Back to Zoobiquity Information home page

Speaker Talk Summaries

Keynote Presentation

Michael Lairmore DVM, PhD, DACVP/DACVM
University of California – Davis School of Veterinary Medicine

"Lessons in One Health in Context to Zoonotic Diseases"

Dr. Lairmore will review the history of comparative medicine with selected examples to illustrate the value of one health approaches to advance biomedical research and fundamental knowledge of medicine and veterinary medicine.

Session 1 Toxoplasmosis

Jose Montoya MD, FACP, FIDSA
Stanford University School of Medicine

"The *Toxoplasma* Paradox in Humans: from Apparently Innocuous Infection to Death of the Host"

Toxoplasmosis in humans can result in a wide spectrum of clinical manifestations. Individuals can be infected for life and seamlessly not bear any apparent consequences. In contrast, in some individuals infection can result in significant morbidity and eventually death of the host.

Melissa Miller DVM, MS, PhD
California Department of Fish and Wildlife

"Tracing the Human Pathogen *Toxoplasma gondii* from Land to Sea Otters"

Among marine mammals, sea otters exhibit unique biological attributes that enhance their risk of exposure to, and infection by land-based pathogens, including parasites, bacteria and fungi. Because *T. gondii* is also an important human pathogen, by studying how this parasite finds its way into sea otters, we can clarify potential under-recognized routes for human infection. We will review scientific discoveries that have helped to trace the path of *T. gondii* from land to sea otters, and demonstrate the intricate cross-connections that exist between humans, otters and our shared environment.

John Boothroyd PhD
Stanford University School of Medicine

"Waltz or Rave? How Polymorphic Effectors of *Toxoplasma* Influence its Dance with the Host"

Naturally occurring strains of *Toxoplasma gondii* differ enormously in the infection they produce in mice and, it appears, in humans. Some engage in an almost graceful dance with little, if any, disease while others produce a rave-like blast with an LD50 in mice of a single organism. Dr. Boothroyd will discuss the surprising and dramatic differences in exactly how these strains engage with their hosts and the clinical implications for how infections should therefore be treated.

Session 2 *Helicobacter pylori* and "like-organisms"

James Fox DVM, DACLAM
MIT

***"Helicobacter* Pathogenesis: An Evolving Paradigm"**

Since its original isolation in human gastritis cases, *Helicobacter pylori* is now known to cause peptic ulcers, gastric adenocarcinoma, and MALT lymphoma. Animal models have been used extensively to dissect the pathogenesis of gastric disease. Importantly, *Helicobacter* spp., other than *H. pylori,* are increasingly associated with gastrointestinal disease in humans and animals. Currently, there are over 2 dozen formally named gastric and enterohepatic *Helicobacter* spp. known to colonize either the stomach, lower bowel, or liver in animals. Many of these also colonize the gastrointestinal system in humans.

Karen Terio DVM, PhD, DACVP
University of Illinois College of Veterinary Medicine

"Seeing Spots and Spirals: Cheetahs, Helicobacter and Gastritis"

Why some animals, including humans, develop gastritis associated with Helicobacter while others do not has been an area of active research. Many captive cheetahs develop a severe gastritis associated with *Helicobacter* sp but wild Namibian cheetahs, heavily colonized by

similar strains of *Helicobacter*, do not. Research comparing wild and captive cheetahs has identified risk factors, including chronic stress, and differences in host immune responses that may contribute to development of gastritis in this species.

Manuel Amieva MD
Stanford University School of Medicine

"3D Microscopy of the Murine Stomach Reveals New Sites of Host Microbe Interactions"

Animal models of infection are most often used to recreate and verify pathological features of human disease. Sometimes, however, a finding in an animal model can lead to previously unrecognized features of infection. We are working with a murine model of *Helicobacter pylori* infection of the stomach. Using 3D microscopy techniques we have uncovered a novel microniche for *H. pylori* colonization deep in the gastric glands. We will describe the implications of this finding for human infection.

Session 3 Cancer and Imaging

Robert Cardiff MD, PhD
University of California, Davis

"The Zoobiquity of Cancer: Why Don't Pigs Get Breast Cancer?"

The study of cancer has relied on domestic and lab animal models of cancer. These models are the basis for modern cancer research, providing insight into the cause and treatment of cancer. Dr. Cardiff will ponder the other side of the coin: Why do some animals not get cancer? Starting with the pig, he focuses on potential Zoobiquity based explanations.

Amy LeBlanc DVM, DACVIM (Oncology)
University of Tennessee College of Veterinary Medicine, Knoxville TN

"Companion Animals in Comparative Oncology Research"

Comparative oncology employs the tumor-bearing pet dog as a relevant and complementary animal model for drug discovery and development. Comparative cancer imaging is a natural extension of this discipline wherein novel treatment strategies and imaging agents/modalities

can be validated and refined in tumor-bearing pet dogs. This presentation will demonstrate the value of comparative oncology as a critical component of the future of biomedical research.

Christopher Contag PhD
Stanford University School of Medicine

"Micro-Optical Designs that Refine and Accelerate *in vivo* Diagnosis of Cancer"

Advances in miniaturization of optical devices are enabling microscopes and other sensor technologies to be put into the body. Combined with molecular probes, such devices can quickly detect cellular and molecular changes that are associated with disease. These tools have the potential to fundamentally change the way we diagnosis and treat disease by improving detection and reducing the time and distance between the patient and the diagnostic event.

Session 4 Novel Animal Models in Comparative Medicine

Paul Buckmaster DVM, PhD
Stanford University School of Medicine

"Are Sea Lions a Good Model for Human Temporal Lobe Epilepsy?"

California sea lions (*Zalophus californianus*) are abundant human-sized carnivores that develop epilepsy after experiencing status epilepticus when naturally exposed to domoic acid. Epileptic sea lions display neuron loss and synaptic reorganization in the hippocampus similar to human patients with temporal lobe epilepsy. Sea lions provide opportunities and challenges as a potential animal model of human temporal lobe epilepsy.

Megan Albertelli DVM, PhD, DACLAM
Stanford University School of Medicine

"The Mouse Lemur: a New Genetic Research Model"

The mouse is the most commonly used animal in biomedical research, but where does a scientist turn to when the mouse fails as an experimental model? The mouse lemur, a small prosimian native to Madagascar, may carry genetic mutations that can help us understand human disease.

Joseph Garner D Phil
Stanford University School of Medicine

“Compulsive Hair-Pulling: A Zoobiquitous Behavior”

After stereotypies, fur or feather pulling is probably the most common abnormal behavior seen in captive animals. Across mammals and birds, the behavior has several striking similarities – it is seen predominantly in females, it onsets during sexual maturity, and fluctuates with reproductive events. The same is true of compulsive hair pulling (trichotillomania) in humans, which is one of the most common mental disorders in women. This talk will review the work we have done to validate this zoobiquitous behavior as a model of trichotillomania, and the insights provided for moving patient care forward.