Dr. Williams Will Be Missed

From Director, Donal O'Toole

Elizabeth (Beth) Williams was born in Columbia, Mo., on November 15, 1951, the first child of Martha Storm Williams and Dr. Walter F. Williams. While Beth pursued her undergraduate study at the University of Maryland, she worked in her father's research laboratory on campus. Once she completed her bachelor of sciences degree at the University of Maryland, her passion led to veterinary medicine and animal health research. On graduation from Purdue, she was accepted into the PhD program for veterinary pathology at Colorado State University. She graduated with her doctorate in 1981. Her thesis topic was paratuberculosis in large ungulates. She joined the Department of Veterinary Sciences at the University of Wyoming on July 1, 1982. She took and passed the certification examination of the American College of Veterinary Pathologists in 1983.

While still a graduate student, and as an aside to her thesis work, she performed necropsies on deer and elk that had an uncharacterized syndrome called chronic wasting disease. She recognized that the lesions in the brains of these animals were consistent with a transmissible spongiform encephalopathy (TSE). She and a neuropathologist at CSU, Dr. Stuart Young, co-wrote the first paper characterizing CWD as a member of the TSE family of diseases.

After her move to the University of Wyoming, Beth continued to work on CWD. It was at that time considered a biological curiosity, and little grant money was forthcoming. Beth published a series of papers on the ecology and distribution of the disease in Colorado and Wyoming. The recognition of bovine spongiform encephalopathy in the UK in the mid-1980s by Dr. Gerald Wells, and zoonotic transmission of BSE in people in the mid-1990s, increased the importance of CWD. Beth was recognized nationally and internationally as one of the leading researchers on the TSE family of diseases.

Beth pursued her career at the University of Wyoming and the Wyoming State Veterinary Laboratory where she excelled at teaching in the undergraduate program and as a board-certified pathologist. She directed many graduate students, solving veterinary pathology problems and directing research programs. In 2001, Beth was selected as the University of Wyoming President's Speaker, which honors outstanding research faculty. She was active and productive in research that was undertaken to better understand and control CWD and other wildlife diseases. At the time of her death, Beth was the editor of the Journal of Wildlife Diseases, the leading international journal in the field.

Beth and her husband Dr. Tom Thorne died in a traffic accident on Highway 287 as they were coming back from a vacation on the night of 29 December 2004. In this copy of the newsletter we reproduce one of the memorials that was given at a ceremony in Beth and Tom's name on 5 January. We thought it was appropriate, since it was given by a University of Wyoming pre-veterinary student.

Donal O'Toole

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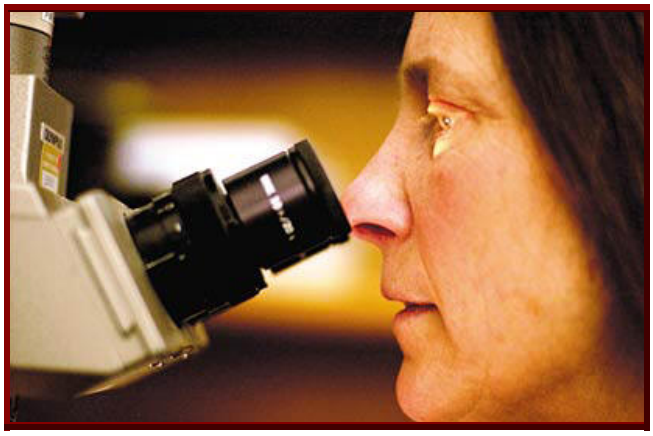
In memory of Dr. Beth Williams

November 15, 1951 - December 29, 2004

This is the text of a speech given by Laura Linn, a pre-veterinary student at the University of Wyoming at a memorial and celebration of Dr. Beth Williams and her husband Dr. Tom Thorne.

The memorial was held in the Fine Arts Auditorium on January 5, 2005. Approximately 800 people were present, including Beth's father and mother-in-law, her sisters, Governor of Wyoming, the president of the University of Wyoming, many veterinarians and wildlife biologists, and the staff and faculty of the Department of Veterinary Sciences.



Like so many students, I entered the Veterinary Sciences Department with a dream and a goal. It is a goal at the end of a long, difficult road. This road will have, without doubt, many more rough spots and unexpected turns. And along this road my classmates and I have come depend on faculty members for advice, motivation and wisdom. Beth Williams was certainly a huge part of that team. She was a model of professional integrity, of success and she exemplified research here at the University of Wyoming.

As a female student, I entered the Veterinary Sciences Department with an additional challenge. That challenge was to become a woman respected in science. For this Beth Williams was far more than a role model or an advisor. Beth was a mentor.

Beth's reputation preceded her. Before I met her, I had read papers and articles; heard stories; and was even caring for some of her research animals. I already had tremendous respect for her success, but then I met her. I had heard she was looking for a student to help raise fawns to be used in future CWD research projects. So I headed up to her office and knocked on the open door. National Public Radio chimed in the background and Beth spun around with a smile and said "Hello!" It didn't take long to figure out that this was a response that was common whenever anyone, freshman or graduate student or faculty, knocked on her door.

The past several months have been a real education for me, even though I didn't have class with Beth. She showed me that being a woman in science is not only being capable in your job, but also having the composure and confidence that commands respect. She showed me

reverence is born of who you are, not what you have done.
Beth was a mentor for me, my classmates and countless students before me. And for all of the classes to follow, the tragedies of the past week have created a void impossible to fill.
But for me, Beth will continue to be…inspiration.
Laura Linn
January 5 2005

Wyovet

Herpesvirus salmagundi

During the last several months, personnel at the WSVL laboratory have diagnosed herpesvirus infections in a variety of species and with different clinical presentations. Herpesviral infections in young animals typically result in severe multifocal necrotizing lesions. In fetal horses, cattle, puppies and goats the result is death and abortion as a result of equine, bovine, canine and caprine herpesvirus infection, respectively.

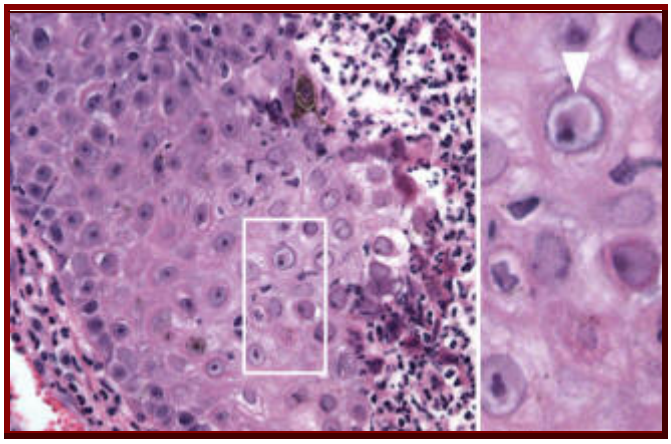
CASE 1: Herpesvirus in a pet-store bought puppy

Tissues from a 10-week-old Schnauzer puppy were submitted to the laboratory for diagnostic workup. The puppy was from a local pet store. According to the pet store personnel, the puppy seemed to be hypoglycemic on arrival. Blood glucose determination at the time of examination was 31 mg/dl. The pup became lethargic, passed bloody stools, did not respond to treatment, and was euthanized. Laboratory testing revealed a necrotizing enteric cryptitis and multifocal hepatitis with intranuclear inclusion bodies compatible with herpesvirus. Fluorescent antibody testing and virus isolation confirmed herpesvirus infection in this puppy. An additional complicating factor was the presence of numerous coccidian (*Isospora spp.*) in the small intestine. Canine herpesvirus infection is well recognized in puppies up to 2 weeks of age but, as this case demonstrates, it can occur in older individuals as well.

CASE 2: Herpesvirus in a cat with chronic erosive dermatitis of the nose

Feline herpesvirus is well recognized as a cause of conjunctivitis and upper respiratory tract infections. Dermatitis has only rarely been recorded. A syndrome of severe necrotizing, ulcerative facial and/or nasal dermatitis due to herpesvirus infection was recently been reported in domestic cats. The cats ranged in age from 4 months to 16 years and represented multiple breeds. The lesions involved haired skin of the face and nasal planum. Lesions were necrotizing and ulcerative with intranuclear inclusion bodies in viable epithelial cells of the epidermis and adnexal structures. A virus indistinguishable from feline herpesvirus type 1 was associated with the lesions. The lesions in some cats persisted for many months. Recrudescence was observed after apparent recovery.

The WSVL recently received a skin biopsy from a 16-year old neutered male domestic Devon Rex cat. The cat had a lesion in the unhaired skin around the nostril for one year. Ti had been treated with corticosteroids previously and responded. The lesion recurred, and a biopsy was taken. Histologically it consisted of severe necrosis and ulceration. There were intranuclear inclusion bodies in viable, intact epithelial cells within and at the margins of the ulcer.



Herpesviral nasal dermatitis affecting nasal epithelium in a cat. The intranuclear inclusion is shown on the image on the right (arrowhead)

The veterinarian reported that he has seen this lesion with some frequency and that some resemble squamous cell carcinoma.

CASE 3: Herpesvirus in a herd of Boer goats in northern Wyoming

An abortion storm in a herd of Boer goats was diagnosed as herpesvirus on the basis of histologic findings and virology. Submitted fetuses appeared to be in the early third trimester and autolysis was typically advanced suggesting death had occurred *in utero* some time prior to expulsion. Lesions consisted of multifocal necrotizing pneumonitis, hepatitis, and splenitis. A herpesvirus was isolated from some of the fetuses and the virus reacted to antisera to bovine herpesvirus-1 (BHV-1). Caprine herpesvirus-1 (CHV-1), an alpha herpesvirus closely related to BHV-1 has only rarely been reported as a cause of abortion in goats in the United States (Journal of Veterinary Diagnostic Investigation 16:478-484, 2004). Specific antibodies to the caprine virus are not available. Titers to BHV-1 have been reported in sheep, swine, and goats and BHV-1 has been recovered from aborted ovine and porcine fetuses but no reports could be found in goats. It certainly seems possible that this abortion storm is related to CHV-1. Unfortunately, this same herd had experienced several abortions due to *Coxiella burnetii* (Q-fever) in January and February 2004.

CASE 4: Herpesvirus in a group of sale-barn-bought heifers

Abortions in 15 of 100, 2-year-old heifers purchased from a sale barn were caused by bovine herpesvirus-1 (BHV-1). Lesions and results of testing in virology were typical of herpesvirus abortions as described for the goats. Laboratory personnel had wondered if the heifers had received a modified live vaccine but that information is not currently available.

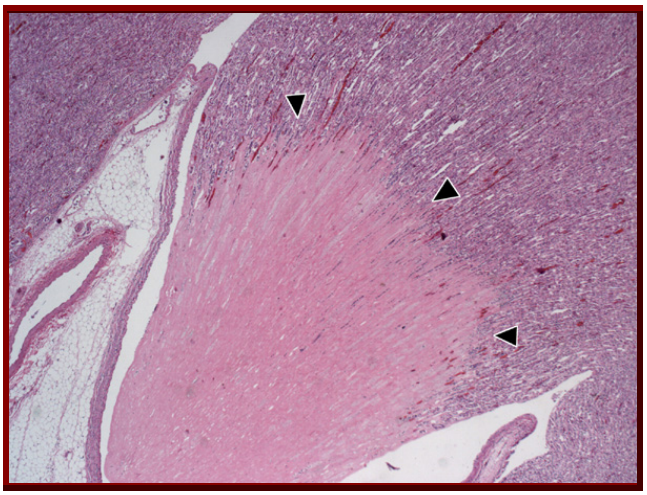
Dr. Don Montgomery
February 2005

Reference: Hargis AM, Ginn PE, Mansell JEKL, Garber RL: Ulcerative facial and nasal dermatitis and stomatitis in cats associated with feline herpesvirus 1. Vet Dermatol 10:267-274, 1999

Suspected Analgesic Nephropathy

A 6-month old female domestic shorthair cat was submitted to the WSVL for postmortem examination. Within the previous two weeks the cat was spayed and developed an upper respiratory infection. The cat received multiple oral doses of the nonsteroidal anti-inflammatory drug (NSAIDs) meloxicam (e.g., Metacam®) over a four-day period. Three days later the cat was presented to the veterinary clinic obtunded and dehydrated. Clinical chemistry revealed elevated total protein, amylase, BUN, creatinine, and phosphorus. Blood glucose was 314 mg/dl. Sodium was low and potassium high.

At necropsy, bilateral pallor and slight yellow discoloration were noted in the renal papillae. Microscopically, extensive acute coagulative necrosis compatible with renal papillary necrosis was the lesion in these areas of pallor.



The pale area demarcated by arrowheads demonstrates acute necrosis

A syndrome of analgesic nephropathy with papillary necrosis is well recognized in humans. Renal lesions are believed to reflect the combined effects of inadequate water intake (dehydration) and failure of vasoregulation in the kidney leading to ischemia. Similar acute syndromes of renal failure due to papillary necrosis are reported in animals. NSAIDs inhibit cyclooxygenase (COX) enzymes involved in prostaglandin synthesis and prostaglandins are involved in regulating vascular tone. This is mainly an effect of COX-I inhibition. Newer NSAIDs such as meloxicam primarily inhibit the COX-II enzyme and supposedly have less severe side effects. The lesions and history of meloxicam administration in the cat may indicate the need for caution in administering the drug and assurance of adequate hydration in this species

Dr. Don Montgomery
3 February 2005

Vesicular Lesions in the Mouths of Cattle and Horses in Wyoming

This year the USDA has responded to approximately twice the usual number of reports of vesicular-like lesions in large animals that are normally encountered. The cases have been distributed widely over much of the state of Wyoming. The signalment for all cases is similar. Horses present with profuse salivation and are off feed for several days. Typically, on examination, there are numerous blister-like lesions on the distal portion of the tongue and lips. The animals are afebrile. There are no lesions on the feet or deep in the oral cavity. All of the referred cases have been sampled and are laboratory negative for vesicular stomatitus on serology (CF, ELISA) and virus isolation. Every case has totally recovered or died of unrelated causes. None of the cohorts on any of the premises have become similarly ill after the initial reporting.

In a couple of the more advanced cases, samples were collected and split between the National Veterinary Services Laboratory in Ames, Iowa and the Wyoming State Veterinary Laboratory in Laramie WY in an effort to establish a positive diagnosis and explanation for the spike in vesicular-type lesions being reported. WSVL's samples were held until preliminary results were in from NVSL, excluding VS or other foreign animal diseases. Personnel at the WSVL perform histopathology and electron microscopic examinations on samples.

At this point, the results from WSVL have also been inconclusive. If you see this syndrome, please contact the Area-Veterinarian-in-Charge, Dr. Bret Combs, the State Veterinarian of Wyoming, Dr. Dwayne Oldham, or the writer.

Dr. John Duncan
October 29, 2004

How to Make a Ringworm Diagnosis in Animals

- **Dermatophyte Culture**: This is the most reliable method for the definitive diagnosis for the presence of ringworm organisms. Results usually take seven to ten days. Microscopic examination of cultured organisms taken from culture media can help in making a diagnosis.
- **U-V Fluorescence:** A few species will cause a distinct apple-green fluorescence in infected hair shafts when these are illuminated by an ultraviolet light source. Many infections are due to non-fluorescing species and false positives (fluorescence) are also possible.
- **Microscopic Examination:** The presence of infective spores on hair shafts may occasionally be visualized microscopically. We use a calcofluor stain that makes the fungal elements easier to see. The possibility of false negative results is, however, great.
- **Histopathology:** Biopsy specimens are also useful but can give false negative results depending on the section examined.

Dr. Ken Mills
December 2004

Anticoagulant Pesticide Intoxication

Diphacinone is an highly toxic anticoagulant pesticide, with acute oral LD_{50} values of 0.3 to 7 mg/kg in rats and 3.0 to 7.5 mg/kg in dogs. All formulations are Restricted Use Pesticides (RUPs). As such, diphacinone may be purchased and used only by certified applicators and we seldom see poisoning of domestic animals with the compound. It is normally used in North America to control rodent pests, however in South America it has been fed to cattle to control predation by vampire bats. We recently saw a case of diphacinone poisoning.

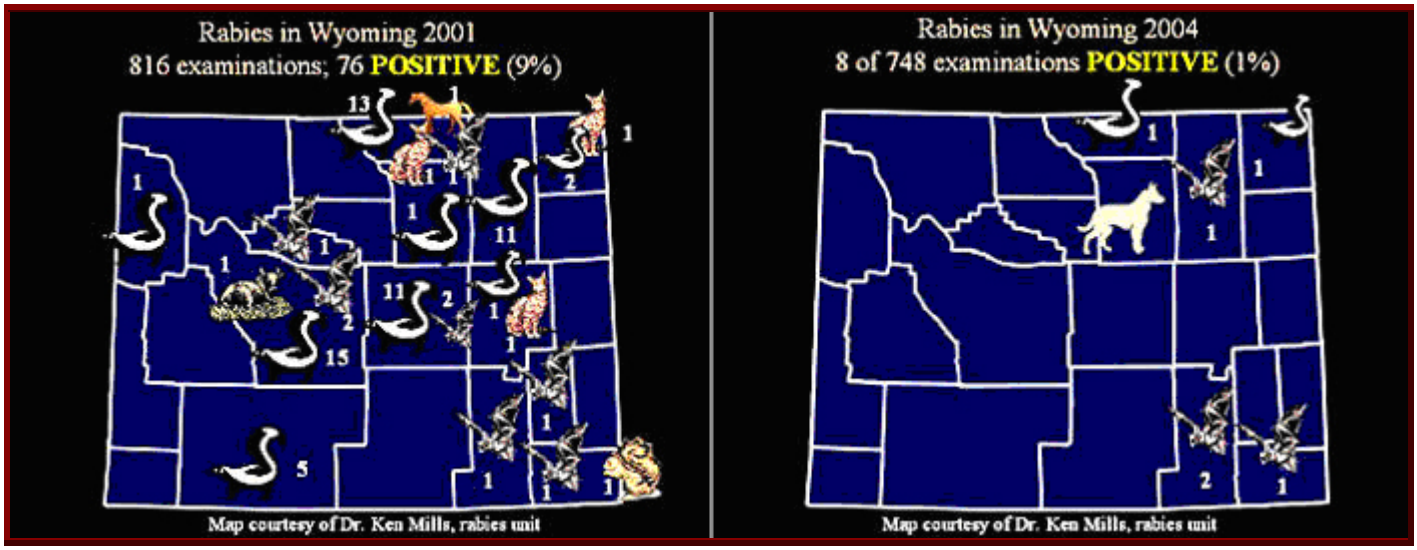
Diphacinone was one of the first "second-generation" anticoagulants, a class of compounds characterized by much longer half-lives than the prototype warfarin. For example, the half-life of diphacinone in humans is 15 to 20 days. In most mammals diphacinone is not metabolized to any significant extent and accumulates to varying degrees in liver, kidney and lungs. It is eliminated principally via feces.

The basic mechanism of action is similar to the other anticoagulants such as Talon or Warfarin, i.e. inhibition of vitamin K epoxide reductase. Thus a presumptive diagnosis can be based upon a deficit in clotting factors II, VII, IX or X. Definitive diagnosis requires identification of the compound in liver or blood. Treatment with vitamin K1 should be continued for at least 3 weeks.

Dr. Merl Raisbeck
3 February 2005

Rabies In Wyoming

Rabies in 2004 - No longer a problem?



As you will note, we had few positive cases of rabies in 2004. This may make you think it is a disease that we don't need to worry about for a while. Although there were only 2 confirmed positive skunks, which is the lowest total we've seen for 20 years in the state, these two cases indicate that rabies still actively cycles in skunks in the northeast part of the state.

Even if we had no rabies in skunks, humans and animals still face potential exposure to rabies in bats, where the virus cycles independently of the terrestrial cycle in the skunk population in the Missouri drainage. Skunk rabies occurs in major cyclical outbreaks at intervals of 6-8 years, with some as short as 4 years. Rabies cycling in skunks can have a serious effect on their populations which was demonstrated a number of years ago by looking at skunk survival before and after an epidemic. Skunk survival went from 85% level to 17%.

The bottom line?

If you are a veterinarian or animal owner in Wyoming, please keep rabies in mind if you see an animal showing neurological signs, even if you haven't seen a case recently. The single positive dog we had in 2004 was an import from Texas. Confirmation was done by genetic analysis of the virus. This confirmed that it was not a strain that we encounter in Wyoming skunks or bats. It originated in Texas, which accorded with the epidemiological investigation by Dr. David Barber in the Wyoming Department of Health.

Dr. Ken Mills
February 2005

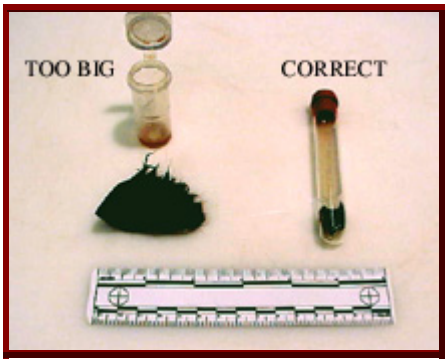
Ear Notching For Bovine Viral Diarrhea

PBS ELISA

We continue to receive inappropriate ear notch samples for BVDV testing. The most common problem is taking samples that are too big, and need to be trimmed down in the laboratory. This involves time and labor at our end. More importantly, the test is validated for tissues of a specific size in 2 ml of buffer. What is tested is the BUFFER for virus - antigen leaks from the ear into the fluid. The other major problem we see is putting in too much or little PBS fluid. The correct amount is 2 ml.

Samples for the BVDV ear notch test should be 2 x 2 cm in size. That is about this size:

If the sample it is difficult to fit into a red top tube, it is TOO LARGE and will compromise the accuracy of the test



Two samples have been taken (left) The sample in the red top tube is the correct size. The samples are best taken with an ear notcher (above).

Donal O'Toole

PRP Genotype in Deer may Determine Incubation Period of CWD in Deer

Chronic wasting disease (CWD) is an infectious fatal neurodegenerative disease of cervid species in North America. It affects wild mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*) and Rocky Mountain elk or wapiti (*Cervus elaphus nelsoni*). The disease is of concern since wild herds may be gradually destroyed by CWD, we have a poor understanding of how the agent persists in the environment, it belongs to a family of agents that includes member which can infect people, and it is a threat to the game farm industry.

It is well established in other acquired prion diseases such as scrapie of sheep and variant Creutzfeldt–Jakob disease (vCJD) that amino acids encoded at certain key positions in the endogenous host prion protein (PrP) are strongly associated with susceptibility to TSE infection.

In a recent study published by Dr. Jean Jewell and her colleagues, PrP polymorphisms in select populations of free-ranging mule deer in Wyoming and Colorado were examined to establish whether there was a relationship between PrP genotype and likelihood of animals having chronic wasting disease. They found that free-ranging mule deer with the 225SF genotype were 30 times less likely than deer with the 225SS deer to develop CWD. Although the 225 SF genotype does not protect mule deer from developing CWD, deer with this genotype are slower to develop the disease.

The article will be published in the **Journal of General Virology.** A preprint of the article is available by going to **JGV Direct** where articles considered by the editors to be of special importance and merit immediate online publication.

Jackson Hole Veterinary Rendezvous

JUNE 18 - 22 2005

JACKSON HOLE VETERINARY RENDEZVOUS OFFICE

Contact person: **Vicki Smith**
346 W. 4th St.
Kuna, ID 83634
PHONE" 208.922.1785
FAX: 208.466.7693 (for registrations)
General FAX: 208.922.9435

There will be a satellite meeting organized by a veterinary epidemiologist with the Wyoming Department of Health, **Dr. Jamie Snow**. The session will address Veterinary Emergency Management and will be held on Sunday, June 19.

Topic of the veterinary emergency management session will include:

Foreign Animal Diseases from a Plum Island specialist - Dr. William R. White

Bioterrorism and USAMRID highlights - **Dr. Gerry Andrews**, Wyoming State Veterinary Laboratory

Biosecurity highlights for small and large animal practitioners and - much more!