Diagnostic Update

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In this Issue:

Retirement of Dennis Olexson

By Noel Clancey, Veterinary Clinical Pathologist

It is my bittersweet charge to announce the retirement of Dennis Olexson from the Atlantic Veterinary College (AVC) at the University of Prince Edward Island.

Most Atlantic Canadian veterinarians readily recognize the name of Dennis Olexson, as he has managed the AVC Diagnostic Services Laboratory for the past 26 years. Dennis was raised on a grain farm near Rosthern, Saskatchewan, and attended the University of Saskatchewan, where he obtained a BSc, an MSc in Biochemistry and an Advanced Registered Technologist Certificate from the University Hospital. Following his education, Dennis was recruited to operate the Western College of Veterinary Medicine Diagnostic Laboratory, where he served as manager for 10 years. At the encouragement of Dr. Sally Lester, Dennis accepted an exciting opportunity in 1986 to establish and manage the new AVC Diagnostic Services Laboratory. Since then, Dennis has been instrumental in making AVC Diagnostic Services a leader in the veterinary diagnostic field.

Dennis has also had a strong impact on the diagnostic veterinary community beyond our region.

He is very proud to be involved with the development of the Veterinary Laboratory Association Quality Assurance Program (VLAQAP). This is a quality assurance program, run in conjunction with Catachem Inc. and Timeless Veterinary Systems Inc., which confidentially monitors testing results from over 300 veterinary laboratories around the world. Under the umbrella of the American Society for Veterinary Clinical Pathology, Dennis served as vice-chairperson for 6 years and chairperson for 3 years for the Veterinary Laboratory Professionals organization. He has formally and informally consulted for numerous veterinary laboratories the world over, has published in various peer-reviewed journals, co-authored a textbook on Quality Assurance with Dr. James Bellamy and is Chief Executive Officer and Chief Technical Officer for Global Vetnostics Laboratory.

Dennis will be remembered for many wonderful traits. He always had a keen attention to detail, an insistence to provide prompt, quality results and an overt willingness to assist others, particularly students. Dennis consistently went the extra mile to provide quality service, readily staying late to ensure any job was reliably completed. These quality traits have effectively rubbed off on us all. Those that know Dennis also know that he is very approachable and can take a “good ribbing” as well as being able to dish it out. Rarely in a poor humor, Dennis can easily see the brighter side of anything with a light joke or whimsical comment.

Dennis's interests beyond the profession consist of travel, fine dining and gardening. He also has a passion for good wine and single malt scotch. While his vast knowledge, accessibility and good humor will be greatly missed around the laboratory, we all wish him the very best to pursue life and his interests at a more leisurely pace. We will miss you Dennis!

Toxicology and Analytical Services: Testing for Metals

By Darlene Mahar, Analytical Chemist

Toxicology and Analytical Services (TAS) receives a range of samples from clients requesting various tests. Some of these analyses result from routine requests by veterinarians to monitor herd health, while others are performed to determine the cause of an unexplained death. These tests encompass pesticide screens, drug residues, vitamin levels and metal analysis.

Over the years, TAS has been involved in a variety of research projects in addition to routine analytical diagnostic testing. One such current project is the monitoring of blood lead levels in eaglets on PEI. Lead is a highly toxic metal that is not broken down or metabolized once ingested. This heavy metal can accumulate over time, causing morbidity and death if levels reach the toxic range.

An increasing number of adult bald eagles on PEI have been found to have significantly high blood lead levels. The source of lead in these birds is unknown but is likely from the eagles feeding on animals or other birds contaminated with lead shot. The adult eagles also share this food with their young. This could result in the eagles succumbing to lead poisoning and the shortening of their lifespan. Atlantic Veterinary College researchers and PEI wildlife technicians collect the blood from the eaglets still in the nest to establish baseline lead levels.

In a clinical setting, when an animal is suspected of lead poisoning, the case is considered urgent. The staff of TAS treats these samples as a top priority so the animal can be treated promptly if necessary. It is because of this urgency that TAS changed their method of blood lead analysis by switching from the time consuming atomic absorption spectrophotometer to a dedicated lead analysis instrument. Samples for blood lead analysis are collected in either a heparin or EDTA tube. One blood sample for lead analysis can be analyzed in less than 5 minutes with a limit of detection of 0.014 ppm (parts per million).

Other tests requested by clients of TAS include the measurement of heavy metals in matrices such as blood, serum, milk, various tissues like liver and kidney and even paint chips. The metals which are requested on a regular basis and researched in the TAS laboratory are cadmium, cobalt, copper, iron, lead, selenium and zinc. All matrices for these metals, except blood lead, are still analyzed on the atomic absorption spectrophotometer. Some of these elements are common in the environment and diet and are necessary for good health but large amounts of any of these may cause acute or chronic toxicity. However, other metals such as lead are toxic and have no known beneficial effect. One of the most common requests is for selenium levels in serum and tissue. On PEI and elsewhere, selenium can be deficient in the soil, hence the feeds grown there may be inadequate for proper growth and reproductive performance of livestock. Testing for both deficiency and toxicity of metals is therefore critical for animal health. The TAS staff are pleased to be able to provide this service to veterinarians in the Atlantic provinces and beyond.

Inclusion Body Disease in the Maritimes - a not so Exotic Disease of Boid Snakes

By Shannon Martinson, Veterinary Anatomic Pathologist

In the past few years, we have seen an increase in the numbers of reptile species submitted to our postmortem laboratory. Most notable, has been an increase in the number of pet snakes, mainly belonging to the Boidae family (including a variety of species of boas and pythons). While diseases related to suboptimal husbandry are the leading cause of morbidity in reptile species, it is important to remember that these species are also susceptible to a wide variety of infectious diseases. Inclusion Body Disease (IBD) is considered by many to be the most important infectious disease of boid snakes.

It is a common misconception among local snake owners and veterinarians that IBD has not been diagnosed in the Maritime provinces. In fact, we have diagnosed a number of cases of IBD in boa constrictors from Nova Scotia, Prince Edward Island, and New Brunswick over the past 10 years and most were diagnosed last year (Table 1). Many of these cases involved a single animal, but in two incidents, this disease devastated entire collections of snakes.

While recognized for more than 30 years, there remains a great deal of confusion surrounding this transmissible and

progressive disease. A viral etiology has long been suspected. However the causative agent has been elusive and, to date, no pathogen has been definitively characterized. Over the past two decades most studies have suggested a retrovirus as the causative agent. However, many healthy snakes have been found to carry retroviruses and retroviruses cannot be identified in all affected snakes. More recently, there has been evidence to suggest that IBD may be caused by a novel Arenavirus or Arenavirus-like agent.

Table 1: Cases of Inclusion Body Disease in the Maritime provinces.

Date submitted	Species	Clinical Signs	Location
June, 2003	Boa constrictor	Neurological signs	NB
October, 2008	Boa constrictor	Found dead	PEI
April, 2009	Boa constrictor	Anorexia, weight loss	PEI
February, 2012	Boa constrictor (x2)	Snake 1: Respiratory signs, anorexia, regurgitation, weight loss Snake 2: Found dead	NS
May, 2012	Boa constrictor (x6)	No clinical history provided	*
September, 2012	Boa constrictor	Respiratory signs, neurological signs	NS

*Location not provided

Transmission is thought to occur directly through exposure to secretions, via arthropod vectors (snake mites), and possibly via venereal and intrauterine transmission. Clinical signs vary, are often non-specific and develop over a few weeks to several months. Snakes may exhibit chronic regurgitation, anorexia, increased incidence of bacterial infections (stomatitis, enteritis and pneumonia are very common), and/or progressive neurological signs such as incoordination, star-gazing or paresis. Pythons typically develop rapidly progressive neurological signs, while chronic and subclinical infections are more common in boa constrictors. In animals that develop clinical signs, this infection is considered invariably fatal resulting in either death or humane euthanasia.

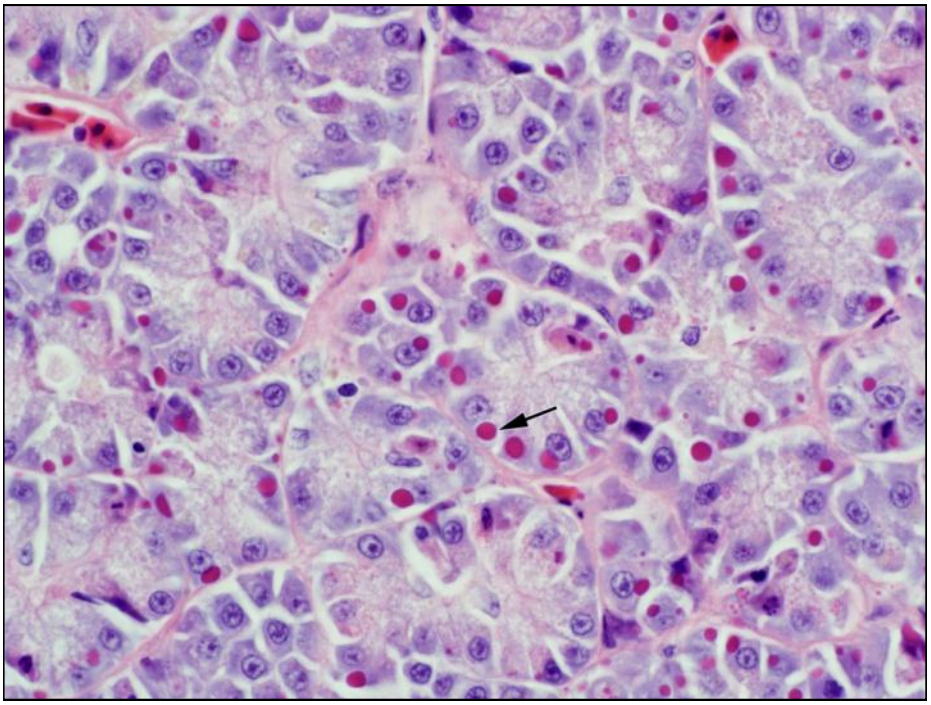

Figure 1: Inclusions in pancreatic acinar cells (arrow) in a boa constrictor with Inclusion Body Disease. H&E, x 60 objective.

A presumptive diagnosis of IBD is typically made via the detection of large eosinophilic inclusion bodies in the cytoplasm of infected cells (Figure 1). These inclusion bodies may be identified in tissues collected during necropsy or in surgical biopsy samples from the liver (preferred), kidney or esophageal tonsils. In some cases, inclusions can be detected within leukocytes and, less often, erythrocytes. Therefore evaluation of blood smears may allow for less invasive testing for this disease. Other non-specific clinicopathologic findings include leukocytosis and lymphocytosis early in disease and leukopenia at later stages. It should be noted that antemortem diagnostic methods may lack sensitivity, especially in pythons, in which the inclusions are often restricted to the brain.

Additionally, blood smear evaluation has been known to yield both false-positive and false-negative test results.

Because there is no known treatment for IBD, euthanasia of affected snakes is generally recommended to prevent further spread of this disease. It is therefore crucial to prevent the introduction of this disease into snake collections. When acquiring new snakes, it is recommended that owners quarantine these animals (with strict hygiene procedures) for 6 to 12 months to monitor for clinical signs prior to introducing these animals to a collection. Antemortem testing can be done to screen these animals, but false negative test results are not uncommon. Therefore, any snakes developing suggestive clinical signs or just doing poorly should not be introduced to a collection regardless of test results. Because mites may act as an important mode of transmission, controlling mite infestations is important.

In summary, IBD is an important infectious disease of captive snakes that is worldwide in distribution. It has been diagnosed in the Maritimes with increased frequency over the past year and should be considered as a possible differential diagnosis in snakes presenting with a variety of non-specific clinical signs. The potentially devastating effects of the introduction of IBD into captive snake collections make it a disease of great veterinary importance.

References:

1. Chang L-W, Jacobson ER. Inclusion body disease, a worldwide infectious disease of boid snakes: a review. *J Exot Pet Med.* 2010;19:216-225.
2. Schumacher J. Inclusion Body Disease Virus. In: Mader DR, ed. *Reptile Medicine and Surgery*. St Louis, MO: Saunders Elsevier; 2006:836-840.
3. Stenglein MD, Sanders C, Kistler AL, et al. Identification, Characterization, and *In Vitro* Culture of Highly Divergent Arenaviruses from Boa Constrictors and Annulated Tree Boas: Candidate Etiological Agents for Snake Inclusion Body Disease. 2012;mBio 3(4):e00180-12. doi:10.1128/mBio.00180-12.

Greyhound Blood Tests – Unique Aspects to be Aware of!

By Shelley Burton, Veterinary Clinical Pathologist

Atlantic Canadian veterinarians are seeing more Greyhounds in recent years. These racing dogs have unique physiological aspects that translate into fascinating clinical pathology differences compared to other breeds. These must be considered when evaluating test results so that misinterpretations do not occur!

Compared to most other breeds, healthy Greyhounds have higher values for hematocrit (Hct), hemoglobin concentration (Hgb) and red blood cell count (RBC). This optimizes oxygen carrying to tissues during intense exercise. What does this mean in terms of CBC evaluations? First, laboratories do not routinely have specific Greyhound reference intervals, so results from a healthy Greyhound will often be flagged as high for Hct, Hgb and RBC, potentially leading to a misleading consideration of dehydration. Second, a Greyhound has to be very anemic to have Hct, Hgb and RBC values below the regular canine reference intervals. A mild anemia will not have these parameters flagged as low and can be easily missed.

Although not as dramatic as the differences in the red blood mass parameters, Greyhounds also have lower total white blood cell counts, lower neutrophil counts and lower platelet counts than other breeds. Values normal for them will therefore often be flagged as low using regular canine reference intervals. Interestingly, Greyhounds also have eosinophils with vacuolated granules that do not stain pink like those in these cells in other dogs; they are actually called grey eosinophils. An inexperienced person may confuse them with monocytes or toxic neutrophils and veterinarians could erroneously consider inflammation or miss consideration of allergic or parasitic conditions.

Healthy Greyhounds have many differences on biochemical panels from other breeds. They have higher creatinine concentrations which reflects their high muscle mass, so mild increases using regular canine reference intervals typically does not indicate azotemia. Compared to other breeds, healthy Greyhounds also typically have lower total protein and globulin concentrations and higher AST and ALT activities. Both total thyroxine (T4) and free T4 concentrations are lower, making erroneous consideration of hypothyroidism possible if using regular canine reference intervals. Several other routine biochemical results are also different In these dogs. Please see the following table extracted from a recent excellent review article[1] on these unique dogs:

Table 1: Selected test results characteristic of Greyhounds compared to other breeds. Modified from: Zaldivar-Lopez S, et al[1]

Higher Values	Lower Values
Hct, PCV, RBC count and Hemoglobin concentration	WBC count and neutrophil count
Creatinine	Platelet count
Alanine aminotransferase (ALT)	Total protein and globulins
Aspartate aminotransferase (AST)	Total T4 and free T4
Sodium (Na) and Chloride (Cl)	Potassium (K) and Phosphate (P)

How do clinical pathologists interpret clinical pathology findings in Greyhounds? Of course, initial reporting of the correct breed on the laboratory submission form is critical. If we don't know the blood is from a Greyhound, we could miss anemia and erroneously consider situations like dehydration, thrombocytopenia or renal disease! Once we do know the data is from a Greyhound, we use our judgement and experience to interpret the changes. It is helpful to us that The Ohio State University has released Greyhound specific reference intervals, but because they are not directly from our laboratory, we still use them judiciously.

A final point to remember is that while this has not been as rigorously evaluated in the literature, other sighthound breeds such as the Saluki or Borzoi have similar physiology to Greyhounds. It is anticipated that they would have similar clinical pathology features. In conclusion, evaluation of clinical pathology data from sighthounds is both challenging and interesting. Please call us if you have any questions on this fascinating topic or would like to receive an electronic copy of the review article below!

Acknowledgement: Greyhound picture courtesy of www.Petwave.com.

Reference:

1. Zaldívar-López S, Marín LM, Iazbik MC, Westendorf-Stingle N, Hensley S, Couto CG. Clinical Pathology of Greyhounds and other sighthounds. *Vet Clin Pathol.* 2011;40:414-425.

Bovine Respiratory Syncytial Virus Infection in Cattle: An Update

By Carmencita Yason, Veterinary Diagnostic Virologist

Bovine Respiratory Syncytial Virus (BRSV) is a very important pathogen of beef and dairy calves. It can cause lower respiratory tract disease alone or as a major infectious component of the bovine respiratory disease (BRD) complex. Human Respiratory Syncytial Virus (HRSV) is a closely related human pathogen which is an important lower respiratory pathogen in infants and young children. Diseases caused by BRSV and HRSV in cattle and humans, respectively, share many aspects of pathogenesis, clinical manifestation, epidemiology and immune response. Although BRSV and HRSV are highly similar antigenically, they are distinct viruses. There are no reports of human infection with BRSV. It is a fairly stable virus but changes in the sequences of surface glycoproteins have occurred with time and these can probably be attributed to pressure from vaccination. Repeated infection of an individual or population is common in both BRSV and HRSV. Although BRSV outbreaks are common in late autumn and winter, the virus circulates between cattle herds all year round.

Both BRSV and HRSV belong to the genus Pneumovirus and subfamily Pneumovirinae of the Paramyxovirus family. These viruses are highly infectious, are transmitted primarily by contact with infectious secretions and aerosols, and replicate in the respiratory ciliated epithelium and to a lesser extent in Type 2 pneumocytes.

Clinical signs of BRSV infection in calves can vary from mild to severe, usually beginning with fever, cough and nasal discharge often followed by depression, anorexia and tachypnea. Some animals develop severe respiratory distress. Open mouth breathing with head and neck extension is characteristic of the most severe form. The type of clinical signs in children with HRSV infection can also vary from subclinical to a mild cough to bronchiolitis and severe pneumonia. The IgE antibodies against BRSV proteins are present in the serum and nasal secretions of calves with more severe disease. IgE antibodies are also seen in children with severe or wheezing disease associated with HRSV. The pathologic features can vary from mild to severe, such as bronchiolitis and lung infiltration with neutrophils, eosinophils and mononuclear cells.

The host response to infection plays a major role in respiratory syncytial virus (RSV) pathogenesis in both cattle and humans. Vaccination or re-infection exacerbates the disease in both species[1-3]. The research during the last decade has shown that like HRSV, BRSV is able to modulate or alter the immune response. The skewing of the immune response results in the release of cytokines responsible for the clinical signs and pathology associated with HRSV and BRSV. There is currently no licensed HRSV vaccine due to the rigorous criteria for safe and effective vaccines in humans. Safety and effectiveness issues also exist for BRSV vaccines but since minor risk has been judged to be acceptable for livestock, several BRSV vaccines have been commercialized and used worldwide. The vaccine issues that need to be addressed are the short term protection and the need to improve the strategy for immunizing young or immature animals in the presence of maternal antibodies. It has to be stressed that BRSV affects young animals and that vaccination is still wise despite potential maternal antibody effects which could limit effectiveness of the vaccine to some degree. The two types of vaccines currently used for BRSV are classical modified live (attenuated) vaccines and killed vaccines. There are concerns of potential reversion for modified live vaccines and concerns that killed virus does not work well in the presence of maternal antibodies.

Progress is being made, however, and effective and safe vaccines continue to be developed and improved for both BRSV and HRSV. The incorporation of adjuvants is showing promising results in seeming to overcome the inhibitory effect of maternal antibodies. Local immunity induced through an intranasal route of administration of modified live BRSV vaccine also shows promise, but there are concerns with the potential reversion of the live virus to pathogenicity. It is important that biosecurity measures be integrated in the management protocol to prevent infection by BRSV and other infectious agents.

During the last few years, BRSV has been the most common respiratory virus detected at the Regional Diagnostic Virology Services (RDVS) in specimens from bovine herds with respiratory disease. The diagnostic tests available at the RDVS are as follows: BRSV fluorescent antibody test (FAT) on tissues, BRSV polymerase chain reaction (PCR) on nasal swabs and tissues, and serodiagnosis utilizing acute and convalescent serum samples collected during outbreaks of BRSV or BRD complex. The BRSV is very fragile and very difficult to isolate in cell culture and therefore we require freshly collected samples for virus isolation (VI). Please phone the laboratory at 902-566-0877 if you have any questions regarding diagnostic testing for BRSV.

The prevention of HRSV in children worldwide has been a priority of the World Health Organization, just as BRSV has been priority for the cattle industry. The research on both HRSV and BRSV during the last 40-50 years has provided important strategic information. This is helping to guide the development of effective and safe vaccines that can be used for the prevention and management BRSV and HRSV infections.

References:

1. Gershwin LJ. Immunology of bovine respiratory virus infection of cattle. *Comp Immunol Microbiol Infect Dis*. 2012;35:253-257.
2. Gershwin LJ. Bovine respiratory syncytial virus infection: immunpathogenic mechanism. *Anim Health Res Rev*. 2007;8:207 -213.
3. Meyer G, Deplanche N and Schelcher F. Human and bovine respiratory syncytial virus vaccine research and development. *Comp Immunol Microbiol Infect Dis*. 2008;3:191-225.

Samples Shipped in Formalin: Shipping Update

By Pam Maloney, Veterinary Laboratory Technologist and Cornelia Gilroy, Veterinary Clinical Pathologist

The health and safety of people involved in the transport and handling of samples received by Diagnostic Services is very important. Samples for histopathology are received daily by our laboratory, most of which are shipped in 10% formalin. There are many people who handle these samples from the time it leaves your clinic to when it arrives at Diagnostic

Services. These include courier drivers, people at the courier sorting facility, the shipping/receiving clerks at the Atlantic Veterinary College and sample reception clerks and technologists in Diagnostic Services. Occasional samples in formalin solutions have been shipped in glass jars which break, plastic bags which split, loose topped urine collection bottles which crack, or containers with poor fitting or cross threading lids which leak. When sample containers of these types are used, leaks occur and exposes all those people listed above to formalin.

There are many well documented adverse effects to formalin exposure in humans, including irritation to the eyes, respiratory tract and skin. Skin exposure can lead to local redness, tingling and skin sensitization with the possibility of an allergic reaction with subsequent exposure. Symptoms involving the respiratory tract can include coughing, wheezing, burning pain of the nose and throat, shortness of breath and possibly pulmonary edema. Formalin is documented as a cancer causing agent, which is a concern with chronic exposure.

Samples from our courier arrive in a large bag. When there is a formalin leak, the formalin therefore spills over the other specimens shipped by many clinics. This can lead to damaged or unreadable submission forms and exposure to formalin fumes can adversely affect slide staining which can impact evaluation of blood smears and cytology specimens.

How can you help? We are asking our clients to please use leak proof containers when shipping histology samples fixed in formalin. An example of an ideal container already used by some of our clients is LeakBuster™ Specimen Containers (Starplex^{R}). These containers come in a variety of sizes and can be purchased from VWR or Fisher Canada.

Most of the samples submitted to our laboratory are packaged appropriately and we sincerely appreciate your diligence. However, to further minimize the risk of exposure to formalin by all those involved in the handling and shipping of samples, please evaluate the type of sample containers used by your clinic and ensure that proper packaging is used for shipping these samples. Further information is found in this past article in the February 2009 edition of Diagnostic Update: http://avc.upei.ca/files/avc/AVCDSN_2009-feb.pdf. If you have any questions concerning the packaging and shipping of samples, please do not hesitate to contact the staff at Diagnostic Services. We look forward to your business!

Laboratory News

By Cornelia Gilroy, Veterinary Clinical Pathologist

Here are some recent happenings in Diagnostic Services:

- The AVC Canadian Veterinary Medical Association Teacher of the Year Award was awarded in October 2012 to Dr. Shelley Burton, Veterinary Clinical Pathologist. It is awarded based on a class vote to the faculty member most influential in promoting the interest and enthusiasm of second year students in veterinary medicine.
- Dr. Dania Villarnovo, clinical pathology resident, gave a presentation at the Veterinary Laboratory Professionals meeting in Seattle, Washington in December 2012. This meeting is held in conjunction with the American College of Veterinary Pathology and American Society for Veterinary Clinical Pathology annual meeting. The talk focused on Dr. Villarnovo's research on the evaluation of a commercially available major cross-matching kit (RapidVet®-H) for use in dogs, cats and horses. At this same meeting, Dania was awarded a Share the Future travel grant and the CL Davis Foundation Student Scholarship Award for Veterinary Pathology. The CL Davis Foundation serves to promote international advancement in veterinary and comparative pathology. Congratulations Dania!
- Dr. Andrea Bourque served a 1 year proctor term and Dr. Shelley Burton finished a 4 year member term on the American College of Veterinary Pathologists (ACVP) Certifying Examination committee. This is a rigorous 3 day board examination held each September in Ames, Iowa and successful passing confirms the title of Diplomate ACVP in either anatomic or clinical pathology.
- Mr. Dennis Olexson retired in October from his position as Manager of Diagnostic Services. He was instrumental in developing the laboratory over a 25 year period. A farewell party was held to wish him well on October 3, 2012. Please see a full article on Dennis and his retirement on page 1.
- We welcomed back Karen Van Lunen as a part-time technologist in the clinical chemistry section. Karen had previously worked in our laboratory before moving to Newfoundland in 2005. She has returned to PEI and we are happy to have her back!

Staff Focus

Dr. Shelley Burton

By Cornelia Gilroy, Veterinary Clinical Pathologist and Allan MacKenzie, Veterinary Clinical Pathology Technologist

Dr. Shelley Burton has been a key figure in Diagnostic Services since 1992 when she joined the Department of Pathology and Microbiology as a clinical pathologist. Many of you know her well from phone conversations about a particularity challenging case but this article may tell you some things you may not know!

A native of Regina, Saskatchewan, Dr. Burton graduated with distinction from the Western College of Veterinary Medicine in 1983. Following six years in private small animal practice, she did her Master of Science graduate work and clinical pathology training at the Atlantic Veterinary College. She became board certified in Clinical Pathology by the American College of Veterinary Pathologists (ACVP) in 1994. She recently became a full professor at the AVC where she is recognized as an outstanding teacher with ten teaching awards! One of these awards was the esteemed Hessian Merit Award for Excellence in Teaching. This award requires nomination from three colleagues and includes nominees from the entire University of Prince Edward Island faculty.

Dr. Burton is an expert clinical pathologist and she is instrumental in the instruction of veterinary students in this subject in the 2nd year course and the 4th year clinical rotations. She also devotes a great deal of time to the supervision and training of graduate students and residents, thereby positively influencing their careers. Dr. Burton thoroughly enjoys providing continuing education sessions for veterinary practitioners and pathologists both regionally (many times at the Atlantic Provinces Veterinary Conference) and nationally.

Dr. Burton recently finished a 4 year term as a member (3 years) and chair (1 year) of the clinical pathology section of the ACVP Certifying Examination Committee. This group prepares and marks the rigorous 3 day board examination held each September in Ames, Iowa; successful passing confirms the title of Diplomate ACVP in either anatomic or clinical pathology. A large amount of personal time was devoted to this endevour which benefited both the AVC and the training of residents in pathology. Part of her success in writing questions is undoubtedly due to her passion for the correct use of grammar!

In her free time, Shelley enjoys country life in PEI with her husband, Darcy Shaw, and their three applehead Siamese cats, Norm, Stewie and Charlie. She loves to travel and a recent enjoyable trip was to the South (USA). Highlights according to Shelley were eating too much fried chicken and biscuits, visiting honkytonks in Nashville and a stop at Elvis Presley's Graceland in Memphis!

Reader Feedback: The ***Diagnostic Update*** group invites comments or suggestions for future topics in the newsletter. Please submit your comments to *Dr. Cora Gilroy* (cgilroy@upei.ca), Diagnostic Services, Atlantic Veterinary College, UPEI, Charlottetown, PE, C1A 4P3 and they will be forwarded appropriately.