

Monitoring of Humans and Animals for the Presence of Various Rickettsiae and *Coxiella burnetii* by Serological Methods

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ABSTRACT: Serological examination of humans in Slovakia suspected of having rickettsial infections revealed the presence of antibodies to spotted fever group rickettsiae (*R. conorii*, *R. slovaca*, and *R. typhi*). Of interest is the finding of serological positivity to the newly recognized “IRS” agent. Antibodies to these rickettsiae and to *C. burnetii* were demonstrated also in domestic and hunting dogs and pet animals. These results confirm the occurrence and possible circulation of these rickettsiae and *C. burnetii* in the Slovak Republic.

KEYWORDS: rickettsiae; “IRS 4”; *C. burnetii*; antibodies; ELISA; immunofluorescence test

INTRODUCTION

Infectious diseases caused by *Rickettsia* and *Coxiella burnetii* continue to present public health challenges. Newly described forms of rickettsioses represent distinct entities with unique epidemiological and clinical features which require constant attention. On the basis of serologic examination in Slovakia, only *Rickettsia slovaca*, *R. typhi*, and *C. burnetii* infections should be considered. However, increasing traveling due to tourism and migration includes the possibility of introducing exotic rickettsioses to this area.¹

The aim of this study was monitoring of infections with SFG rickettsiae and *C. burnetii* in humans, dogs, and pet animals by enzyme-linked immunosorbent assay (ELISA), immunofluorescence (MIF) test, and cross-absorption test. In the serological tests, Corpuscular antigens of *R. slovaca*, *R. conorii*,

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Ann. N.Y. Acad. Sci. 1078: 587–589 (2006). © 2006 New York Academy of Sciences.
doi: 10.1196/annals.1374.117

R. typhi, “IRS 4” agent (*Ixodes ricinus* Slovakia)—a newly recognized member of spotted fever group rickettsia — and *C. burnetii* were employed.² Dogs were included in our study because they play an important role in the ecology of SFG rickettsiae and *C. burnetii*,^{3–6} but little is known about the prevalence of the rickettsial antibodies in our country.⁷

MATERIALS AND METHODS

Human serum samples were obtained from 26 persons professionally exposed to domestic and wild animals and 213 persons suspected of having rickettsial infection or infection of unknown origin. Sera were collected in various districts of Slovakia in 2001–2004. Serum samples from 366 hunting and domestic dogs and pet animals (10 dogs and 15 cats) were collected in eastern and western Slovakia.

All the serum samples were tested by ELISA for reactivity to rickettsiae with *R. conorii*, *R. slovacica*, *R. typhi*, and *C. burnetii* as antigens. The ELISA-positive sera were then tested by MIF and eventually confirmed by the cross-absorption test. The testing for the “IRS 4” was done by MIF.

RESULTS

A total of 239 human sera were initially screened by ELISA for IgG and IgM antibodies. Of 56 ELISA-positive sera (23.4%), 7 (12.5.9%) had IgG antibodies to *R. conorii* and 5 (8.9%) to *R. slovacica* and *R. typhi* each in MIF test (the titers varied from 50 to 1,600). Interestingly, antibodies to “IRS 4” were found in 11 (4.6%) sera. Out of those, two sera exhibited titers of 100 and 800 for *R. slovacica* and *R. conorii*, respectively, and one serum had titers of 100 with *R. typhi* and 800 with *R. slovacica*. The positive results for *R. slovacica* with all three sera were confirmed by cross-absorption test. One serum exhibited titers of 100 and 200 for *R. typhi* and “IRS 4,” whereas the cross-absorption test confirmed the positive results for “IRS 4” only.

A total of 45 (11.5%) of 391 dog sera had antibodies to rickettsiae and *C. burnetii* in ELISA. In MIF test, out of the 45 ELISA-positive sera, 12 had antibodies to *R. conorii*, and *R. slovacica* and 5 had antibodies to “IRS 4.” The cross-absorption test confirmed only 3 of 7 sera positive for *R. slovacica* in MIF test as well as positive for *R. slovacica*. However, no specific antibodies were detected in the sera from pet animals.

CONCLUSIONS

Our results showed that (i) dogs can be naturally infected with various rickettsiae and *C. burnetii*, (ii) a close contact with humans predetermines them

as a possible source of SFG rickettsiae and *C. burnetii* infection, and (iii) the presence of antibodies to “IRS 4” in human and animal sera indicates a prevalence of this agent in nature. However, a possible pathogenic threat to public health has not been demonstrated.

ACKNOWLEDGMENTS

The authors are very grateful to Dr. J. Žemla for reviewing the manuscript. The work was supported by the Grants No. 3050 and 5053 of the Scientific Grant Agency of the Ministry of Education of the Slovak Republic and the Slovak Academy of Sciences.

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