Newsletter 2019

VETERINARY MEDICINE & BIOMEDICAL SCIENCES
TEXAS A&M UNIVERSITY

The Gastrointestinal Laboratory

Promoting Gastrointestinal Health in Companion Animals

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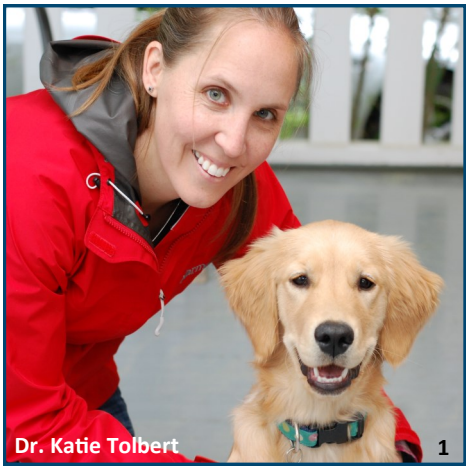
Graphic Designer: RM Gold

News from the Gastrointestinal Laboratory at Texas A&M University



Dr. Katie Tolbert 1

Once again, the time has come to highlight a few special events that have happened in the GI Lab over the last year. One could say that the first part of 2018 was pretty uneventful, but in September Dr. Katie Tolbert (see picture 1), formerly at the University of Tennessee, joined our team. As you probably know, Dr. Tolbert had been doing consult calls for us for a while, but in September she joined our team more permanently. Of course, we couldn't be happier as Katie is just an all-around wonderful person. But this change also holds some significant promise for you, our clients. Katie's work focuses on gastric physiology, gastric disease, antacids, and also *Tritrichomonas foetus*, areas that we have not been very active in for the last 10 years. Dr. Tolbert's first PhD student will start at Texas A&M University this coming spring and with more graduate students to join her group later in 2019 you should expect more of her ground-breaking work to get published and change the way we all practice small animal internal medicine in the coming years. Because Katie has recently become a mother to a wonderful little boy, she will only work half-time, but knowing Katie, you won't notice a difference.

In October, we had our first Vet KU - TAMU Internal Medicine conference in Pattaya, Thailand. In short, the conference was a big success and Jonathan will tell you more about it later in this newsletter. Inspired by this success, we are already planning the next conference to be held on Phuket Island, Thailand the week of October 7th to 11th. The focus in 2019 will be endocrinology with world-renowned speakers: Cynthia Ward from the University of Georgia, Jacquie Rand from the University of Queensland, David Church from the Royal Veterinary College in London, and Edward Feldman from the University of California, Davis. Please find some more details later in this newsletter and plan to join us for this wonderful event.

Finally, in December, we moved into our new service laboratory. Our lab has grown every year for the last 21 years (yes, that is how long we have been at Texas A&M University) and this growth has led to us running out of space every few years. When we first came to Texas A&M, we were assigned two small lab modules that housed all our service and research operations. When we outgrew that space we were lucky to take over 2 more lab modules from large animal researchers who had previously been housed in the basement of the small animal clinic. This space also quickly became insufficient and so we took over 2 more lab modules from someone who was retiring. By now the service lab was a collection of small rooms, each one functional, but too small to be able to handle any

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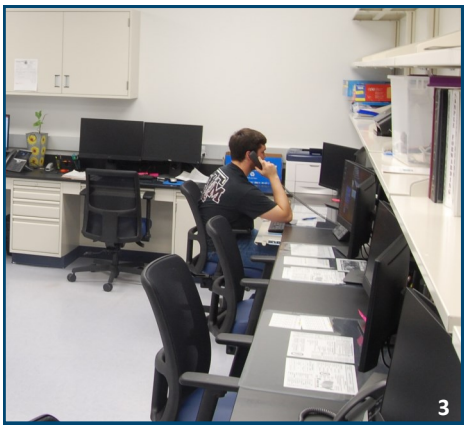
sort of growth. When the vet school opened its new teaching building in 2017 the junior surgery lab moved to that new building and thanks to the support of our wonderful leadership team of Dr. Eleanor Green (Dean), Dr. Kenita Rogers (Executive Dean), and Dr. Jon Levine (Department Head), and many others, we were able to take over a large portion of that space. After 18 months of planning and 6 months of building, our new service lab is finally ready. We are proud to say that it was designed to support optimal work-flow, with a large package-opening area (see picture 2), plenty of work-stations to enter accessions and answer your phone calls (see picture 3), and a cooled large-equipment room (see picture 4). We now operate 5 automated chemiluminescence analyzers and various other large pieces of equipment, and have



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Inside this issue:

enough benches to set up our various ELISAs (see picture 5). While we are still in the basement, we have taken out every wall we can (without making the clinic on the floor above us drop down for an unexpected visit), we have added lots of windows, and used bright lights to make the work-space as pleasant as possible for our fabulous staff.

With all of these exciting developments we are very much looking forward to 2019. We have 4 new PhD students starting in 2019 and lots of ideas to research pertinent questions in small animal gastroenterology and beyond. We are also slowly getting ready to remodel the space the service lab has recently vacated. So stay tuned for more exciting news!

However, I would be remiss not to shout out a big THANK YOU, to you, our friends! Without the samples you send to us and the donations you direct our way we would not be able to push to new boundaries and help advance the well-being of our 4-legged friends. (Jörg M. Steiner)

Update on Intestinal Dysbiosis

The GI tract harbors a complex microbiota (i.e., bacteria, fungi, protozoa, and viruses). Normal gut bacteria and their metabolites protect the host by fending off transient enteropathogens, aiding in digestion, providing nutritional support for enterocytes, and stimulating the host immune system. Various defense mechanisms within the GI tract prevent overgrowth or translocation of potentially pathogenic bacteria, including gastric acid secretion, intestinal motility, secretion of antimicrobial substances in biliary and pancreatic secretions, and intestinal IgA. When these natural defense mechanisms fail and excessive numbers of certain bacterial species persist in the intestines, they may contribute to GI pathology even though they are not traditionally considered enteropathogens.

Dysbiosis is defined as an altered composition of the bacterial microbiota. Common causes for intestinal dysbiosis are intestinal inflammation, abnormal intestinal anatomy (e.g., neoplasia, stricture, or adhesion) or motility, exocrine pancreatic insufficiency (EPI), and administration of antibiotics or other drugs. Dysbiosis occurs in most patients with GI disease. The present lack of assays to comprehensively characterize microbiota functionality along the length of the GI tract make these alterations difficult to fully assess.

Characterization of microbiota dysbiosis

Bacterial culture lacks the resolution to characterize the numerous and primarily anaerobic bacterial species within the complex GI ecosystem. Therefore, traditional culture-based approaches grossly underestimate total bacterial numbers, missing out on a majority of bacterial groups present in the GI tract.

Quantification of bacterial groups using PCR is currently the most efficient approach for detecting dysbiosis in fecal samples. The canine microbiota dysbiosis index (DI) is a recently developed rapid PCR based assay that quantifies the abundance of 8 key bacterial groups from a fecal sample (i.e., *Faecalibacterium, E. coli, Blautia, Streptococcus, Turicibacter, C. hiranonis, Fusobacterium*, and total bacteria). The strength of the DI is its ability to condense the semiquantitative results for each bacterial group in one single number. Thus, it allows us to define a reference interval for the composition of the fecal microbiota in normal dogs. A DI below 0 indicates a normal fecal microbiota, while a DI of 2 or above indicates fecal dysbiosis. A DI between 0 and 2 is equivocal. See Box 1 for suggested indications for this test.

The DI is increased in dogs with chronic enteropathy and EPI. Most antibiotics also induce intestinal dysbiosis and a consequent increase in the DI. Generally, the microbiota is thought to recover within weeks of oral antibiotic cessation, however, some dogs may have a prolonged dysbiosis. This may or may not be associated with signs of intestinal disease. We therefore recommend that, when possible, antibiotics are stopped for 1 month prior to performing this test. Please note that a feline fecal DI is not currently available.

Small intestinal dysbiosis

Due to differences in anatomical and physiological factors along the GI tract, the microbial composition differs along the length of the GI tract intestine. Therefore, evaluation of the fecal dysbiosis index alone may not accurately reflect microbiota changes in the small intestine. Concurrent evaluation of serum concentrations of cobalamin and folate with assessment of the fecal DI may help raise suspicion for small intestinal dysbiosis. A tentative diagnosis of small intestinal dysbiosis can be made by evaluating clinical signs, ruling out other causes of those signs (e.g., specific enteropathogens, endocrine disease, and diet responsive diarrhea), detecting hypocobalaminemia and/or hyperfolatemia, and/or a positive response to an antibiotic trial. However, since a wide array of diseases caused by undetected intestinal

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pathogens may also respond (at least temporarily) to antibiotic therapy, a positive response to therapy does not necessarily confirm the presence of small intestinal dysbiosis.

Therapy of intestinal dysbiosis

Small and large intestinal dysbiosis often occur secondary to chronic enteropathy or other gastrointestinal disorders (such as EPI), but may also be present in otherwise healthy animals following antimicrobial administration. Therefore, the recommendations for patients with dysbiosis vary widely. **The most important therapeutic goal is to identify and treat underlying factors where possible**. Additionally, documenting the presence of dysbiosis does not predict to which therapy a dog will respond to best.

For non-critically ill dogs and cats with chronic enteropathy that are appetent, a diet trial(s) is usually recommended at an early stage in their diagnostic work up. Often this means feeding a prescription hydrolyzed protein diet, a novel protein diet, or an easily digestible "intestinal" diet that is supplemented with prebiotic fermentable fiber. Especially in dogs, therapies aimed to modulate the gastrointestinal microbiota are often tried next. These include fermentable fiber (e.g. psyllium) and/or probiotics. Although certain antimicrobials (e.g., tylosin: 25 mg/kg PO q12 hours for 6-8 weeks) may result in a clinical improvement, they likely perpetuate the dysbiosis and clinical signs often quickly recur after administration is stopped.

Fecal microbiota transplantation (FMT) is an emerging treatment for intestinal dysbiosis. FMT is the infusion of fecal contents from a healthy individual donor into the GI tract of a diseased individual, with the aim to restore eubiosis. In veterinary medicine, anecdotal reports have recently emerged, suggesting that FMT can lead to improvement in clinical signs in some patients with chronic enteropathies, but no comprehensive published studies are available as of yet. The dysbiosis index (DI) can be used to screen potential FMT donor dogs. We recommend combining this test with a panel for enteropathogens to exclude subclinical infections in donor dogs and prevent iatrogenic pathogen transmission. The DI can also be used to assess the FMT's impact on the recipient microbiota (Figure 1); a rise in the DI to pre-treatment levels following FMT may provide an indication for a repeat procedure. Much work remains to be completed to understand the best techniques, indications, risks and benefits of FMT for veterinary species. (Jan Suchodolski)

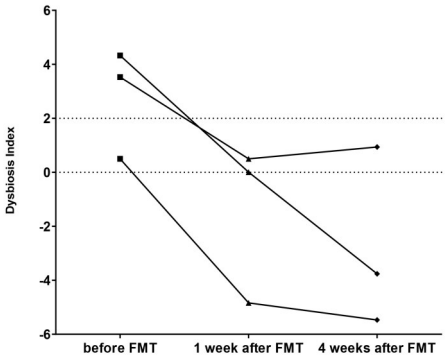


Figure 1. Changes in the dysbiosis index of 3 dogs before and after FMT. A dysbiosis index below 0 indicates a normal microbiota. A DI below 0 indicates a normal fecal microbiota, while a DI of 2 or above indicates fecal dysbiosis. A DI between 0 and 2 is equivocal.

Box 1. Suggested Indications for Performing a Fecal Dysbiosis Index

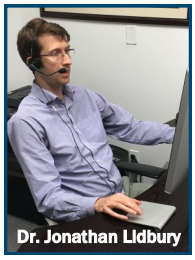
1. *Screening donor dogs before fecal microbiota transplantation (FMT)*
2. *Monitoring changes in the microbiota of canine FMT recipients*
3. *Screening for GI dysbiosis in dogs suspected to have chronic intestinal disease*
4. *Monitoring changes in the GI microbiota of dogs with chronic intestinal disease over time*
5. *Monitoring the recovery of GI dysbiosis after antibiotic therapy*

Dr. Steiner Receives AVMA Award

We are pleased to announce that Dr. Jörg Steiner has been recognized by the American Veterinary Medical Association (AVMA) for his career achievement in the area of canine research. With more than 260 peer-reviewed articles, 94 book chapters, 435 research abstracts, and the development of assays for the diagnosis of pancreatic and intestinal disease in companion animals, Jörg's career exemplifies the AVMA's mission of advancing the science and practice of veterinary medicine to improve animal and human health. While serving as a mentor or co-mentor to more than 75 graduate and veterinary students and residents, Jörg has also embraced AVMA's mission to advocate for members of the veterinary profession. He has instilled a love of the profession in his students and countless colleagues, including myself, and has furthered the advancement of veterinary research all the while improving the quality of life of hundreds of thousands of companion animals. We have all benefited from his dedication to veterinary medicine and his friendship. (Katie Tolbert)


Dr. Jörg Steiner

Consultants' Corner


Dr. Jonathan Lidbury

The Gastrointestinal Laboratory offers a free consultation service for veterinarians using our lab who need advice interpreting our test results or managing challenging cases of gastrointestinal disease in dog and cats. The service is currently provided by 6 internal medicine specialists: myself (Jonathan Lidbury), Jörg Steiner, Katie Tolbert, David Williams, Alison Manchester, Yuri Lawrence, and Sina Marsilio. To set up a consultation, call the lab (979.862.2861) and talk to our customer service representatives. As we take the consultations in addition to our other responsibilities, if we are not available to talk to you immediately our staff will take a message and we will call you back. I have answered a few frequently asked questions below.

My canine/feline patient has a high serum TLI concentration but a normal serum PLI (Spec cPL/Spec fPL) concentration. Does it have pancreatitis?

We see this seemingly contradictory pattern of results quite frequently in patients with chronic intestinal disease. However, since the PLI is a more sensitive test for pancreatitis than the TLI assay it does NOT suggest that the patient has pancreatitis. In humans it has been shown that in patients with intestinal disease enterocytes can start to synthesize and secrete trypsinogen and we assume that this also can happen in dogs and cats.

If you have a patient with a high TLI and have not run a serum PLI we do recommend adding this to help determine if the patient has pancreatitis or not. We save any excess serum you send to us so just call the lab and see if we have enough left over to run a PLI.

Does enzyme replacement therapy for exocrine pancreatic insufficiency affect serum TLI results?

No, the cTLI and fTLI assays that we offer are species-specific for dogs and cats, respectively. Therefore, administering porcine or bovine pancreatic enzyme replacement products does not affect the results. Consequently, if you are caring for a cat or dog that has been definitely diagnosed with exocrine pancreatic insufficiency there is no value in re-checking serum TLI concentration unless you believe that your patient has recovered from EPI, which happens extremely infrequently. However, dogs and cats with EPI are often cobalamin-deficient and it is important to recheck serum cobalamin concentration to make sure that they are being effectively supplemented. If a patient with exocrine pancreatic insufficiency is not cobalamin deficient on diagnosis we still recommend checking serum cobalamin concentrations every 6 months in case deficiency develops later.

Can I perform fecal enteropathogen testing or a fecal dysbiosis index on a patient receiving antimicrobials or anthelmintics?

The short answer is that if possible we recommend stopping antimicrobials/anthelmintics for at least 2 weeks prior to fecal enteropathogen testing (except when testing for canine parvovirus) and at least 1 month prior to performing a fecal dysbiosis index.

The longer answer is that it depends on what you are testing for, the antimicrobial that the patient is receiving, and how likely it is that those organism(s) are killed/inhibited by that drug. For example, we have seen some dogs have an increased fecal dysbiosis index for several months after receiving a short course of tylosin and although *Tritrichomonas foetus* in cats is not effectively treated with metronidazole the organism may not be detectable in the feces of cats receiving this drug. As always, if you have any questions please call to set up a consult.

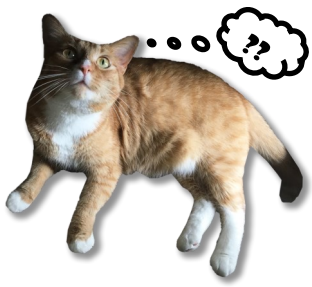
How long do patients need to be held off food before measurement of serum TLI concentration?

Serum TLI may be slightly increased after feeding in healthy dogs and cats. Therefore, both dogs and cats should not be fed during the 8 - 12 hours before blood sample collection. As these increases are small, if a dog or cat is inadvertently fed before sample collection and the result is well within the normal range, exocrine pancreatic insufficiency is unlikely. However, if the result is borderline for the diagnosis of exocrine pancreatic insufficiency, repeat sampling after withholding food for 8 -12 hours is required.

My patient has a serum cobalamin concentration within the lower part of the reference interval. Why do you still advise cobalamin supplementation?

The reference interval for serum cobalamin concentrations are 251 - 908 ng/L for dogs and 290 - 1,500 ng/L for cats. Reference intervals are constructed to include 95% of healthy individuals and ours reflect this. However, we recommend that you consider supplementation for dogs and cats with serum cobalamin concentrations < 400 ng/L in both species.

Methylmalonic acid is a metabolite that builds up when patients are cobalamin deficiency at the cellular level and this may actually be a more useful marker of cobalamin status than measuring serum cobalamin concentrations. Although we offer measurement of methylmalonic acid, the assay is time consuming and relatively expensive to perform, and therefore we do not recommend running this test routinely. We have identified that some dogs and cats with serum cobalamin concentrations within the lower part of the respective reference intervals have increased serum concentrations of methylmalonic acid, suggesting cobalamin deficiency at the cellular level. Cobalamin supplementation is cheap and carries a low risk of adverse reactions, therefore we recommend supplementing dogs and cats with low normal serum cobalamin concentrations in case they are cobalamin deficient at the cellular level.



2019 Vet KU - Texas A&M Internal Medicine Conference

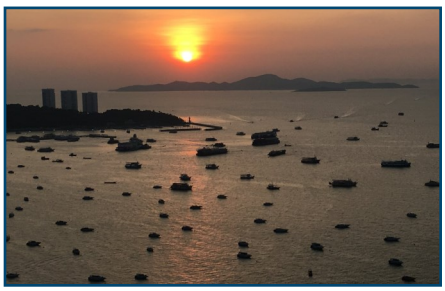
Focus: Endocrinology

In 2018 we held the first Vet KU - Texas A&M Internal Medicine Conference in Pattaya, Thailand. Naturally the focus of our first ever conference was gastroenterology. We were joined by over 90 veterinarians from the US and across Asia, and I am pleased to say that the event was a great success! The lectures were both interesting and informative, the panel discussions were lively and thought-provoking, and I can certainly say that I learned a lot. Staying at the Centara Grand Mirage Resort, Pattaya was a real treat; the facilities were amazing and the staff was truly hospitable. It was also a great experience to spend time getting to know colleagues from all over the world during the conference's social program. The conference was made possible by generous support from Nutramax Laboratories, IDEXX Laboratories, Royal Canin, Nestlé Purina, and Haemaru Animal Referral Hospital.

I are very excited to announce the 2019 Vet KU - Texas A&M Internal Medicine Conference. The conference will be held at the family friendly five-star Centara Grand Beach Resort Phuket, Thailand between Monday 7th October and Friday 11th October 2019. This year the focus will be small animal endocrinology. Twenty-five hours of top-quality continuing education will be delivered by a panel of internationally renowned experts.

Our in-depth program focuses on providing you with the latest practical relevant information on endocrine disease in dogs and cats. To this end, several sessions will outline a logical diagnostic approach to challenging but common problems, while others will help you formulate optimal treatment plans for your patients once they have been diagnosed with an endocrine disease. The final hour of each day will be an interactive session, covering complex and controversial topics. Audience participation is very much encouraged and we anticipate some great discussions.

We have been fortunate to recruit some fantastic speakers: David Church from the Royal Veterinary College, London, Edward Feldman from the University of California, Davis, Jacquie Rand from the University of Queensland, Brisbane, and Cynthia Ward from the University of Georgia. The speakers will be happy to talk about your challenging cases and answer your questions throughout the conference. Lectures will run between 8:00 am and 1:10 pm, allowing you free afternoons to enjoy the beautiful venue. Thanks to our generous sponsors (IDEXX Laboratories, Nestlé Purina, Nutramax Laboratories, and others), in addition to the educational program a social program will also be offered; this will provide an excellent opportunity for you to network and mingle with colleagues from the United States and Asia.



The Centara Grand Beach Resort in Phuket draws its design theme from the classic Sino-Portuguese architecture that characterizes Phuket Town. The resort is set directly on the sands at Karon Beach, backed by a green hill, and grouped around its own water park. The resort offers a memorable holiday experience for everyone. Families will love the exhilarating activities, the water sports, and of course the water park.

For good reason, the island of Phuket is one of the world's premier beach destinations offering beautiful white sands, swaying palm trees, glittering seas, and lively towns. Patong is the closest town to the conference venue and offers a wide array of dining options as well as a vibrant nightlife. If you love the sea you will be spoiled for choice as the island is a tropical paradise that offers more than idyllic 30 beaches. Patong Beach, Kata, Karon, and Kamala are among the most famous but there are also more secluded beaches on its North shore. Visitors can also take short boat trips to reach famous locations such as the Phi Phi Islands or Phang Nga Bay. You will never forget your trip to Phuket!

For more information and to register for the conference our conference website will be opening soon (texasimconference.tamu.edu). If you have any other questions please feel free to contact our office manager, Lori Kessler (LKessler@cvm.tamu.edu, 979.458.0732). If you have any questions about the resort or you would like to book your room please contact:

Ms. Nattita Thongbang (Assistant Sales Manager)
Centara Grand Beach Resort Phuket
Telephone: +66 (0) 7620 1234
Email: NattitaTh@chr.co.th

We really hope that you can join us for what promises to be an unforgettable experience! (Jonathan Lidbury)

VET KU - TEXAS A&M

Internal Medicine Conference

FOCUS: ENDOCRINOLOGY

MONDAY, OCTOBER 7TH, 2019 - FRIDAY, OCTOBER 11TH, 2019

Centara Grand Beach Resort | Phuket, Thailand

	Before May 15, 2019	May 16 - August 1, 2019	From August 2, 2019
Tamu Faculty and Alumni	$600	$720	$840
General Participants	$750	$900	$1,050

Dr. David Church
Royal Veterinary College

Dr. Edward C. Feldman
University of California, Davis

Dr. Jacquie Rand
University of Queensland

Dr. Cynthia R. Ward
University of Georgia

Dr. Jörg M. Steiner
Texas A&M University

- Faculty of Veterinary Medicine, Kasetsart University
- Texas A&M University

KU Kasetsart University Faculty of Veterinary Medicine

TEXAS A&M UNIVERSITY
Veterinary Medicine & Biomedical Sciences

VET KU - TEXAS A&M *Internal Medicine Conference*

MONDAY, OCTOBER 7TH, 2019

8:00 AM - 8:50 AM	How I work up a PU/PD case	Edward C. Feldman
9:00 AM - 9:50 AM	How I work up a hypercalcemic dog	Edward C. Feldman
10:20 AM - 11:10 AM	Updates on the management of feline hyperthyroidism	Cynthia R. Ward
11:20 AM - 12:10 PM	The clinical approach to the difficult hyperthyroid cat	Cynthia R. Ward
12:20 PM - 1:10 PM	Interactive session: PU/PD cases	Panel

TUESDAY, OCTOBER 8TH, 2019

8:00 AM - 8:50 AM	Diagnosis of canine hyperadrenocorticism and discriminating pituitary from adrenal disease	Edward C. Feldman
9:00 AM - 9:50 AM	Treatment of canine hyperadrenocorticism	Edward C. Feldman
10:20 AM - 11:10 AM	Hyperadrenocorticism: what to do when trilostane/mitotane is not working; pituitary macro-tumors: recognition & treatment	Edward C. Feldman
11:20 AM - 12:10 PM	Atypical hyperadrenocorticism	David Church
12:20 PM - 1:10 PM	Panel discussion: controversies in the diagnosis and treatment of canine hyperadrenocorticism	Panel

WEDNESDAY, OCTOBER 9TH, 2019

8:00 AM - 8:50 AM	Canine diabetes mellitus considerations in 2019: Part 1	David Church
9:00 AM - 9:50 AM	Canine diabetes mellitus considerations in 2019: Part 2	David Church
10:20 AM - 11:10 AM	The challenge of the cushingoid diabetic dog	Cynthia R. Ward
11:20 AM - 12:10 PM	Difficult diabetic dogs and DKA	David Church
12:20 PM - 1:10 PM	Panel discussion: controversies in the diagnosis and management of diabetes	Panel

THURSDAY, OCTOBER 10TH, 2019

8:00 AM - 8:50 AM	Feline diabetes: causes and how they affect management choices	Jacquie Rand
9:00 AM - 9:50 AM	Feline diabetes: maximizing diabetic remission	Jacquie Rand
10:20 AM - 11:10 AM	How i avoid stress hyperglycemia confounding glucose measurement in cats, the myth of somogyi & how i adjust insulin	Jacquie Rand
11:20 AM - 12:10 PM	Feline acromegaly: is it something we should be concerned about in 2019	David Church
12:20 PM - 1:10 PM	Interactive session: problem diabetic cats	Jacquie Rand

FRIDAY, OCTOBER 11TH, 2019

8:00 AM - 8:50 AM	Hypoadrenocorticism: typical and atypical	David Church
9:00 AM - 9:50 AM	Emerging endocrine diseases in cats	Cynthia R. Ward
10:20 AM - 11:10 AM	How i diagnose and treat thyroid disease in dogs	Cynthia R. Ward
11:20 AM - 12:10 PM	Endocrine diseases of the GI tract	Jörg M. Steiner
12:20 PM - 1:10 PM	Interactive session: interpretation of endocrine tests	Panel

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For more information please contact:
Lori Kessler
Tel. 979.458.0732
lkessler@cvm.tamu.edu

Current Studies

Project I Contact Information	Brief Description
Comparison of parenteral and oral cobalamin supplementation Dr. Chee-Hoon Chang chchang@cvm.tamu.edu	This project aims to compare the efficacy of parenterally and orally administered cobalamin supplementation in both dogs and cats. Dogs and cats with cobalamin deficiency for any reason can be enrolled. However, patients cannot have any significant co-morbidities, such as chronic kidney disease. This study is fully funded. No cost to owner for participation.
Canine chronic enteropathy study Dr. Agostino Buono tamu.gilab@gmail.com	The purpose of this study is the discovery of non-invasive biomarkers for dogs with chronic enteropathy. Dogs with chronic signs of gastrointestinal disease in which intestinal biopsies are collected or planned for diagnostic purposes are eligible for enrollment. Unfortunately, dogs that already receive immunosuppressive drugs are excluded from the study. The study provides complete bloodwork, including GI panel, fecal testing, and histopathology interpretation at no cost. Samples can be submitted up to three times (initial presentation and two rechecks).
Evaluation of cyclosporine as a treatment for dogs with chronic pancreatitis and diabetes mellitus Dr.Sina Marsilio smarsilio@cvm.tamu.edu Dr. Sue Yee Lim slim@cvm.tamu.edu	The aim of this study is to evaluate cyclosporine as a novel therapy for dogs with insulin-resistant diabetes mellitus and chronic pancreatitis. Qualifying cases will receive Atopica free of charge for the trial period of six weeks.
Dietary management for chronic pancreatitis Dr. Yuri Lawrence ylawrence@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.
Feline chronic pancreatitis Dr. Punyamanee (Mookky) Yamkate pyamkate@cvm.tamu.edu	The aim of this clinical trial is to assess the efficacy of cyclosporine and prednisolone for treating chronic pancreatitis in cats. Patients will receive prednisolone and Atopica for the three weeks of the study at no charge as well as GI panels.

Assay Prices

Serum Submissions

Assay	Amount Required	Price
TLI, PLI, Cobalamin, Folate	2.0 ml fasted	$76.00
TLI, Cobalamin, Folate	1.0 ml fasted	$55.00
PLI, Cobalamin, Folate	1.0 ml fasted	$55.00
TLI, PLI	1.0 ml fasted	$55.00
Cobalamin, Folate	1.0 ml fasted	$38.00
TLI	1.0 ml fasted	$29.00
PLI ***Serum PLI (Spec cPL or Spec fPL will be run only within panels or alone as a follow-up test	0.5 ml fasted	$29.00
Canine C-reactive Protein	0.5 ml fasted	$45.00
Bile Acids	Pre-feeding: 1.0 ml fasted 2 hr post-feeding: 1.0 ml	$18.00 $18.00
Methylmalonic Acid	0.5 ml fasted	$56.00
Gastrin	0.5 ml fasted	$29.00
Triglycerides	0.5 ml fasted	$16.00

Fecal Submissions

Assay	Price
Canine Fecal α1-Proteinase Inhibitor **A set of 3 samples for α1-P1 must be submitted when test is selected. Fecal α1-P1 collection tubes (15 for $25.00)	$54.00
Canine Microbiome Dysbiosis Index	$48.00
Canine Enteropathogen Panel Canine panel includes PCR testing for *Clostridium perfringens* enterotoxin gene, net F toxin gene-*C. perfringens*, *C. difficile*, *Campylobacter jejuni* and coli, canine parvovirus, *Salmonella* spp., and IFA testing for *Giardia* and *Cryptosporidium*	$110.00
Feline Enteropathogen Panel Feline panel includes PCR testing for *Clostridium perfringens* enterotoxin gene, net F toxin gene-*C. perfringens*, *C. difficile*, *Campylobacter jejuni* and *coli*, feline panleukopenia virus (FPV), *Salmonella* spp., *Tritrichomonas foetus*, and IFA testing for *Giardia* and *Cryptosporidium*	$120.00
Real-time PCR Assays *Tritrichomonas foetus* *Campylobacter jejuni* and *C. coli* *Heterobilharzia americana* Canine Parvovirus (CPV-2) Feline Panleukopenia virus (FPV) *Salmonella* spp. Net F toxin gene - *C. perfringens*	First PCR assay $36.00 Each additional $12.00
Immunofluorescence Assay (IFA) *Giardia* and *Cryptosporidium*	$38.00
Bacterial Toxin Assay (ELISA) *Clostridium difficile* Toxin A and B *Clostridium perfringens* enterotoxin	$34.00 $34.00