

Abstract

The thesis deals with *Leishmania* development in sand flies focusing on factors that could affect the vectorial part of their lifecycle. First, we examined an effect of temperature on *Leishmania* development in sand flies since the global warming was suggested to be one of the most important factors affecting dissemination of leishmaniasis. Development of three *Leishmania* species were studied at two different temperatures (20 and 26°C); *L. infantum* in natural vectors *Lutzomyia longipalpis* and *Phlebotomus perniciosus*, and two closely related *Viannia* species *L. braziliensis* and *L. peruviana* in *Lu. longipalpis*. *Leishmania peruviana* thrived well only at the lower temperature tested. At the higher temperature, most of infections were lost between days 2 and 8 post feeding, i.e. time of blood-meal remnants defecation. This suggests that this Andean species is adapted to slower metabolism of vectors living at lower temperatures. On the other hand, *L. infantum* and *L. braziliensis* successfully developed in sand flies at both temperatures tested, which might be substantial for their further spread to new areas.

Next, an impact of gregarine *Psychodiella sergenti* on *L. tropica* in *Phlebotomus sergenti* was studied. Gregarines are commonly found in sand flies, and in mosquitoes, they can affect development of other parasites. We did not find any significant difference in *L. tropica* development between gregarine infected and non-infected *P. sergenti* females. Parasites developed equally well, heavily infected females and mature infections were observed. Thus, we concluded that co-infection with gregarines did not have any negative impact on *Leishmania* development.

Finally, since the monoxenous trypanosomatid *Leptomonas seymouri* was recently isolated from patients with visceral leishmaniasis and sand flies were discussed as potential vectors of this species, we evaluated the ability of *L. seymouri* to survive and develop in *P. argentipes* and *P. orientalis*, both vectors of *L. donovani*. *Leptomonas seymouri* was capable to persist for several days in both sand fly species tested; nevertheless, infection rates and intensities fell down consequently being almost all lost until the late phase of infection. Neither co-infection with *L. donovani* did not show any difference, although *Leishmania* parasites developed well all days tested. Thus, we assume that a relevance of sand flies in *L. seymouri* transmission is unlikely.