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Survey of Dogs From Vietnam for Antibodies to Visceralizing *Leishmania* spp.

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ABSTRACT: Cases of visceral leishmaniasis, one of the most neglected tropical diseases, are increasing globally. Dogs are considered an important reservoir host for visceral leishmaniasis in people. The first cases of human visceral leishmaniasis in Vietnam have recently been reported. Blood samples were collected from 41 dogs in rural Vietnam. Sera were examined for antibodies to visceralizing *Leishmania* spp. by canine immunochromatographic strip assays based on recombinant K39 antigen. Antibodies to *Leishmania* spp. were not detected in any of the dogs tested. Results from this study suggest that rural dogs are not likely to be involved in the emergence of human visceral leishmaniasis in Vietnam.

The leishmaniases are a group of protozoan diseases caused by *Leishmania* spp. and transmitted by phlebotomine sand flies. Most species of *Leishmania* are pathogenic for humans and other mammals. Visceral leishmaniasis (VL) is a systemic clinical syndrome characterized by a range of symptoms including fever, lymphadenopathy, and hepatosplenomegaly. There are 2 main types of VL, and both are caused by infection with parasites in the *Leishmania donovani* complex. In the Indian subcontinent and in East Africa, anthroponotic VL results from infection with *L. d. donovani*, and *L. d. infantum* is the etiological agent of zoonotic VL. Dogs are a major reservoir host for *L. d. infantum* in parts of Europe, Latin America, and North Africa (Chappuis et al., 2007).

Worldwide, there are approximately 12 million people with leishmaniasis, and 500,000 new cases of VL are diagnosed annually (Desjeux, 2004). Leishmaniasis is widespread in many parts of the tropics and subtropics. The distribution of this disease, however, is changing rapidly, and the number of cases of all forms of leishmaniasis is increasing at an alarming rate (Shaw, 2007). Indeed, leishmaniasis has been reported in many regions of the world where it was not found previously (Shaw, 2007). Economically poor communities in parts of East Africa and India are particularly affected by VL (Chappuis et al., 2007), but leishmaniasis was not considered an endemic disease in southeast Asia. In 2002, however, VL was diagnosed for the first time in Vietnam in 3 HIV-positive women (Taverne, 2002). The species of *Leishmania* was not reported in these infections, and little information regarding leishmaniasis in Vietnam is available. The objective of the current study was to determine the serum antibody prevalence of *Leishmania* spp. in dogs from Vietnam.

Blood samples were collected from 41 dogs in 7 rural provinces. Four provinces (Binh Phoc, Binh Duong, Dong Nai, Tay Ninh) are east of Ho Chi Minh City and 3 (Tien Giang, Ben Tre, and Long An) are in a rural area west of Ho Chi Minh City. The dogs were local breeds, and both males and females were sampled. Each dog originated from a separate home, and dogs ranged in age from 1 to 4 yr old. Dogs in rural Vietnam are raised for protecting homes, and the excess guard dogs are sold for human consumption. As part of a *Toxoplasma gondii* genetic characterization study (Dubey et al., 2007), the dogs were purchased from individual households. A veterinarian killed the dogs by overdose injection of sodium thiopental, and blood samples were collected at

necropsy. Serum was separated and stored at -20°C prior to testing for antibodies to *Leishmania* spp.

Sera were examined by the commercially available immunochromatographic dipstick assay for qualitative antibody detection according to the manufacturer's test procedure. The tests are based on recombinant antigens and have been developed into a dipstick format. It is currently considered the best field diagnostic tool available for detecting VL in remote locations (Chappuis et al., 2007). Canine sera were tested for antibodies to recombinant K39 (Kalazar Detect[®] Canine Rapid Test, InBios International Ltd., Seattle, Washington), which is an amastigote protein specific to visceralizing *Leishmania* spp. (Burns et al., 1993). Positive and negative *Leishmania* control sera were obtained from dogs serologically and culture-proven to be infected and uninfected, respectively.

Antibodies to *Leishmania* spp. were not detectable in any of the 41 canine sera; thus, there was no serologic evidence of exposure to visceralizing *Leishmania* spp. in dogs from rural Vietnam. Nonetheless, the distribution of the leishmaniases is expanding into new geographic regions. Reports from Vietnam, and a subsequent case of indigenous leishmaniasis in Taiwan (Wang et al., 2008), highlight the emergence of leishmaniasis in areas of Asia where it was not previously found. Results from the present study suggest that dogs are likely not involved in the emergence of human VL in Vietnam. Continued surveillance, however, is needed to provide a mechanism to detect the spread of VL in a new geographical location and to prevent its emergence in a reservoir host.

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LITERATURE CITED

- BURNS, J. M., JR., W. G. SHREFFLER, D. R. BENSON, H. W. GHALIB, R. BADARO, AND S. G. SEED. 1993. Molecular characterization of a kinsin-related antigen of *Leishmania chagasi* that detects specific antibody in African and American visceral leishmaniasis. *Proceedings of the National Academy of Sciences USA* **90**: 775-779.
- CHAPPUIS, F., S. SUNDAR, A. HAILU, H. GHALIB, S. RIJAL, R. W. PEELING, J. ALVAR, AND M. BOELAERT. 2007. Visceral leishmaniasis: What are the needs for diagnosis, treatment and control? *Nature Reviews Microbiology* **5**: S7-S16.
- DESJEUX, P. 2004. Leishmaniasis: Current situation and new perspectives. *Comparative Immunology, Microbiology and Infectious Diseases* **27**: 305-318.
- DUBEY, J. P., L. T. T. HUONG, N. SUNDAR, AND C. SU. 2007. Genetic characterization of *Toxoplasma gondii* isolates in dogs from Vietnam suggests their South American origin. *Veterinary Parasitology* **146**: 347-351.
- SHAW, J. 2007. The leishmaniases—Survival and expansion in a changing world. A mini-review. *Memórias do Instituto Oswaldo Cruz* **102**: 541-547.
- TAVERNE, J. 2002. Visceral leishmaniasis in Vietnam. *Trends in Parasitology* **18**: 152.
- WANG, J.-R., S.-T. LEE, W.-H. JUAN, W.-L. CHUANG, S.-I. HUNG, W.-H. CHUNG, AND H.-S. HONG. 2008. Indigenous leishmaniasis in Taiwan: Report of a case. *International Journal of Dermatology* **47**: 40-43.

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