UNDER THE SCOPE AUTUMN 2019

MU VMDL Newsletter

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A MESSAGE FROM VMDL DIRECTOR SHUPING ZHANG

Welcome to the MU VMDL fall 2019 newsletter! I hope everyone has had a wonderful summer. First of all, I would like to introduce our newest faculty members: Dr. Xiangwei (Shaun) Du (analytical chemist), Dr. Tatiana Rothacker (clinical pathologist), and Dr. Michael Zinn (anatomic pathologist). We are excited to welcome them to the VMDL team. I'm sure you will enjoy getting to know them in the coming years.

The firearms season for deer hunting is rapidly approaching. This year we will continue our collaboration with Missouri Department of Conservation on chronic wasting disease testing. We are expecting more than 30,000 samples for the 2019/2020 season. The VMDL staff are certified to test wild cervids by ELISA (screening) and IHC (confirmation).

Lastly, the VMDL has been working with USDA-APHIS and NAHLN on a series of African Swine Fever functional exercises and drills. In late July, I attended the African Swine Fever Outbreak Laboratory Response Course at the Plum Island Animal Disease Center. Dr. Wole Odemuyiwa, the VMDL Molecular Diagnostics section head, will receive the same training in December. These activities are important to refine and improve the procedures that will be used in the event of an outbreak. They also reflect the VMDL's long-standing commitment to animal health, and Missouri's animal agriculture industry.

As always, your feedback is important to us because the VMDL is here to serve all of you and the state of Missouri.

Enjoy the beautiful fall leaves!

Best regards,
Shuping Zhang, Director,
Veterinary Medical
Diagnostic Laboratory
Professor, Veterinary Pathobiology

Element Panel Now Validated for Serum

MU VMDL's Toxicology Section is now validated to perform trace and toxic element analysis by ICP-OES on serum or plasma. The following elements are included: cobalt, copper, iron, manganese, molybdenum, selenium and zinc. The cost per sample is $45. We recommend submitting 2-3mL of serum or plasma, but analysis can be done on as little as 1mL.

Additionally, be aware that zinc can leach from rubber. Therefore, we recommend collecting samples into royal blue top tubes, which are manufactured to reduce the amount of zinc that leaches into the sample. After collection, separate serum into an all-plastic, leak-proof container. If royal blue top tubes are not available for collection, avoid contact between the sample and any rubber to reduce the likelihood of leaching of zinc. Samples not collected in royal blue top tubes will still be analyzed.

Let us know if you have any questions about this assay.

MU VMDL Newsletter

Reduced Fees for Livestock and Poultry Bacteriology Testing

Effective July 1, our Bacteriology Section reduced prices on livestock and poultry cultures to better serve our food animal clientele. Now an aerobic culture for a livestock or poultry specimen costs only $17, and you can run both aerobic and anaerobic cultures for $23 per specimen. Our companion animal aerobic and anaerobic culture combination has also been reduced to allow practitioners to request anaerobic cultures on more of their cases.

Scope Contamination: Is it Happening to You?

Calling all practitioners! Do you use an endoscope to obtain diagnostic specimens for bacterial culture? If so, do you know for certain that your scope is clean?

The biopsy channels and flush channels of endoscopes are prone to damage, whether rigid or flexible. Flexible scopes are certainly more prone to damage, with cracks, folds and fissures that can form within the biopsy channel, but even rigid endoscopes can eventually acquire scratches and burrs. These small defects may not affect the overall function of the endoscope but they are very good at providing shelter for microorganisms. In addition, biopsy channels can be very difficult to dry completely and moisture also helps provide microbial habitat. It is very common for endoscopes to become contaminated with bacteria.

The most common scope contaminants include the water-associated organisms *Pseudomonas* and *Stenotrophomonas* spp. as well as soil organisms in the *Burkholderia cepacia* group. These organisms are well-known for growing in moist areas; some of these species will even grow in disinfectant solutions! These particular bacteria are also very commonly multi-drug resistant. Other bacteria may also be scope contaminants and many of the contaminant bacteria may be considered veterinary pathogens.

So why should you care if there's some bug growing in your scope? First, you may inadvertently inoculate a patient with that bacterium, with the potential to cause disease. Second, you may confound any culture samples you obtain with that scope. If we grow a *Pseudomonas* from a scope-acquired sample, how can you know if it's from the patient or from your scope? (You can't.) This can lead to inappropriate treatment for "infections" that may not actually exist. The use of double-guarded sampling catheters can decrease the chance that a contaminant bacterium will be found in the sample, but does not eliminate it.

Treatment of infections with *Pseudomonas* and related organisms may involve fairly "big gun" and expensive antibiotics which should be avoided except when clearly needed due to the potential for development of antibiotic resistance. Thus it would be beneficial to ensure that any bacteria are in fact originating in the patient and not in your endoscope.

So what can you do? First, make sure that your scope's biopsy channel is not damaged and that the scope receives regular maintenance. Second, clean and disinfect your scope in accordance with the manufacturer's recommendations. Third, ensure that the biopsy and flush channels are completely dry between uses; this will often require extended time or the use of forced air through the channels. Finally, check your scope periodically by culturing an aliquot of saline that has been flushed through the biopsy channel and an aliquot of fluid flushed through the flush channel. Any positive result indicates that the scope is contaminated and should be subjected to a thorough cleaning and disinfection. Repeated positive cultures in the face of appropriate disinfection and drying suggest that there is damage in the channel; consult your endoscope manufacturer for appropriate service.

Here at the VMDL we are happy to assist you in contamination-checking your endoscope. The ideal sample is at least 2ml of sterile saline or liquid culture medium inoculated into liquid Amies transport media such as an E-swab tube. Alternative-

Continued on page 3

Scope, continued

ly, the fluid sample may be dripped onto a culturette swab with transport media in gel or sponge form. Samples should not be submitted in red-top tubes if transit time will be >24h, as bacterial death can occur when no media is provided. If you would like us to send you E-swabs, call the VMDL.

When Should I do an Anaerobe Culture?

Many practitioners ask when an anaerobe culture is needed. To a microbiologist, of course, the answer is "always," but there are definitely clinical situations in which anaerobes are more likely to be encountered. An anaerobic culture is never a wrong thing to do, but in the following situations an anaerobe culture is strongly recommended:

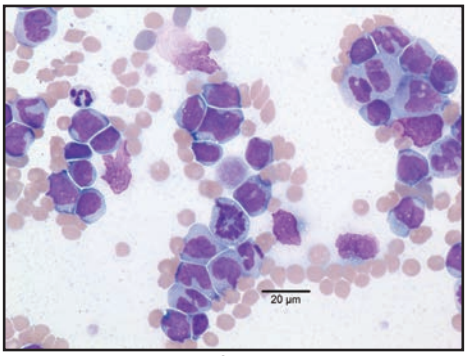
- Any deep wound (punctures, bite wounds)
- Any lesion that has a foul odor
- Any lesion producing gas
- Closed body cavity specimens (pleural, peritoneal or pericardial fluid)
- Suspected aspiration pneumonia
- Any oral or pharyngeal lesion
- Urine in diabetic cats or dogs
- Ruminant liver
- Ruminant metritis
- Any time a histiotoxic Clostridium is on the differential list (e.g. blackleg, malignant edema)
- Feces when enteric clostridial disease is a differential
- Digital lesions from livestock

When submitting an anaerobic culture be sure to exclude as much air as possible, as oxygen is toxic to anaerobes. Also, tissue is more reliable than swabs for anaerobe recovery. If a swab is the only option, E-swabs are excellent for transporting anaerobe specimens. Small pieces of tissue may also be placed in the E-swab tube. Gel swabs are adequate, but the spun fiber swabs or the swabs with a bit of sponge at the bottom of the culturette tube are not recommended for anaerobe culture. A single specimen, if appropriately handled, can be used for both aerobic and anaerobic culture. Feces and larger tissue specimens should be shipped in a Whirl-pak from which air can be excluded, or in a small screw-cap container filled to the brim in order to exclude air. Please do not send tissue, fecal or fluid samples in a Ziploc-type bag or in a glove or obstetric sleeve as they consistently leak. Anaerobe specimens may be shipped at room temperature or chilled, but do not freeze.

A CBC Mystery

An 8-year old castrated male German Shepherd presented with a history of decreased appetite and lethargy worsening over two weeks. An in-clinic hematology analyzer reveals marked leukocytosis, moderate anemia, and mild thrombocytopenia. Automated (machine-generated) differential count suggests the leukocytosis is due to increased numbers of neutrophils and monocytes. Does this patient have a severe inflammatory process? What do you think?

Whoa – those are NOT neutrophils or normal monocytes! This patient has a marked leukocytosis due to



the presence of large neoplastic cells (blasts) in circulation. These cells have large ovoid to irregularly indented nuclei which often contain one to three nucleoli. They have small to moderate amounts of medium to dark blue cytoplasm which sometimes contain a few small clear vacuoles. Rare mitotic figures are even found on the blood film.

Microscopic appearance of these large cells indicates they are neoplastic, and the presence of concurrent anemia and thrombocytopenia along with rapid onset of clinical signs are suggestive of an acute leukemia (as opposed to leukemic stage of lymphoma).

Hematology analyzers are prone to misclassifying large atypical cells in circulation. They cannot accurately enumerate band neutrophils or recognize neutrophil toxicity, and the presence of either a left shift or neutrophil toxicity can lead to erroneous automated differential cell counts as well. For these reasons (among many others), we recommend microscopic evaluation of blood films from clinically ill patients anytime a CBC is performed. Our laboratory staff review a blood film for every standard CBC request we receive to ensure the accuracy of our reports.

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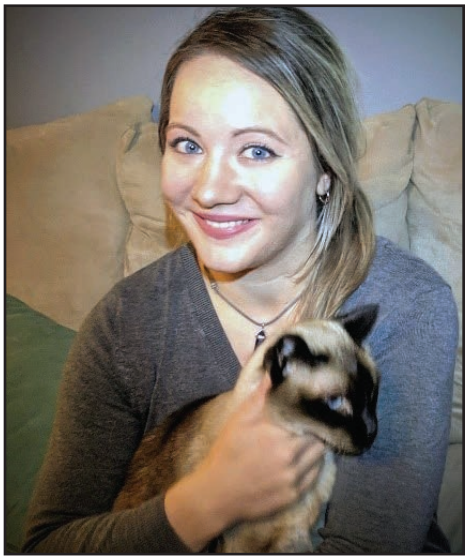
Faculty Updates

The VMDL is proud to introduce several new faculty members. Drs. Du, Rothacker, and Zinn have joined the Toxicology, Clinical Pathology, and Anatomic Pathology sections, respectively. They look forward to furthering the VMDL's mission of service, teaching and research.



Tatiana Rothacker, DVM, is originally from Cliffwood Beach, New Jersey. She attended Central Connecticut State University where she earned a bachelor of science with a major in biomolecular science and a minor in chemistry. She then attended veterinary school at the University of Missouri where she participated in the Veterinary Research Scholars program, and graduated with the class of 2015.

She developed an interest in clinical pathology during her second year of veterinary school and decided to pursue a residency in the field. After veterinary school, she completed a diagnostic laboratory internship at Kansas State University with a focus on clinical pathology. She then completed her residency in clinical pathology at the University of Missouri Veterinary Medical Diagnostic Laboratory. She recently passed her ACVP board exam and joined our faculty team.

She has many pets including three cats and a 17-year-old Jack Russel terrier. She enjoys spray paint art, playing the piano, designing and making costumes, playing board and video games, and escape rooms.

Michael Zinn, DVM, grew up in Scottsdale, Arizona. He attended Arizona State University and received his bachelor's degree in 2004. He then attended veterinary school at Colorado State University, and graduated with his DVM in 2008.

After veterinary school, he was a small animal practitioner in Mesa, Arizona for eight years. In 2016, he began his anatomic pathology residency at the University of Missouri Veterinary Medical Diagnostic Laboratory. He recently passed his ACVP board exam and is excited to continue his pathology career at MU.

Xiangwei (Shaun) Du is the new chemist in the VMDL. He focuses on chemistry (analytical and organic) and analytical toxicology.

He received his PhD from Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences and his postdoctoral training from Iowa State University where he spent eight years learning analytical toxicology.

His research interests focus on analytical toxicology and organic synthesis. He is interested in developing new assays to detect toxins, nutrition, and veterinary drugs as well as isolation, purification, and characterization of their new metabolites, we well as designing new probes for biosensor and new veterinary drugs. He likes playing table tennis, cooking, and spending time with his two boys, Joshua and Caleb.