

# SPOTLIGHT ON Long Island University Veterinary Medicine

Advancing animal health and welfare through research

## Basic, clinical, and one-health research at Long Island University

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The College of Veterinary Medicine at Long Island University is a new school that admitted its first class of DVM students in the fall of 2020. The faculty are involved in a diverse range of research projects on the health and well-being of animals and animal models of human diseases. The new and growing faculty have secured significant funding from NIH, National Science Foundation, USDA, Foundations and through contracts with industry. Research areas of emphasis include Infectious Diseases and Comparative Medicine and Therapeutics and are closely aligned with the University's research signature areas, particularly one health, innovative cures, and resilient communities.

In the focus area of Infectious Diseases, faculty are engaged in understanding the pathogenesis and transmission of bacterial, viral, and parasitic agents of animals. Investigators and students are pursuing the development of novel vaccines based on antigens expressed in the host, mechanisms by which anaerobic bacteria develop metritis in dairy cows, and the role of host immunity in controlling *Staphylococcus pseudintermedius*-induced canine pyoderma. Faculty in the Laboratory for Biofilm Studies investigate the role of bacterial biofilms in chronic host infections applicable to all species, in part, using 3-D tissue cultures. Biofilm matrix components are used as potential vaccine candidates, and novel, biocompatible compounds that can remove the biofilm matrix are being examined as a therapeutic and to enhance antimicrobial therapy. The control of bacterial antimicrobial resistance is being studied through molecular epidemiology and through a detailed understanding of the molecular mechanisms of such resistance. The interactions between marine bacteria and lobsters that result in epizootic shell disease, an important problem on Long Island Sound, are being studied to enhance the local lobster population. A new amphibian research laboratory will be the focus of work on emerging infectious agents such as ranaviruses and on the physiology, pathology, and immunology of amphibian species. Bovine coronaviruses are being investigated to control and prevent diseases in bovines and as an animal model for the control of human coronaviruses. Parasitic infections, such as zoonotic

parasites of mesocarnivores and modeling the distribution of intermediate hosts of parasitic nematodes, are being examined to understand the impact of global change on parasitic infections in domestic and wild animals.

Faculty in the Comparative Medicine and Therapeutics research program study pathophysiological processes associated with human and animal diseases and develop innovative therapies for clinical applications. Comprehensive research areas include cancers, bone disorders, immune-mediated diseases, and aging. The cancer research group is investigating novel epigenetic mechanisms of dietary stilbenes and their implications in cancer chemoprevention and therapy. They are also developing novel, targeted combinatorial treatment strategies and prognostic biomarkers, including protein and microRNAs for cancers in animals and in animal models for humans. Investigators in the Immune Regulation and Stem Cell Laboratory are determining the mechanisms that keep the immune system from attacking self-tissues and promote tissue repair and regeneration using animal models of autoimmune diseases, such as inflammatory bowel disease. Orthopedic researchers use state-of-the-art technologies, such as 3-D printing, to define bone structure-function relationships, material properties, modeling and remodeling, and the effects of aging on osteoporosis. In the field of redox biology, investigators identify the role of redox proteins in the pathophysiology of ischemic diseases and age-related disorders, particularly renal ischemia, reperfusion injury, and age-related macular degeneration. The Mitochondrial Biology Laboratory uses an integrative approach to investigate the mitochondrion-dependent molecular and biochemical responses induced by various environmental stressors and how signals originating from mitochondria contribute to maintaining cellular and organismal homeostasis. Research in nutrition-related topics includes the following: nutrition and aging, nutrition-related diseases, and nutritional management of critical patients, particularly small animals and exotic pets. The research is conducted, in part, in the Clinical Nutrition Center and Kitchen, sponsored by Nestlé Purina.