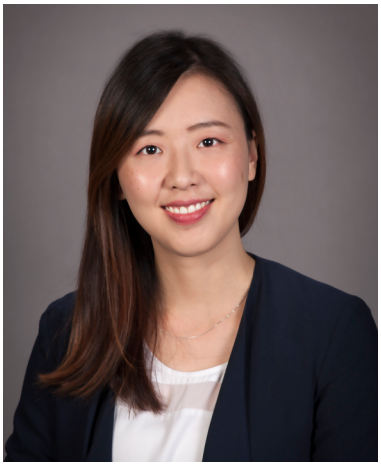
The GI Lab
VETERINARY MEDICINE & BIOMEDICAL SCIENCES
TEXAS A&M UNIVERSITY
Promoting Gastrointestinal Health in Companion Animals
Newsletter - Spring 2025 Steiner, Tolbert, Aicher, Phillips, Lidbury, Gould, & Toresson Layout by: RK Phillips

What's Inside This Issue:

News from the Gastrointestinal Laboratory

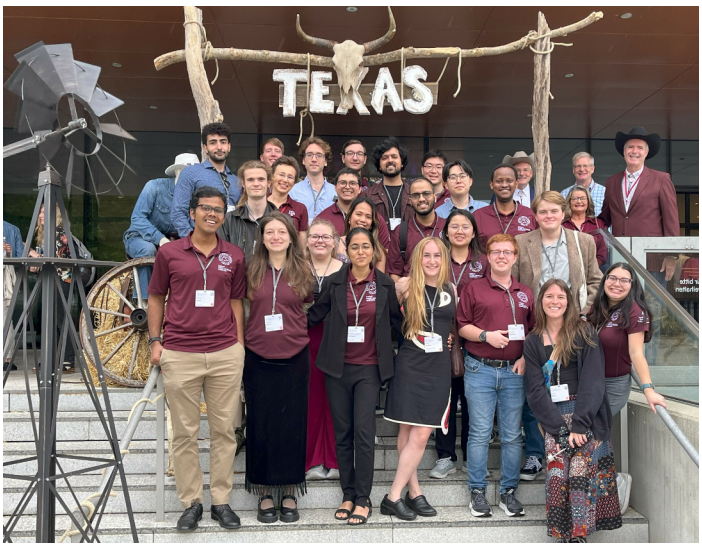
As I have done for many years, I want to give you a brief update on what is happening at the GI Lab and how our advances could impact you and your patients. You may recall from last year that Dr. Katie Tolbert had just passed her board examination in clinical nutrition, and since then, we have been working hard to develop a clinical nutrition program. This fall, Dr. Tolbert was hired as an Associate Professor in Small Animal Clinical Nutrition. She is joined by Ashley Self, a licensed veterinary technician certified in clinical nutrition with over 10 years of experience. In addition, we just received approval to open another faculty position in Clinical Nutrition. This means we will be able to provide a comprehensive clinical service geared towards: teaching clinical nutrition to our future colleagues, seeing nutrition referrals at the Texas A&M Veterinary Medical Teaching Hospital, conducting clinical nutrition research studies, consulting on complex cases throughout our teaching hospital, and most impactful for you, providing external remote clinical nutrition consultations. Please find information later in this newsletter on how to arrange a nutrition consult from the GI Lab Clinical Nutrition Service.



I am sure many of you have spoken to Dr. Tolbert for a GI consult in the past and have come to enjoy her clinical expertise in helping you solve your most complex cases. Her knowledge as one of our GI consultants will be missed. But fear not. We have recently hired Dr. Sue Yee Lim (pictured at left), a board-certified internist, to become a permanent part of our consulting team. Dr. Lim is originally from Malaysia and completed her PhD on advanced imaging modalities for the diagnosis of pancreatitis in dogs at Hokkaido University in Japan. She later joined the GI Lab as a combined resident in internal medicine and PhD student. Dr. Lim is currently working on finishing up her *second* PhD here at the GI Lab – yes, you read that correctly. As of this fall, Dr. Lim now serves as an Assistant Professor of Small Animal Internal Medicine at the GI Lab. I am sure you will be impressed when you have a chance to speak with her.

As you know, we very closely monitor the performance of the assays we offer, regardless of whether we develop them in house or purchase established assays from an outside company. Late in 2023, we discovered that there were several canine patients that despite having clinical signs of EPI had a serum trypsin-like immunoreactivity concentration (cTLI) within the reference interval. When we carefully looked at the data over the last 20 years, we became suspicious of an assay shift in this commercial assay, one used by virtually all commercial laboratories worldwide. To explore this further, we immediately initiated a large survey (thank you so much if you were one of the colleagues who provided answers to this survey), and we used this data to inform an adjustment of our cut-off value for a diagnosis of EPI to 5.5 µg/L. Interestingly, many other commercial laboratories have now adjusted their cut-off value in response to our study. So, as you can see, we are leading the way in continuous quality control throughout the industry.

This last year was also a great year for our outreach activities. We once again held a joint small animal internal medicine conference with Kasetsart University (Bangkok) in Pattaya, Thailand. The topic of the conference was feline medicine, and every seat was filled with colleagues from many different countries, including the USA, Australia, South Korea, Hong Kong, and of course Thailand (see photo above). This conference would not be possible without our long-term sponsors, including Nutramax Laboratories Veterinary Sciences, Nestle Purina Pet Care, Idexx Laboratories, and Hill's Pet Nutrition. Please see the save the date reminder in this newsletter for our 2025 conference focusing on gastrointestinal diseases, including the liver and the exocrine pancreas. So, if you love high-end continuing education, a fabulous beach, fantastic food and service, and a foreign country, don't miss this opportunity!



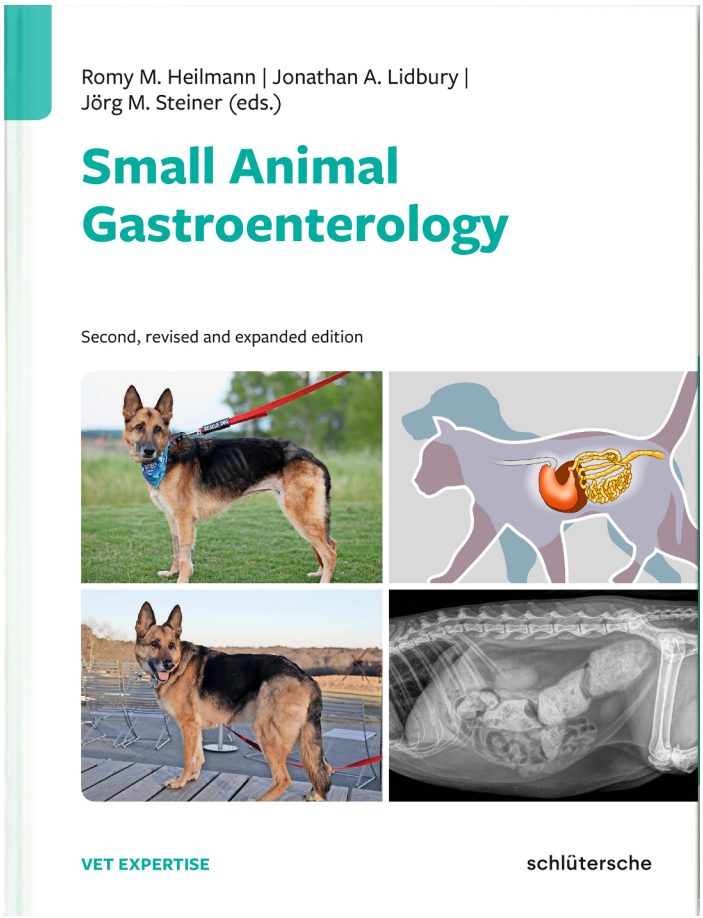
We also continue to lead the Lindau Nobel Laureate Meeting Initiative at Texas A&M University, and I was able to take a group of 31 young scientists from across the United States to the 2024 Lindau Nobel Laureate meeting in Germany (see photo above) where they joined more than 30 Nobel Laureates in Physics and more than 650 young scientists from across the globe. This is a career-altering opportunity.

Education and outreach are very important to all of us here at the GI Lab. We teach students during their preclinical years and on the clinic floor, give lectures across the globe, and publish many papers in peer-reviewed journals every year. This year we were very excited to be able to finally publish the second edition of a comprehensive textbook on small animal gastroenterology for dogs and cats (cover pictured at right). We hope that you will find this second edition useful in your everyday practice.

Of course, we continue our research on a wide variety of topics related to diseases of the gastrointestinal tract, including the liver and the exocrine pancreas (see page three of this newsletter). One area of research that may lead to a paradigm shift in small animal gastroenterology is our program directed at the liver fluke *Heterobilharzia americana*. Truth be told, this investigation started years ago with a phone call from one of our colleagues in the field who told us that they were frequently diagnosing this fluke. Back then, we immediately set out to develop a fecal PCR test for this parasite, and now Dr. Kate Aicher, with collaborative support from one of our Hagler Fellows, Dr. Jody Gookin, and the rest of the GI Lab faculty, is leading multiple studies in this area. You can read about it in more detail later in this newsletter.

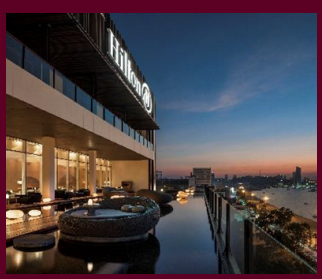
Finally, I would like to gently remind you that we are still in need of several donors for a variety of initiatives. We have some matching funds available for a Chair in Comparative Gastroenterology and a chair in Gastrointestinal Pathology. We also have matching funds for establishing an Institute in Small Animal Clinical Nutrition. So, if you have a client who has been impacted by our services and you think they may be interested in establishing their legacy in any of these areas (or another area in small animal gastroenterology) by making a sizeable donation to one of our programs, please let us know – we would love to chat with them and you about these opportunities.

As always, thanks so much for your patronage – you are the backbone of what we do! Our research efforts are funded by the samples you submit to us and guided by the cases you see in practice, which assist us in identifying emerging fields in need of further study (e.g., *Heterobilharzia americana*). The data you help generate by taking the time to enroll patients in one of our clinical trials or by answering our questionnaires is priceless. Simply put: without your support, we could not do the work that we do. Thank you for being part of our team! (Jörg Steiner)



SAVE THE DATE: 2025 Vet Ku – Texas A&M Internal Medicine Conference Focus: Gastroenterology

We are very excited to announce the 2025 Vet Ku – Texas A&M Internal Medicine Conference in partnership with the Faculty of Veterinary Medicine at Kasetsart University in Bangkok, Thailand. The conference will be held at the Hilton in Pattaya, Thailand, between **Monday, October 13,** and **Friday, October 17, 2025**. The focus will be small animal gastroenterology. A panel of internationally renowned experts will deliver 25 hours of top-quality continuing education. More details to follow…



New Year Brings New Nutrition Service

The Gastrointestinal Laboratory has been at the forefront of advancing veterinary care for companion animals. We offer specialized diagnostic testing, continuing education programs, expert veterinary consultations, and we conduct high-quality research. A key focus of our work is collaborating with the veterinary community on nutritional approaches to gastrointestinal health. Much of our research is oriented towards better understanding the pathophysiology of GI diseases and addressing knowledge gaps so as to improve nutritional management strategies.

In line with our commitment to improving patient outcomes, the GI Lab is pleased to announce the launch of a small animal nutrition service. This new initiative will be spearheaded by myself (Katie Tolbert, DVM, PhD, DACVIM [SAIM, SA nutrition]; featured in our 2023 newsletter) and Ashley Self, MS, LVT, VTS-Nutrition (pictured at right). Ashley hails from Illinois and brings over a decade of experience as a licensed veterinary technologist who specialized in nutrition while at the University of Tennessee. In 2018 she obtained her veterinary technician specialty in nutrition, and in 2023 she completed her master's degree in animal science. Her background in veterinary nutrition supports her role as the Secretary for the American Academy of Veterinary Nutrition (AAVN). Ashley's clinical expertise focuses on nutritional interventions for critically ill companion animals. Her passion and credentials make her a critical addition to our nutrition service team, and we are thrilled to have her on board.

Our nutrition service will be offering veterinarian and owner-directed consults. These consults will initially be focused on the nutritional management of gastrointestinal diseases and critical illness.

- **Direct-to-owner:** initial appointment fees will range from $450 to $750, depending on the specific needs of the patient and the degree of customization required for the final recommendation.
- **Direct-to-vet:** fees will depend on the complexity of the case and the duration of the consultation.

Please visit our nutrition service website at https://tx.ag/gilabnutrition/ for more information about how to schedule a consultation with our team. (Katie Tolbert)

Current studies	Study description
Evaluation of markers of pancreatic disease in cats before and after switching to a special diet for kidney disease or diabetes mellitus 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://tx.ag/catpad/.
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) and will cover half of the patient's surgical bill at Texas A&M.
Diet trial for treatment of exocrine pancreatic insufficiency (EPI) in dogs Dr. Kate Aicher – *epistudy@tamu.edu*	This clinical trial aims to assess the efficacy of a new diet compared to pancreatic enzyme replacement therapy for the treatment of exocrine pancreatic insufficiency in **dogs**. The study includes a total of six visits with the costs of each covered by the study. In addition, dogs will be provided with diet and pancreatic enzyme replacement therapy for the duration of the study. Patients enrolled in this study are seen at their primary care veterinarian's office.
Medical management for gallbladder mucocele in dogs Dr. Kate Aicher – *vetclinicaltrials@tamu.edu*	This clinical trial aims to determine if daily supplementation with a mixture of vitamins, standard of care treatments, and feeding of a veterinary therapeutic low-fat diet will result in resolution of gallbladder mucocele formation in **dogs**. Participation in the study will generate approximately $5,000 in cost savings by providing free prescription dog food, free medications, free abdominal ultrasound examinations, and free blood work over a period of 1 year. Study visits are only at Texas A&M University or North Carolina State University.
Prevalence of *Heterobilharzia americana* in high-risk Labrador Retrievers in Texas Dr. Kate Aicher – *thedrakeproject@tamu.edu*	This Drake Project aims to determine the prevalence of *Heterobilharzia americana* in a high-risk breed (**Labrador Retriever**) with a high-risk lifestyle (four or more entries per month into freshwater bodies) within Texas. A voided fecal sample will undergo testing via zinc sulfate centrifugation flotation, fecal sedimentation, and *Heterobilharzia americana* PCR testing at no charge to the owner.
Clinical trial investigating effect of novel probiotic in healthy dogs and cats Dr. Bruna Correa Lopes – *brunalopes@tamu.edu*	This clinical trial aims to assess the effect of a novel probiotic therapy on improving the intestinal microbiome. We are seeking to enroll healthy **dogs** and **cats** without a history of gastrointestinal disease (and irrespective of any previous antibiotic usage). The probiotic treatment is administered with meal over 3 days (1 pill per day). A total of 7 fecal samples must be collected and returned to the GI Lab. All necessary materials (including probiotic, sample collection kits, and instructions) will be mailed directly to owners at no cost.
Treatment of canine chronic pancreatitis Dr. Sue Yee Lim – *slim@cvm.tamu.edu*	We are currently enrolling **dogs** with chronic pancreatitis in a study that aims to investigate the efficacy of prednisolone and cyclosporine as treatments for dogs with chronic pancreatitis. Dogs will be evaluated (and fasted blood samples will be collected) by their veterinarian at three time points: before, during, and after treatment. Eligible patients will receive prednisolone and cyclosporine for the 3-week treatment at no charge.

It Could Happen to You:
Heterobilharzia americana Where You Might Not Expect It

The name *Heterobilharzia americana* (HA) might elicit a faint memory of a trematode parasite that you learned about all the way back in veterinary parasitology for an exam, only to never think about again. Yet, for those practicing in Texas, this name might be familiar to you as an important infection to exclude in dogs presenting to your practice for evaluation of liver or gastrointestinal disease. This blood and liver fluke parasite of dogs was thought to have a defined geographic range limited to the Gulf Coast and southern Atlantic regions of the United States. However, research into the prevalence of HA in dogs conducted by our laboratory has revealed that this is not the case. Our research reveals that HA infection is possible in dogs from a wide geographic range across the United States.

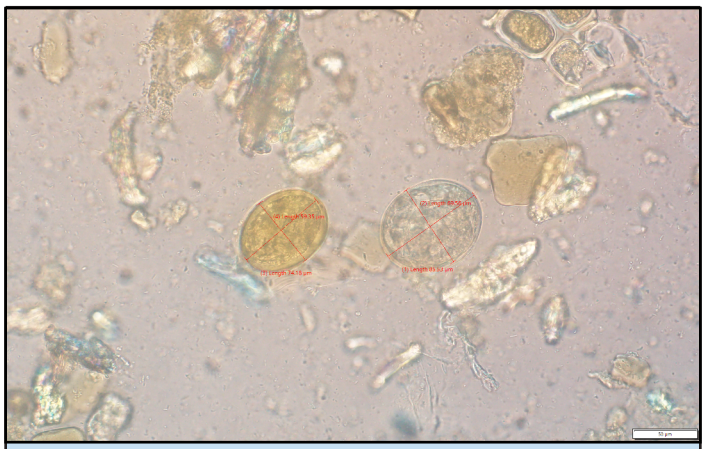


Figure 1. Two *Heterobilharzia americana* eggs identified by light microscopy following saline sedimentation of fecal sample. Image courtesy of Joe Luksovsky (TAMU - Parasitology Diagnostic Lab).

Heterobilharzia americana is the cause of canine schistosomiasis and has a fascinating, but complicated life cycle. This trematode infects a wide range of mammals but is most frequently found in dogs and raccoons, with the latter playing an important role in maintaining it in the environment. Eggs of an infected animal are passed into the feces and will hatch immediately into the next life stage, miracidia, upon contact with freshwater. Miracidia will then swim to find and penetrate the intermediate host, a freshwater snail, to develop into infectious cercariae, which are then released into the water by the snail. A dog may become infected when cercariae penetrate their skin during time spent swimming or wading in freshwater. At this time, the parasite will transform into a juvenile stage, which migrates to the lungs and then the liver of the dog to become adult parasites. The adult parasites will eventually settle into the mesenteric vessels to mate and produce eggs. It may take up to 3 months from the time of infection before eggs can be detected in the feces of a dog. The lifecycle helps illustrate how dogs become infected, how infectious stages can be maintained in the environment, and how important timing of testing can be for a diagnosis in a dog who may have been exposed to an infected water source.

Dogs may be asymptomatic or have clinical signs related to the presence of the HA eggs, which can cause granulomatous inflammation in various organs, most notably the intestines, liver, and pancreas. Clinical symptoms overlap with many other disorders, and include weight loss, lethargy, anorexia, vomiting, diarrhea, hematochezia, polyuria, and polydipsia. Clinicopathologic changes may include anemia, eosinophilia, hyperglobulinemia, hypoalbuminemia, hypercalcemia, thrombocytopenia, elevated liver enzyme activities, and proteinuria. Over time, inflammation in chronically affected organs may be appreciated via diagnostic imaging. Mineralization of the walls of the intestines may be appreciated radiographically, or pinpoint hyperechoic foci may be appreciated sonographically in the liver, pancreas, intestines, or mesenteric lymph nodes. While these imaging abnormalities are not found in every infected dog, they can provide a helpful clue to veterinarians considering this infection.

A diagnosis of HA infection can be achieved by fecal testing or histopathology. HA eggs do not float and thus cannot be detected by flotation methods; therefore, a fecal saline sedimentation must be performed to reliably visualize HA eggs (as shown in Figure 1). Sedimentation can be performed easily in practice but is both time consuming and requires some level of expertise to accurately identify eggs. A fecal PCR test to detect HA eggs is available through our lab and performs very well in dogs with symptomatic HA infection. Research is underway to determine how to best screen asymptomatic dogs at risk for HA infection, and we currently recommend a combination of a fecal sedimentation and PCR in this population. However, in dogs with symptomatic disease, fecal PCR should be sufficient for diagnosis.

Treatment requires the use of praziquantel and fenbendazole in higher doses and for a longer duration of time than is required for treatment of common intestinal parasites and may require additional doses to eliminate infection. Dogs undergoing treatment may benefit from the use of supportive medications (e.g., anti-nausea medications), a highly digestible diet, and short courses of anti-inflammatory doses of corticosteroids. Repeat fecal testing with both a HA PCR and fecal saline sedimentation are recommended at least one month following treatment. Testing of multiple fecal samples is recommended to ensure the infection has been successfully eliminated. Biochemical abnormalities seen prior to treatment frequently will resolve with successful elimination of infection, although mineralization seen with imaging will likely persist. The inflammation created by eggs may leave lasting changes in affected organs, and additional therapy or diagnostic testing for pancreatic, liver, or intestinal dysfunction may be indicated in some more severely affected patients.

Figure 2. Drs. Kate Aicher (left) and Lea Poellmann (right), members of the Drake Project research team, posing with fecal samples collected at a recent retriever hunt test.

The prevalence of HA remains unknown, even in geographic regions long since recognized as endemic. A small research team within our lab began a project to help answer this important question earlier this year. The Drake Project, named in honor of a TAMU patient named Drake that died from complications of HA infection, began to investigate the prevalence of HA in dogs at high risk of infection within

the state of Texas. This work was funded by a grant from the AKC Canine Health Foundation. Texas has one of the most active competition retriever communities in the country, with thousands of dogs traveling here from all over the country for training and competition in hunt tests and field trials with other dogs. The Drake Project team, led by researcher Dr. Lea Poellmann (pictured in Figure 2), spent a great deal of time this year collecting fecal samples from dogs all over Texas. In addition, they performed educational community outreach to dog owners and veterinarians through AKC club events, webinars, and podcasts (https://tx.ag/gilabHApodcast) to help raise awareness of this disease. We have tested nearly 1,000 dogs in Texas through these efforts and expect to publish these results in 2025.

Observations of samples submitted to our laboratory from all over the country, coupled with documented outbreaks in dogs in Moab, UT, and Blythe, CA, suggested that the endemic regions may be expanding or larger than previously recognized. We know that many families travel across the country with their dogs (like those shown in Figure 3) and frequent recreational bodies of water, creating the potential for expansion of endemic areas for HA. Historically, the geographic range of HA had been limited by the range of a capable intermediate snail host. However, this appears to no longer be a limiting factor as additional capable freshwater snail hosts have been documented by research teams from the University of California-Riverside and the University of New Mexico. This past summer, Hannah Nichols, a current second year veterinary student who participated in the Veterinary Medical Scientist Research Training Program, led a prevalence study to investigate HA infection in dogs in the southwestern United States, most of whom had access to the lower Colorado River basin. Her work led to the discovery of hundreds of dogs infected with HA in this region, a desert climate where most veterinarians lack familiarity with HA infection. Hannah's results will also be published in 2025. There are communities of families who live or vacation in this part of the country, and regularly spend time in water with their dogs. Currently, there are no recognized effective preventative treatment for dogs, therefore our research team is beginning to design clinical trials to help meet this important need.

Figure 3. Four Dalmatian dogs from one family with recreational exposure to the Colorado River that were later diagnosed with *Heterobilharzia americana* by the GI Lab. Image courtesy of Tracy Rossello.

Our work this year illustrates the importance of considering HA infection as a differential for your canine patients, even in the absence of a known travel history to a recognized endemic area. While many dogs may remain asymptomatic for their infection, the parasite can cause significant morbidity and mortality.

We wish to thank the AKC-CHF for their generous support of our work, as well as several AKC clubs, most notably the Bryan College Station Retriever Club and the Heart of Texas Labrador Retriever Club. We are also grateful to the hundreds of dog owners and veterinarians who helped support this work by sending us fecal samples and information about their beloved dogs. Stay tuned for further updates on our work on this emerging parasitic disease. (Kate Aicher)

Suchodolski Wins 2024 AVMA Career Achievement Award

This past summer, the American Veterinary Medical Association (AVMA) honored our very own Dr. Jan Suchodolski as the winner of the 2024 AVMA Career Achievement in Canine Research Award. Recipients of the AVMA award, which honors lasting contributions to the field of canine research, are selected by the AVMA's Council on Research. AVMA president Dr. Rena Carlson notes, "Dr. Suchodolski's pioneering work in defining the gastrointestinal microbiome in dogs has had a profound impact on veterinary medicine and has paved the way for new diagnostic tools and treatment approaches."

In particular, Dr. Suchodolski's 2009 paper in *BMC Microbiology* was one of the first to describe the major disruptive and lasting impact that antibiotics such as tylosin can have on the canine gut microbiome. Many studies later, he continues to advocate for more judicious antimicrobial usage in veterinary practice. In 2017, Dr. Suchodolski published a manuscript in *FEMS Microbiology Ecology* describing a novel fecal microbiome assessment dubbed the Dysbiosis Index. This new tool, which combines the results of multiple quantitative PCR tests, provides clinicians with a simplified evaluation of the overall gut microbiome health in dogs suspected of GI disease. This test is currently available for both dogs and cats through the GI Laboratory.

Dr. Suchodolski earned his DrVetMed from the University of Veterinary Medicine in Vienna, Austria, and his PhD in veterinary microbiology from Texas A&M University. He is currently professor and Nestle Purina Chair in Microbiome Research at Texas A&M University, while also Associate Director for Research and Head of Microbiome Sciences of the Gastrointestinal Laboratory. Dr. Suchodolski serves on the Scientific Advisory Board of the Morris Animal

Foundation, a large financial supporter of veterinary research activities, and is a Fellow of the American Gastroenterological Association. As the author or co-author of more than 400 peer-reviewed publications, his work has been cited over 10,000 times. (Robert Kyle Phillips)

Consultants' Corner:

Fecal Microbiota Transplantation

We often receive questions about fecal microbiota transplantation (FMT). Recently an international consortium of veterinary experts (including several GI Lab faculty members) published clinical guidelines for this procedure in dogs and cats. These are available for anyone to access (see references below) and are considered the current standard of care for FMT in dogs and cats. In case you do not have time to read the whole document, we have briefly answered several of your frequently asked questions below.

What is the feline/canine fecal dysbiosis index, and when should I order it?

The canine and feline microbiota dysbiosis indexes (DI) are PCR-based assays that quantify the abundance of key bacterial groups from a fecal sample. The DI consolidates the quantitative PCR results for each bacterial group into a single number, allowing us to assess whether the fecal microbiota of an individual pet is similar to that of the majority of healthy pets. A DI below 0 indicates normobiosis, while a DI above 2 (dogs) or ≥1 (cats) indicates fecal dysbiosis.

Indications for running a DI include: 1) screening donor dogs/cats before FMT, 2) monitoring changes in the microbiota of FMT recipents, and 3) monitoring the recovery of GI dysbiosis after antibiotic therapy. Severe dysbiosis often occurs secondary to other conditions (e.g., chronic enteropathy or EPI), and an increased (abnormal) DI is not an indication to start any specific therapy (e.g., antimicrobials).

Can I perform a fecal DI or fecal enteropathogen testing on a patient receiving antimicrobials?

If possible, we recommend stopping antimicrobials for at least 2 weeks prior to fecal enteropathogen testing (except when testing for canine parvovirus) and discontinuing antimicrobials at least 1 month prior to performing a DI.

When should I consider giving fecal microbiota transplantation (FMT) to a dog/cat?

Few clinical trials have assessed the efficacy of FMT in dogs or cats; however, the Companion Animal FMT Consortium currently recommends considering FMT as an adjunctive therapy for canine parvovirus enteritis, canine acute diarrhea, and chronic enteropathy (CE) in both dogs and cats. For animals with CE, initial data suggest that pets with a more severely abnormal DI tend to "lose" the clinical benefits of FMT administration more rapidly than those with a mildly abnormal DI and may benefit from repeated FMTs.

How do I screen a dog to be an FMT donor?

The Companion Animal FMT Consortium currently recommends that donor dogs are adult, are clinically healthy, have an acceptable body condition score (4-6/9), have no history of chronic GI disease (within at least the past 4 months, or permanently exclude if signs have ever been of >3 weeks' duration), have no acute GI signs within the past 2-3 months, have not been fed a raw food diet/treats within the past 30 days, have not been hospitalized/boarded in the past 4 weeks, have not received antimicrobials in the past 6 months, and have not received acid suppressing medications within the past 2 weeks. In addition, it is recommended to screen the donor with a fecal microbiota DI. Finally, donors should be screened (initially and then every 6 months) for enteropathogens. Specifically, dogs should be screened for Salmonella, *Campylobacter jejuni*, Cryptosporidium, and other intestinal parasites. Testing for *Clostridium perfringens* netF toxin gene and *Clostridium difficile* is considered optional. It is not recommended to screen for *C. perfringens* enterotoxin and alpha toxin genes as the clinical significance of either is unknown in dogs (and cats).

How do I screen a cat to be an FMT donor?

In addition to the screening described above for dogs, potential donor cats should ideally be housed indoors only and be from a single cat household. They should be tested for the following infectious agents in addition to those listed for dogs: *Tritrichomonas (foetus) blagburni* (by PCR), FeLV/FIV, and feline enteric coronavirus.

How should I collect and store donor feces?

The fecal donations should be naturally voided, collected as soon as possible, and stored in clean plastic containers. As it is sometimes difficult to collect cat feces immediately after

Figure 1. Placement of rectal catheter in preparation for FMT administration.

defecation, the Consortium considers collection within 12 hours of passage to be acceptable.

What is the recommended route for FMT?

There is no evidence to suggest that either fecal or oral administration of FMT is superior. However, fecal administration is easy and more common in companion animals.

What is the recommended dose for FMT?

The optimal dose of donor feces for FMT is not known. However, in several recent studies the following protocol has been used: 5 g of donor feces/kg body weight of the recipient for dogs up to 25 kg, and 3 g/kg body weight for large breed dogs, based on the weight of unprocessed feces prior to blending with saline. Similar doses can be used in cats, but after mixing with saline (see below) the total volume of the transplant enema should preferably not exceed 10 ml/kg body weight

How should I prepare the donor feces for FMT?

Although no consensus on FMT preparation is available at this time, the Consortium listed several protocols. We recommend the following based on our own and others' experiences and publications:

After removal of large particles, blend the feces with sterile 0.9% saline to make a slurry. Household blenders are commonly used for this purpose. A good approximate starting ratio of feces to saline is 1:1 (dogs) and 1:1.5 (cats). The final slurry should have a texture like a smoothie so that it passes easily through a rectal catheter. After that, strain the slurry through a sieve to remove small particles.

The fecal slurry can be used immediately or frozen at -20°C (either with or without 10% glycerol) for use within 3 months. In humans, fresh or frozen feces are equally effective for FMT, and this is likely true for dogs and cats, too. As stability of the donor microbiota at 4°C is limited, refrigeration should only be used for short-term storage.

How do I administer FMT by enema?

If possible, the patient should be motivated to defecate before giving the enema. Most dogs do not require sedation, while premedication with oral gabapentin is sufficient for most cats. Pre-FMT bowel cleansing is *not* necessary. The fecal slurry is placed in a 60-ml catheter tipped syringe(s). A 14 to 16 French red rubber catheter is connected to the syringe. The catheter is lubricated and advanced gently into the patient's rectum (see Figure 1). The fecal slurry is administered slowly over several minutes (see Figure 2). The patient should be confined to a cage, kennel, or even the owner's car on the drive home for at least 60 minutes afterwards. This procedure is typically well tolerated by the patient.

Are there any risks associated with FMT?

Although there is limited data regarding adverse events associated with FMT in dogs and cats, FMT is considered a relatively safe procedure with few side effects. In both humans and companion animals, the most frequently reported adverse events include worsening of diarrhea, bloating, flatulence, abdominal pain, nausea, vomiting, and dysrexia. Fever and dehydration have seldom been reported in dogs or cats.

What other precautions should I take?

Personal protective equipment should be worn by staff who are preparing and administering FMT material. This should include: gloves, a face mask, and eye protection (as shown in Figure 3).

The full Consortium guidelines contain additional information that we highly recommend you read if you are considering treating a patient with FMT.

If you have any questions about FMT or any other GI disease, please contact our lab at (979) 862-2861 to set up a consultation with one of our board-certified internists. Please give our customer service representative a 4-hour window during which we may return your call. The GI Lab offers this complimentary consultation service to all veterinarians who use our laboratory services. (Jonathan Lidbury, Emily Gould, and Linda Toresson)

References

1. Clinical guidelines for fecal microbiota transplantation in companion animals. Winston JA, et al. *Advances in Small Animal Care* 2024;5:79–107; https://doi.org/10.1016/j.yasa.2024.06.006.

2. Clinical effects of faecal microbiota transplantation as adjunctive therapy in dogs with chronic enteropathies – a retrospective case series of 41 Dogs. Toresson L, et al. *Veterinary Science* 2023;10:271; https://doi.org/10.3390/vetsci10040271.

Figure 2. Injection of fecal slurry by enema.

Figure 3. Suggested PPE for FMT procedure.

Serum Submissions

Assay	Vol. req'd	Price
TLI, PLI, Cobalamin, Folate, Cortisol (dogs only)	2.0 ml fasted	$96.00
TLI, PLI, Cobalamin, Folate	2.0 ml fasted	$86.00
TLI, Cobalamin, Folate	1.0 ml fasted	$63.00
PLI, Cobalamin, Folate	1.0 ml fasted	$63.00
TLI, PLI	1.0 ml fasted	$63.00
Cobalamin, Folate	1.0 ml fasted	$42.00
TLI	1.0 ml fasted	$33.00
PLI *Note: Spec cPL or Spec fPL test is only offered as part of a panel or alone as a follow-up*	0.5 ml fasted	$33.00
Canine C-reactive Protein	0.5 ml fasted	$33.00
Bile Acids	Pre-feeding: 1.0 ml fasted	$24.00
	2 hrs post-feeding: 1.0 ml	$24.00
Methylmalonic Acid	0.5 ml fasted	$66.00
Gastrin	0.5 ml fasted	$33.00
Triglycerides	0.5 ml fasted	$18.00

Fecal Submissions

Assay	Price
Canine Alpha-1 Proteinase Inhibitor (1 g) 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_1PI collection tubes (15 for $30.00).	$64.00
Dysbiosis Index: Canine or Feline (1 g)	$52.00
Canine Enteropathogen Panel (3-5 g) Canine panel includes PCR testing for: netF toxin gene-*C. perfringens*, *C. difficile*, *Campylobacter jejuni*, canine parvovirus, *Salmonella* spp., and IFA testing for *Giardia* and *Cryptosporidium*	$116.00
Feline Enteropathogen Panel (3-5 g) Feline panel includes PCR testing for: netF toxin gene-*C. perfringens*, *C. difficile*, *Campylobacter jejuni*, feline panleukopenia virus (FPV), *Salmonella* spp., *Tritrichomonas foetus*, and IFA testing for *Giardia* and *Cryptosporidium*	$126.00
Real-time PCR Assays First PCR assay Each additional PCR assay *Tritrichomonas (foetus) blagburni*; *Campylobacter jejuni; Hetero-bilharzia americana*; canine parvovirus (CPV-2); feline panleuko-penia virus (FPV); *Salmonella* spp.; netF toxin gene-*C. perfringens*; *C. difficile*; feline coronavirus (for FMT donor screening only, 3-5 g)	 $42.00 $15.00
Immunofluorescence Assay (IFA) for *Giardia* and *Cryptosporidium*	$44.00
Bacterial Toxin Assays (ELISA) for *Clostridium difficile* Toxin A and B	$42.00

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Gastrointestinal Laboratory

Sample submission forms customized with your clinic's information are available on our website at **https://vetmed.tamu.edu/gilab** under **CLINIC LOGIN**.

For any questions or to set up a new account, please contact us by phone at **(979) 862-2861** or by email at ***gilab@cvm.tamu.edu***.