

## European hedgehogs, *Erinaceus europaeus*, support the circulation of *Rickettsia helvetica* in sylvatic environment

Joanna Stańczak<sup>1</sup>, Patrycja Celmer<sup>1</sup>, Jerzy Michalik<sup>2</sup>, Bożena Sikora<sup>2</sup>

<sup>1</sup>Department of Tropical Parasitology, Institute of Maritime and Tropical Medicine, Medical University of Gdańsk, Powstania Styczniowego 9B, 81-519 Gdynia, Poland

<sup>2</sup>Department of Animal Morphology, Faculty of Biology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, Poland

Corresponding Author: Joanna Stańczak; e-mail: astan@gumed.edu.pl

The European hedgehog, *Erinaceus europaeus*, is known to host large loads of *Ixodes ricinus*, the main vector of tick-borne encephalitis virus, *Borrelia burgdorferi* s.l., *Anaplasma phagocytophilum*, *Rickettsia* spp. and others, which may cause diseases in humans and domesticated animals. To date, however, only limited information has been available on the role of the hedgehog as a host or reservoir for these pathogens in Europe.

We investigated blood samples and ixodid ticks from European hedgehogs for the presence of *Rickettsia* spp. A total of 70 blood samples, 716 *Ixodes ricinus*, and 5 *I. hexagonus* were collected from 70 hedgehogs life-trapped from May to September 2012–2014, in forest settlements within the Landscape Park „Zielonka”, western Poland. These were tested by a conventional PCR assay with primers targeting the citrate synthase gene (*gltA*) fragment of 165 bp. Female ticks were tested individually, larvae and nymphs in pools (2–5 ticks). None of blood samples and *I. hexagonus* was PCR positive for *Rickettsia* spp. The rickettsia minimum infection rate in *I. ricinus* was 9.3%, with an increase detected with each tick stage (7% for larvae, 8.9% for nymphs, and 19.8% for females). Temporal and seasonal differences in *Rickettsia* prevalence were observed, being the highest in 2012 (11.5%) and in the autumn (28.8%), respectively. Positive samples were subjected to nested and semi-nested PCRs targeting the partial *ompA* and 16S rRNA genes, respectively. All samples examined by the nested PCR were negative, what suggested that ticks were infected with *R. helvetica*, as the *ompA*-gene seems to be not amplified in this species. Using sequencing of partial 16S rRNA, *Rickettsia helvetica* was the only species identified.

These results indicate that European hedgehogs are exposed to *R. helvetica* via infected ticks and might be involved in its natural transmission cycle also as a potential vertebrate reservoir for this *Rickettsia* species.

This study was partially supported by the Ministry of Science and Higher Education (grant No. N N304 325439) and by the funds of Department of Tropical Parasitology MUG.