamber. Microscopic lesions in the heart were typical.

An adult neutered male cat was received with a history of diabetes and chronically elevated bilirubin. The clinical diagnosis of diabetes was supported by extensive islet cell **amyloidosis** in the pancreas. There was also severe necrosis and hemorrhage of uncertain origin in the adrenal glands.

We received a four-month-old domestic shorthair kitten with a history of wasting, clinical diarrhea, and inappetence. The condition was unresponsive to therapeutic attempts. Necropsy findings included nasal congestion and considerable mucus in the nasal passages and extending into the dorsal pharynx. There was also congestion of the lungs and intestinal contents were watery. The only significant finding was **calicivirus,** which was isolated from nasal swabs. Histopathology confirmed chronic rhinitis and bronchiolitis.

Chronic **foreign body enteritis** with resulting peritonitis with extensive intestinal adhesions was the necropsy finding in a seven-month-old domestic medium hair kitten with a history of being a “poor doer” and of an acute onset of vomiting and lethargy. Several segments of twine-like coarse fibers, each of them several inches long, were found throughout the intestine.

We periodically receive “poor doer” kittens which fit the rather loosely defined **“fading kitten syndrome”,** sometimes associated with neonatal feline leukemia virus infection, and often aggravated by nutritional deficiencies, low birth weight, and weaning stress. This condition was diagnosed in two separate cases during this reporting period: a seven-week-old domestic short hair kitten that was FLV positive, and a nine-week-old Egyptian Mau where no clear-cut precipitating causes were identified.

A cerebral **meningioma** was the cause of seizures of sudden onset followed by death in an adult domestic shorthair feline. The tumor was a large ovoid mass in the right cerebral hemisphere protruding onto the lateral ventricle.

Lymphoma of the adrenals, kidneys, and heart was the necropsy finding in a seven-year-old feline with a clinical diagnosis of Addison’s disease.

Feline urological disease (FUS) with complete urethral blockage and hemorrhagic cystitis was the cause of death of a fourteen-month-old male domestic shorthair cat. The animal was sick for two days, refusing food or water, before the animal was taken to the veterinarian. It died on the way to the clinic.

CANINE

Cardiomyopathy with chronic congestive heart failure was diagnosed in a thirteen-year-old neutered male Cairn terrier. The dog was euthanized after it developed a cough that progressively worsened. The dog had a low valley fever titer but there was no response to treatment with antibiotics or Diflucan®. Lesions

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were compatible with cardiomyopathy and congestive heart failure.

Sudden death of a six-year-old spayed female Doberman due to **cardiomyopathy** was diagnosed at necropsy. The heart had characteristic histologic lesions of Doberman cardiomyopathy including foci of replacement fibrosis, fatty infiltration, sarcoplasmic vacuolation and myofiber size variation in the myocardium. Sudden death resulting from cardiac arrhythmia can occur in cardiomyopathy prior to signs of cardiac insufficiency.

Sudden death in a five-year-old spayed female Golden retriever due to **chronic myocarditis** was diagnosed at necropsy. The dog had a history of treatment for valley fever of seven months duration. At necropsy, numerous granulomas with spherules were found in the lungs. There was a circular, 3 cm area of epicardial fibrosis containing two, 0.2 cm diameter firm tan nodules in the myocardium/epicardium of the superior portion of the right ventricle. Pericarditis and myocarditis have been described in dogs with *Coccidioides immitis* infection. Areas of fibrosis and inflammation can provoke cardiac arrhythmia and result in sudden death.

Trauma, probably as a result of an attack by a larger canine, was diagnosed in a ten-month-old female poodle. The dog was found in the owner's driveway by the owner. There was a penetrating laceration of the ventral abdominal wall in the area of the umbilicus from which a portion of the abdominal viscera protruded. Additional dissection revealed considerable internal trauma as well.

Staphylococcal pneumonia was diagnosed in a ten-year-old spayed female shepherd that developed "progressive" respiratory problems that were suspected to be neoplastic in origin. At necropsy, the lungs were discolored and consolidated. Gram stained smears of lung tissue revealed large numbers of gram-positive coccoid organisms, which proved to be *Staphylococcus aureus* on culture. PCR testing of lung tissue was negative for nucleic acid sequences specific for canine distemper virus.

Two young adult dogs were submitted with a history of concern about poisoning. The only significant necropsy finding was semiliquid stomach contents containing some green-stained particles. Thin layer chromatography was positive for **strychnine** on both animals. We continue to see some cases of malicious poisoning, even though some of these are being rigorously pursued by law enforcement as felonies.

Strychnine poisoning produced by the ingestion of gopher bait was the cause of death of an adult Shepherd female. The animal frequented a golf course where the owner works.

A six-week-old puppy was submitted with a history of having been placed in a foster home after being in an animal control center. It died within two hours after arrival in the foster home. Necropsy indicated that the animal was in overall good condition. The only significant finding was some dog food that was lodged in the larynx, and the stomach was very distended with dog food. There were also some focal hemorrhages in the lungs. It appears that this puppy had eaten very aggressively and some of the food had lodged in the larynx resulting in **asphyxiation**. This is not an uncommon finding, especially in younger dogs.

Strangulation of the small intestine due to a **persistent vitelline duct** was the cause of death in a four-day-old Mastiff puppy. The puppy presented with agonal breathing and with bloody diarrhea. At necropsy, a thin, tough, fibrous band (persistent vitelline duct) extended from the umbilicus to the distal jejunum/ileum. A five cm segment of ileum and the cecum had been incarcerated by wrapping around the band. The segment was dark red/black and had a perforation that spilled contents into the abdomen.

Pneumothorax due to a ruptured sub-pleural bulla was the cause of death in an eight-year-old female Rottweiler. One week prior to death, the dog slowed while on a long walk. The day it died, the dog appeared to have a seizure and let out a severe howl and died. Necropsy lesions were collapse of both lungs with multiple bullae visible beneath the pleura. One 0.5 cm tear in the pleura of the right apical lobe was present. Sub-pleural emphysematous bullae are a rare finding in dogs that can lead to acute or recurrent pneumothorax. The cause is poorly understood. Some dogs have pre-existing, small airway disease (bronchiolitis) that may contribute; others do not have predisposing lesions. This dog did not have small airway disease.

A fourteen-year-old spayed female mixed breed dog had a history of acute collapse and labored breathing. Death occurred eight hours later. At necropsy, there was a 5 cm diameter mass replacing the left adrenal gland. This lesion was diagnosed by histopathology as a **pheochromocytoma**. A nine-year-old castrated male Border collie mix was diagnosed with bilateral **pheochromocytoma** at necropsy. This dog had a history of vomiting for 24 hours, tachycardia, and prolonged capillary refill. It died two hours after presentation.

Adrenocortical insufficiency (Addison's disease) was diagnosed in a three-year-old male Husky that died after a three-day history of illness characterized by fatigue. No vomiting or diarrhea was noted. Necropsy lesions included severe atrophy of the cortex of both right and left adrenal glands with infiltrates of lymphocytes and plasma cells. Lymphoplasmacytic adrenalitis is the typical microscopic lesion in canine adrenal cortical insufficiency. The cause has not been established but an immune mediated process is suspected.

Infectious diseases were diagnosed in several canine necropsies in this period, including **canine distemper** (five cases), **canine parvovirus** (two cases), and **canine ehrlichiosis** (three cases). In addition, there was a case of Alkaligenes *faecalis* pleuritis, and a case of acute *Pasteurella multocida* pneumonia with DIC (disseminated intravascular coagulation). The pasteurella infection followed seizures associated with a focal pyogranuloma of the hippocampus and most likely started as aspiration pneumonia.

Canine hemorrhagic gastroenteritis was diagnosed in two unrelated cases. In one, the condition was associated with an acute infection by *Cl. perfringens* type A (non-enterotoxigenic). In the second case, there was no indication of a clostridial involvement, but food wrappings, pieces of fabric, and strawberry slices were

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found in the stomach, suggesting access to garbage. Rodenticide screens were negative in both cases.

Gastric dilatation and volvulus (GDV) was the necropsy finding in four separate cases: an eight-year-old Husky/Shepherd female, a seven-year-old Rottweiler female, an eight-year-old German Shepherd female, and a ten-year-old Bassett hound male.

Intestinal intussusception caused the death of a one-year-old Chihuahua female two days after hysterectomy surgery.

A **spinal meningioma** (transitional form) was the cause of chronic neurologic problems in an aged Schnauzer cross. A narrowing of the mid-thoracic spinal cord had been diagnosed in a myelogram.

Four cases of **canine distemper** were diagnosed in unrelated canine necropsies. The age range was one week to eighteen months and all four animals had neurologic symptoms, which included twitching, and seizuring. Two of the older animals (one a four-month-old and the other an eighteen month-old) also developed upper respiratory signs that included nasal discharge. Conjunctivitis was noted in the four-month-old animal as well. Lesions were typical and PCR testing was positive for nucleic acid sequences specific for canine distemper viruses in all four animals.

EXOTICS

Trichomoniasis and hypovitaminosis A were the cause of death of two captive Cooper hawks with caseous laryngotracheitis and hyperkeratosis and squamous metaplasia of the pharyngeal and laryngeal mucosa, as well as heavy esophageal hyperkeratosis.

A **Pyogranulomatous esophagitis** with multiple abscesses of the esophageal wall was the cause of death of a captive Hopi rattlesnake. *Pseudomonas* aeruginosa was isolated in pure culture from the abscesses, liver, and intestine.

Gastric distension and pyloric stenosis related to muscular hypertrophy of the pylorus was the necropsy finding in a four-year-old pet rabbit with a history of chronic digestive problems.

WILDLIFE

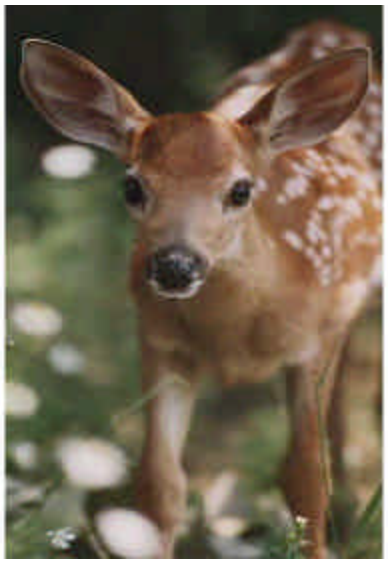
Polyserositis and interstitial nephritis due to **pigeon paramyxovirus type 1** was diagnosed in a three-week-old Modina Rock dove.

Bluetongue virus infection was diagnosed in a yearling mule deer found just south of Tucson, apparently blind, unable to see vehicles and people. The deer was euthanized and the head submitted to the laboratory for investigation of rabies and CWD (chronic wasting disease). There was non-suppurative encephalitis and bilateral keratitis with ulcerations. The infection was diagnosed by a PCR test on brain tissue.

Rabies was diagnosed in a bobcat from southeastern Arizona. The animal unexpectedly attacked a couple that lived in a rural area in southeastern Arizona. Both people suffered scratches and bites but fortunately had been vaccinated in the past for rabies.

Severe head trauma was diagnosed in a three-month-old female coyote that was euthanized after developing "seizuring". Screening of brain tissue was negative for rabies at the Arizona State Department of Health Services Laboratory. At necropsy there was locally extensive hemorrhage in the subcutis over the top of the skull and the dorsal aspect of the cerebrum. The cerebellum was hemorrhagic as well. It is felt that the head trauma and subsmeningeal hemorrhage accounted for the seizuring noted clinically.

Five deer from different Arizona locations were presented during the summer months for necropsy examination. Three were mule deer and two were white tail deer. Four of the deer were found in various locations of southern Arizona and one was found in the north-central area of Arizona. All were in poor physical condition, and were behaving abnormally. Three were found after they had wandered into residential areas and either Game & Fish personnel or hunters found two in the field. **Epizootic Hemorrhagic Disease** was diagnosed in two of the cases and **emaciation** was diagnosed in another two. The fifth case was diagnosed as being **severely dehydrated**. Brain tissue from all the deer was submitted to the Wyoming State Veterinary Laboratory for immunohistochemistry for CWD. This testing was reported as negative in all cases.



Whitetail fawn

Photographer Ron Wulff, Jr.
Photo courtesy of Free Wildlife and Nature Photography Library

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