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Confirmation of *Neorickettsia helminthoeca* in Brazilian dogs

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Abstract

Neorickettsia helminthoeca is the cause of salmon poisoning disease (SPD), which was described only in specific geographic regions of the USA. This report presents the pathological, immunohistochemical (IHC), and molecular findings associated with pathogen in dogs from southern Brazil. Formalin-fixed tissues (25 dogs) were processed for routine histopathology and Giemsa staining. Selected formalin-fixed paraffin-embedded tissue sections were used for IHC (5 dogs); anti-N. helminthoeca serum served as the primary antibody. Frozen tissue fragments of 10 dogs were collected for DNA extraction. PCR primers targeted specific genes (Neorickettsia spp. 16S rRNA [rrs]; rpoB, and groESL). PCR products were cloned and sequenced; nucleotide sequence and phylogenetic analyses were done. Gross pathology demonstrated severe lymph node hypertrophy and hypertrophy of intestinal lymphoid tissue. Cytology revealed intracytoplasmic bacteria within macrophages. Histopathology demonstrated depletion of intestinal lymphoid tissue and lymph node, associated with the accumulation of lymphohistiocytic cells associated with intracytoplasmic Giemsa-stained bacteria in reticuloendothelial cells. IHC identified antigens of N. helminthoeca within reticuloendothelial cells of the intestine and lymph nodes of five dogs, and the lung of one. Molecular biology confirmed partial fragments of the rrs gene of Neorickettsia spp. from two dogs; one of these contained partial fragments of the rpoB and groESL genes of N. helminthoeca. These results demonstrated the presence of N. helminthoeca in tissues of dogs with pathologic alterations consistent with those of SPD, and extend the geographical location of this pathogen to southern Brazil.

Biography

Headley has completed his DVM at the Federal University of Santa Maria, southern Brazil in 1996, after which he did a Master's degree in Veterinary Medicine, major Anatomic Pathology. He concluded his Ph.D at Londrina State University, southern Brazil in 2004 in Animal Health Sciences. Dr. Headley served as Senior Lecturer Veterinary Pathology, University of Helsinki on a contractual basis for 18 months (2007-2008), and was then appointed Associated Professor of Veterinary Pathology St. Matthews University, Grand Cayman (2008-2011). In 2011 Dr Headley returned to Brazil and was appointed Professor Veterinary Pathology, Universidade Norte do Paraná, and is finishing a post-doc at the Londrina State University. Dr Headley has published over 70 articles in international journals. His most impressive achievements include the first confirmation of Neorickettsia helminthoeca in dogs outside of the endemic zone of salmon poisoning disease, and the first characterization of Histophilus somni-induced infections in cattle from Brazil.