

SPOTLIGHT ON Ohio State University Veterinary Medicine

Advancing animal health and welfare through research

Harnessing the microbiome to improve the health and well-being of animals and people

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doi.org/10.2460/ajvr.23.07.0156

The Ohio State University's Center of Microbiome Science (CoMS) is a global leader in the emerging field of microbiome science with an emphasis on research, innovation, and education. Several College of Veterinary Medicine faculty are actively involved in microbiome research, 2 of which serve in leadership positions in the CoMS, and are dedicated to investigating microbial communities and exploring ways to manipulate the microbiota to promote health and reduce disease in animals and people.

Human and veterinary medicine have traditionally viewed microbes as disease-causing agents that require treatment or prevention. More recently, our understanding has shifted, and we recognize that microbes are a crucial part of a body's healthy microbiome. College of Veterinary Medicine researchers are applying microbial ecology principles to use microbiome-directed treatments like prebiotics, probiotics, and fecal microbiota transplants (FMT) to restore microbiome health and benefit animals with a variety of conditions.

Dr. Vanessa Hale, assistant professor in the Department of Veterinary Preventive Medicine and associate director of the CoMS, studies the gut and urine microbiome of wildlife and domestic animals as translational models for understanding animal and human disease. The ultimate goal of her research is to improve disease outcomes through microbiome modulation. One of her major focus areas is bladder cancer, which affects over 60,000 dogs annually and is a robust model for human bladder cancer. Dr. Hale's research characterizes the microbes in canine urine and stool, how they contribute to bladder cancer development, how oral probiotics can impact these microbiomes, and if probiotics paired with standard-of-care chemotherapeutic approaches can improve clinical outcomes in dogs with bladder cancer.

Currently, Dr. Hale is leading a multicenter probiome clinical trial involving veterinary oncology and internal medicine teams at Ohio State, North Carolina State University, and the University of Missouri. Recent studies in human medicine have highlighted the critical role of the microbiome in cancer prognosis and treatment. Manipulation of the microbiome has shown great promise in improving cancer outcomes, and veterinary and human patients alike stand to benefit from the growing body of research developing targeted therapies to beneficially modulate the microbiota.

The research of Dr. Jenessa Winston, assistant professor in the Department of Veterinary Clinical Sciences and a



Exploring microbiome-directed treatments to Be The Model in promoting health and reducing disease in animals and people.

member of the CoMS advisory board, focuses on expanding microbiome science by harnessing the therapeutic power of microbes to improve health in companion animals and people. Dr. Winston uses microbial-directed therapies, such as FMT, to restore microbiome health in diseases associated with dysbiosis, including obesity, enteric pathogens like canine parvovirus, and other inflammatory bowel diseases.

As director of Ohio State's Companion Animal Fecal Bank, Dr. Winston is leading 2 clinical trials evaluating the utility of FMT to enhance weight loss in obese dogs (SLIM study funded by the AKC Canine Health Foundation) and cats (Feline SLIM study funded by the Morris Animal Foundation). Obesity promotes dysregulation of metabolic, hormonal, and inflammatory responses, and gut microbes may contribute to this disease; thus, rational manipulation of gut microbes may confer a health benefit. The SLIM studies are the first to evaluate the efficacy of FMT as an adjunctive therapy for companion animal obesity. By using a multi-omics approach, the SLIM studies will help shed light on the role(s) gut microbes plays during treatment and recovery from obesity. Understanding microbial dynamics will facilitate the development of microbiome-targeted therapies aimed at improving metabolic status to promote healthspan and quality of life in dogs and cats with obesity.

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