

# Serological diagnosis of canine leishmaniosis: comparison of three commercially available tests

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**Abstract** Quantitative serology is an important tool in canine leishmaniosis diagnostics from clinical and epidemiological points of view. Serologic diagnosis in laboratories is traditionally carried out by immunofluorescent antibody test (IFAT), but enzyme-linked immunosorbent assays (ELISA) are being increasingly employed. Two commercially available ELISAs (LEISHMANIA-ELISA DOG® [LED] and INGEZIM LEISHMANIA® [IL]) for the detection of *Leishmania infantum* infection in dogs were compared with the classical IFAT technique. Ninety-two canine serum samples covering a broad range of IFAT titers were chosen for evaluation. Titers ranged from negative (<1:50) to high (>1:3,200). Statistical analysis showed high correlation between all three assays for both negative and positive IFAT-tested samples as described by respective Spearman's rank correlation coefficient ( $r_s$ ), but results varied for samples with inconclusive IFAT titers (1:50–1:100) with IL stating samples predominantly negative. The highest accordance was found between LED and IFAT (percentage of identical results=83.7 %;  $r_s=0.90$ ,  $p<0.0001$ ). IL showed higher analogy with LED (accordance=81.5 %;  $r_s=0.88$ ,  $p<0.0001$ ) than with IFAT (73.9 %;  $r_s=0.80$ ,  $p<0.0001$ ). The distribution of the different ELISA scores is discussed and grouped according to correspondent IFAT titers to familiarize practitioners with the range of these tests since

antibody levels play an important role in clinical management of canine patients with *L. infantum* infection.

**Keywords** *Leishmania infantum* · Dog · Serology · IFAT · ELISA

## Introduction

Leishmaniosis is a protozoan disease caused by members of the genus *Leishmania* (Kinetoplastida: Trypanosomatidae), parasites infecting numerous mammal species, including humans, and being transmitted by sand flies (Gramiccia and Gradoni 2005). Canine leishmaniosis (CanL) is an endemic parasitosis in the Mediterranean Basin, but autochthonous transmissions have recently been recorded in traditionally non-endemic areas, such as Northern Italy (Maroli et al. 2008), and reports of non-autochthonous cases by imported or traveling dogs are well known (Bindseil et al. 1985; Slappendel 1988; Edelhofer et al. 1995; Gothe et al. 1997; Hirsch and Pantchev 2008; Shaw et al. 2009). The current situation in Germany, nevertheless, is not totally clear. Though entomological field studies proved the presence of phlebotomine sand fly species capable of transmitting *Leishmania infantum*, the reported case studies in dogs and results from surveys indicate that the majority of these infections are acquired during traveling in endemic regions, predominantly the Mediterranean region (Mencke 2011). A recent study found 3.6 % of dogs with a travel anamnesis positive for antibodies against *Leishmania* (Hamel et al. 2011). However, there are cases reported in dogs where the case history may indicate an autochthonous infection within Germany (Moritz and Steuber 1999; Kellermeier et al. 2007; Globokar Vrhovc 2013). An adequate travel history is of crucial importance but, unfortunately, is not often available. Given that the number of imported and traveling dogs has steadily increased in the past (Glaser and Gothe 1998; Zahner and Bauer 2004), there is a high demand for *Leishmania* diagnosis in Germany. Though

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