



The GI Lab



**VETERINARY MEDICINE
& BIOMEDICAL SCIENCES**
TEXAS A&M UNIVERSITY

Promoting Gastrointestinal Health in Companion Animals

Newsletter - Spring 2022

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News from the Gastrointestinal Laboratory

Another year has passed and once again we have made it through a strange, yet very exciting period. I am very happy to report that our team is growing. Since my last column, three new faculty members have joined the GI Lab and a fourth, who will work closely with us, has recently joined our Department:



Dr. Emily Gould (pictured to the left) joined our team of internists on September 1, 2021. Emily received her veterinary degree from the University of California at Davis in 2012 and pursued a combined residency/PhD program at the University of Tennessee. When her mentor Dr. Katie Tolbert transferred to

the GI Lab, Emily also moved to Texas A&M in order to complete her PhD program here. Emily's PhD project focused on the effects of acid suppressants on mast cells and mast cell tumors. We feel extremely fortunate that Emily has decided to stay in Texas after completion of her PhD. For the past two years she has already been taking your consultations, but now you will have the opportunity to talk with her on a more regular basis.

Starting at the beginning of 2022, Dr. Paula Giarretta (pictured to the right) will join us, having previously worked at the Federal University of Minas Gerais in Belo Horizonte in Brazil. Paula received her veterinary degree from the Federal University of Santa Maria, Brazil, in 2012 and



completed a combined residency/PhD program in anatomic pathology here at Texas A&M University in 2019 before returning to Brazil. We feel very fortunate that she has chosen to spend the next part of her professional career with us. While Paula will have a partial appointment in the Department of Veterinary Pathology, her main appointment will be in the GI Lab where she will be leading our efforts in gastrointestinal histopathology as well as immunohistochemistry and other advanced histopathologic tools.



Also, starting in early 2022, Dr. João Cavasin (pictured to the left) will be joining our team from Cornell University. João graduated from the Federal University of Parana, Brazil, in 2017 and just completed a residency in anatomic pathology at Cornell University. Similarly to Dr.

Giaretta, Dr. Cavasin will also have a partial appointment in the Department of Veterinary Pathology, but his main appointment will be in the GI Lab where he will focus on hepatic histopathology. Dr. Cavasin has worked with Dr. Sharon Center, Dr. Sean McDonough, and others at Cornell University, and we are very fortunate that he has decided to join our team.

Finally, Dr. Kate Aicher (pictured to the right) has come back to Texas A&M University. You may recall Kate from her time as the lab manager of our service lab many years ago. After attending veterinary school at Texas A&M, she pursued a residency in small animal internal medicine at North Carolina State University and spent several years in private practice as a specialist and the chief medical officer of a specialty referral hospital. As a faculty member at Texas A&M University, Kate will play a major role in teaching veterinary students at our VERO West Texas Campus. However, she will also work closely with the GI Lab. She will be involved with answering your questions on complex gastrointestinal cases, and she will also be involved in some of our research activities.



At the GI Lab, we work to continually improve our facilities in order to make sure we are always ready to serve our missions of

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service, research, and outreach. We just finished an expansion of our Metabolomics lab and have updated our small molecule analysis capacity. We now have two gas chromatography/mass spectrometry (GC/MS) systems that we use for the measurement of bile acids, fatty acids, N-methylhistamine, and methylmalonic acid, amongst others. We also have an automated high-performance liquid chromatography system to simultaneously measure more than 40 amino acids in serum samples. Finally, we recently purchased a brand new liquid chromatography with tandem mass

spectrometry instrument, which will allow us to simplify many of our current GC/MS-based assays.

We continue to be excited about the future – there is a lot more research to be done towards the development of new diagnostic tests that will help us to better and more easily diagnose our patients as well as to offer better treatments to manage their conditions. We would not be able to do this work without your help – thank you for your continued patronage! (Joerg Steiner)

Alpha-1 Proteinase Inhibitor Test Available Again

We are pleased to announce that we once again can offer the fecal alpha-1 proteinase inhibitor (α_1 PI) assay as a marker for gastrointestinal protein loss in dogs. Because α_1 PI is more resistant to degradation than other proteins, such as albumin, it serves as a specific marker to detect excessive gastrointestinal protein loss as can occur with protein-losing enteropathies (PLE). A variety of diseases,

including lymphangiectasia or chronic inflammatory enteropathy, can cause PLE.

A mean three-day α_1 PI concentration of ≥ 13.9 $\mu\text{g/g}$ feces or an α_1 PI of one individual sample of ≥ 21.0 $\mu\text{g/g}$ feces is considered abnormal.

Naturally voided fecal samples (about 1 gram per sample) should be collected immediately following defecation on three

consecutive days. Special pre-weighed fecal tubes must be used and are available from the Gastrointestinal Laboratory. To order fecal tubes, please email us at gilab@cvm.tamu.edu.

Samples should be frozen until submission to our lab and should be shipped on ice by overnight courier. (Katie Tolbert)

Current studies / Contact information	Brief project description
Comparison of parenteral and oral cobalamin supplementation in cats Dr. Chee-Hoon Chang chchang@cvm.tamu.edu	This project aims to compare the efficacy of parenterally and orally administered cobalamin supplementation in cats . Cats with cobalamin deficiency for any reason can be enrolled. However, patients cannot have any significant comorbidities, such as chronic kidney disease. There is no cost to the owner for participation other than for office visits.
Canine chronic enteropathy study Amanda Blake tamu.gilab@gmail.com	The purpose of this study is to discover non-invasive biomarkers for the definitive diagnosis of dogs with chronic enteropathy. Dogs with chronic signs of gastrointestinal disease in which intestinal biopsies have been collected or are planned are eligible for enrollment. The study provides complete bloodwork (including a GI panel), fecal testing, and histopathology interpretation at no cost. Samples can be submitted up to three times (initial presentation and two rechecks).
Treatment trial for canine chronic pancreatitis Dr. Sue Yee Lim slim@cvm.tamu.edu	The aim of this clinical trial is to assess the efficacy of cyclosporine or prednisolone for treating chronic pancreatitis in dogs . Patients will receive prednisolone or cyclosporine for the three weeks of the study at no charge as well as GI panels.
Dietary management for chronic pancreatitis Dr. Floris Droees fdroees@cvm.tamu.edu	The aim of this study is to evaluate the efficacy of an ultra-low fat diet for dogs with chronic pancreatitis. The study will provide the diet free of charge for the duration of the study as well as monitoring of cPLI concentrations.
Treatment trial for feline chronic pancreatitis Dr. Yu-An (Andy) Wu yuanwu@cvm.tamu.edu	The aim of this clinical trial is to assess the efficacy of cyclosporine or prednisolone for treating chronic pancreatitis in cats . The study includes a total of 3 visits (initial appointment, 10th day on assigned treatment, 21st day on assigned treatment). Costs of the assigned treatment will be reimbursed. You can elect to enroll the cat into either the control or the treatment group: (1) For the control group, supportive treatments and other necessary treatments for concurrent diseases are allowed, if no prednisolone/immunosuppressant is used or (2) For the treatment group, enrolled cats will be randomly assigned to receive prednisolone or cyclosporin.
Evaluation of markers of pancreatic disease in cats before and after switching to a special diet for kidney disease or diabetes mellitus (The CATPAD study) Dr. Yu-An (Andy) Wu yuanwu@cvm.tamu.edu	The CATPAD study is a project that looks at cats' pancreatic health and the possible association with diet. We are currently enrolling cats that are about to be switched to a commercially available therapeutic diet intended for cats with kidney disease or diabetes mellitus. More information is available at: https://vetmed.tamu.edu/gilab/research/catpad-study/ .
Evaluation of anti-inflammatory and cytotoxic properties of acid suppressants on canine resectable mast cell tumors (MCTs) Dr. Emily Gould egould@cvm.tamu.edu	Study aims are to evaluate blood and tissue cytokines, MCT viability, and quantifiable histamine (and/or histamine metabolites) before and after acid suppressant or placebo therapy in dogs with surgically resectable MCTs. Study includes a total of 3 visits (initial appointment, surgical resection of tumor, and one post-operative recheck).

Hypoadrenocorticism in Dogs

Hypoadrenocorticism, also known as Addison’s disease (AD), is an endocrine disorder of the adrenal glands, which predominantly affects young to middle-aged dogs. While both sexes can be affected, females are overrepresented. Addison’s disease results from insufficient production of one or more adrenal hormones. There are two forms of AD, known as typical and atypical. Typical AD refers to hypoadrenocorticism that is associated with a typical clinical presentation and abnormalities in serum or plasma potassium and sodium osmolalities, whereas atypical AD is not associated with such changes (i.e., lack of electrolyte abnormalities). The most common cause of hypoadrenocorticism is immune-mediated destruction of the adrenal cortex.

The most common clinical signs of AD are somewhat dependent on which form is affecting that particular patient. Dogs with typical AD are commonly presented to the veterinarian for one or more of the following clinical signs: lethargy, polyuria/polydipsia, regurgitation, diarrhea or soft stools (predominantly small intestinal in presentation), vomiting, weakness, weight loss, and potentially collapse and/or hypovolemic shock.

For atypical AD, many of the clinical signs mimic those of dogs affected by chronic enteropathies. A recent study looking at dogs diagnosed with AD compared to a large population of dogs with chronic enteropathies found no difference in the type of presenting clinical signs between Addisonian dogs and those with chronic enteropathies.¹ These included overt signs of upper GI bleeding and, in a few dogs, even evidence of large bowel disease (e.g., hematochezia, tenesmus). As AD does not typically cause large bowel diarrhea, it is unclear if clinical signs in those few dogs were solely from hypoadrenocorticism or another concurrent disease process. Importantly, many of these dogs lacked the “classical” electrolyte abnormalities that develop due to mineralocorticoid deficiency (i.e., hyperkalemia, hyponatremia). This emphasizes the point that **veterinarians should be suspicious of AD in dogs with chronic GI signs, regardless of the presence or absence of electrolyte abnormalities.**

Clinicopathologic abnormalities on a complete blood count (CBC), biochemistry panel, and urinalysis that should raise suspicion for AD include the following*:	
Anemia secondary to GI bleeding ^{1,2}	Hypoglycemia
Lack of a stress leukogram or “inverse” stress leukogram (i.e., more than 2,500 lymphocytes or more than 500 eosinophils)	Inappropriate urine concentrating ability as evidenced by urine specific gravity (USG) < 1.025
Hypercalcemia	Hyponatremia
Hypokalemia	Azotemia
Hypoalbuminemia and/or hypocholesterolemia (consistent with a protein losing enteropathy) ²	
*For cases with atypical AD, lack of these abnormalities is common and should not decrease the index of suspicion for this disease.	

Interestingly, the study referenced above also found no significant differences in routine laboratory abnormalities between dogs with AD and those with other causes of chronic GI signs.¹ This again emphasizes the point that **chronic GI signs, along with an appropriate patient signalment, warrants screening for AD.**

Failure to promptly diagnose and treat hypoadrenocorticism might be life-threatening. In stable cases, **AD can be reliably and cost-effectively ruled out using a baseline serum cortisol concentration.** When the baseline cortisol is $\geq 2.0 \mu\text{g/dL}$, AD can be ruled out. For dogs in which the resting cortisol is $< 2.0 \mu\text{g/dL}$, an ACTH stimulation test must be performed for definitive diagnosis. It is recommended that synthetic ACTH (e.g., Cortrosyn, Cosyntropin Injection, and/or Synacthen) is used rather than compounded formulations of ACTH because of the former’s more consistent timing of peak action. A recent study concluded that a dose of $1 \mu\text{g/kg}$ of synthetic ACTH produces an equivalent response to that observed with a dose of $5 \mu\text{g/kg}$ traditionally used for the diagnosis of hypoadrenocorticism in dogs.³

Because of the importance of screening for AD in dogs with chronic GI signs, **we now offer an extended GI panel that adds a baseline cortisol to our standard panel (cPLI, cTLI, cobalamin, and folate).** As we save leftover serum for several weeks, it is also often possible to add a baseline cortisol to testing at a later date – just call to ask about this. Measurement of serum cortisol in our lab requires a minimum sample volume of $200 \mu\text{L}$. It is recommended that serum be separated and shipped in a red top tube with a cold pack. Of note, since hypoadrenocorticism is exceedingly rare in cats, we currently do not recommend measuring a baseline cortisol concentration in cats with signs of GI disease. (Emily Gould)

Addison's disease has been recognized to be more common in several breeds, including, but not limited to, the following:	
Bearded collie	Nova Scotia duck tolling retriever
Cairn terrier	Pomeranian
Cocker spaniel	Portuguese water dog
Great Pyrenees	Standard poodle
Leonberger	West Highland white terrier

References

1. Hauck C, Schmitz SS, Burgener IA, et al. Prevalence and characterization of hypoadrenocorticism in dogs with signs of chronic gastrointestinal disease: A multicenter study. *Journal of Veterinary Internal Medicine* 2020;34:1399-1405.
2. Wakayama JA, Furrow E, Merkel LK, et al. A retrospective study of dogs with atypical hypoadrenocorticism: a diagnostic cut-off or continuum? *The Journal of Small Animal Practice* 2017;58:365-371.
3. Botsford A, Behrend EN, Kemppainen RJ, et al. Low-dose ACTH stimulation testing in dogs suspected of hypoadrenocorticism. *Journal of Veterinary Internal Medicine* 2018;32:1886-1890.

Serum Submissions			Fecal Submissions	
Assay	Vol. req'd	Price	Assay	Price
TLI, PLI, Cobalamin, Folate, Cortisol (dogs only)	2.0 ml fasted	\$85.00	Canine Alpha-1 Proteinase Inhibitor Note: A set of 3 fecal samples must be submitted in pre-weighed tubes for testing. Email gilab@cvm.tamu.edu to order fecal α_1 PI collection tubes (15 for \$25.00).	\$54.00
TLI, PLI, Cobalamin, Folate	2.0 ml fasted	\$76.00		Microbiome Dysbiosis Index \$48.00
TLI, Cobalamin, Folate	1.0 ml fasted	\$55.00		
PLI, Cobalamin, Folate	1.0 ml fasted	\$55.00	Canine Enteropathogen Panel Canine panel includes PCR testing for <i>Clostridium perfringens</i> enterotoxin gene, net F toxin gene- <i>C. perfringens</i> , <i>C. difficile</i> , <i>Campylobacter jejuni</i> , canine parvovirus, <i>Salmonella</i> spp., and IFA testing for <i>Giardia</i> and <i>Cryptosporidium</i>	\$110.00
TLI, PLI	1.0 ml fasted	\$55.00		
Cobalamin, Folate	1.0 ml fasted	\$38.00		
TLI	1.0 ml fasted	\$29.00	Feline Enteropathogen Panel Feline panel includes PCR testing for <i>Clostridium perfringens</i> enterotoxin gene, net F toxin gene- <i>C. perfringens</i> , <i>C. difficile</i> , <i>Campylobacter jejuni</i> , feline panleukopenia virus (FPV), <i>Salmonella</i> spp., <i>Tritrichomonas foetus</i> , and IFA testing for <i>Giardia</i> and <i>Cryptosporidium</i>	\$120.00
PLI Note: Spec cPL or Spec fPL test is only offered as part of a panel or alone as a follow-up	1.0 ml fasted	\$29.00		
Canine C-reactive Protein	0.5 ml fasted	\$31.00		
Bile Acids	Pre-feeding: 1.0 ml fasted	\$18.00	Real-time PCR Assays First PCR assay Each additional PCR assay <i>Tritrichomonas foetus</i> , <i>Campylobacter jejuni</i> and <i>C. coli</i> , <i>Heterobilharzia americana</i> , canine parvovirus (CPV-2), feline panleukopenia virus (FPV), <i>Salmonella</i> spp., net F toxin gene- <i>C. perfringens</i>	\$36.00 \$12.00
	2 hrs post-feeding: 1.0 ml	\$18.00		
Methylmalonic Acid	0.5 ml fasted	\$56.00		
Gastrin	0.5 ml fasted	\$29.00	Immunofluorescence Assay (IFA) for <i>Giardia</i> and <i>Cryptosporidium</i>	\$38.00
Triglycerides	0.5 ml fasted	\$16.00	Bacterial Toxin Assays (ELISA) <i>Clostridium difficile</i> Toxin A and B <i>Clostridium perfringens</i> enterotoxin	\$34.00 \$34.00

Sample submission forms customized with your clinic's information are available on our website at <https://vetmed.tamu.edu/gilab>. Click the maroon "Clinic Login" button. For any questions or to set up a new account, please email us at gilab@cvm.tamu.edu.

