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Bartonellosis: Update on an Emerging Infectious Disease

Dr. Edward B. Breitschwerdt is a professor of medicine and infectious diseases at North Carolina State University College of Veterinary Medicine. He is also an adjunct professor of medicine at Duke University Medical Center, and a Diplomate, American College of Veterinary Internal Medicine (ACVIM). Dr. Breitschwerdt directs the Intracellular Pathogens Research Laboratory in the Comparative Medicine Institute at North Carolina State University. He also co-directs the Vector Borne Diseases Diagnostic Laboratory and is the director of the NCSU-CVM Biosafety Level 3 Laboratory.

A graduate of the University of Georgia, Breitschwerdt completed an internship and residency in Internal Medicine at the University of Missouri between 1974 and 1977. He has served as president of the Specialty of Internal Medicine and as chairperson of the ACVIM Board of Regents. He is a former associate editor for the *Journal of Veterinary Internal Medicine* and was a founding member of the ACVIM Foundation.

Breitschwerdt's clinical interests include infectious diseases, immunology, and nephrology. For over 30 years, his research has emphasized vector-transmitted, intracellular pathogens. Most recently, his research group has contributed to cutting-edge research in the areas of animal and human bartonellosis. In addition to authoring numerous book chapters and proceedings, Dr. Breitschwerdt's research group has published more than 350 manuscripts in peer-reviewed scientific journals. In 2012, he received the North Carolina State University Alumni Association Outstanding Research Award and in 2013, he received the Holladay Medal, the highest award bestowed on a faculty member at North Carolina State University. In 2017, Dr. Breitschwerdt received the American Association of Veterinary Medical Colleges Outstanding Research Award.

Conference Lecture Summary

Bartonella species are fastidious Gram-negative bacteria that are highly adapted to a mammalian reservoir host and within which the bacteria usually cause a long-lasting intra-erythrocytic and endotheliotropic bloodstream infection. These facts are of particular importance to veterinarians, physicians, diagnosticians and public health officials, as an increasing number of animals have been identified as reservoir hosts for zoonotic *Bartonella* species. Among numerous examples, *Bartonella henselae*, *Bartonella koehlerae* and *Bartonella clarridgeae* have co-evolved with cats, *Bartonella vinsonii* subsp. *berkhoffii* and *Bartonella rochalimae* have co-evolved with wild canines, and *Bartonella bovis* has co-evolved with cattle. Importantly, the list of reservoir-adapted *Bartonella* species, including a large number of recently identified bat and rodent species, continues to expand exponentially, as new *Bartonella* spp. and additional reservoir hosts are discovered throughout the world.

Bartonellosis is a zoonotic infectious disease of worldwide distribution, caused by the expanding number of recently discovered *Bartonella* spp. Of comparative medical importance, *Bartonella* spp. are transmitted by several arthropod vectors, including fleas, keds, lice, sand flies, ticks and potentially mites and spiders. Prior to 1990, there was only one named *Bartonella* species (*B. bacilliformis*), whereas there are now over 36 species, of which 17 have been associated with an expanding spectrum of animal and human diseases. Recent advances in diagnostic techniques have facilitated documentation of chronic bloodstream infections with *Bartonella* spp. in healthy and sick animals, and in immunocompetent and immunocompromised human patients with vascular, neurological and rheumatologic symptoms.

A Comparative Medicine and One Health approach to this emerging infectious disease is clearly needed to define disease manifestations, to establish the comparative infectious disease pathogenesis of this stealth pathogen, to validate effective treatment regimens and to prevent zoonotic disease transmission from animals to humans.