

Abstract

Leishmaniasis is an important human parasitic disease of tropical and subtropical areas transmitted by bloodsucking insects of the genus *Phlebotomus* or *Lutzomyia*. There are many people under threat, especially in Africa, Latin America, South and Central Asia, in the Mediterranean and the Middle East. The disease manifests from mild skin symptoms to fatal visceral forms. Leishmania parasites proliferate and develop in the digestive tracts of sand fly. Phlebotomine sandflies feed on sugar solutions produced by plants or other insects (eg. honeydew of aphids). Intake of various food causes the contamination of gut with many microorganisms that may affect the vector and/or transmitted parasites. In addition, microbial colonization of the digestive tract occurs during larval development. Females lay eggs in places rich in organic detritus and decaying animal faeces serving as a larval food.

The article published in *Folia Parasitologica* deals with the composition of the bacterial microflora in laboratory-reared colony of *Phlebotomus duboscqi*. Mainly aerobic or facultative anaerobic gram-negative rod-shaped bacteria were identified in the gut of larvae and adults. We demonstrated, for the first time in the sandflies, transstadial passage of bacteria from larvae to adults. Bacteria of strain AK, identified as genus *Ochrobactrum*, was isolated in large numbers from the gut of the larvae, the pupae and from newly hatched females. In addition, the work revealed that the lectin activity present in the sand fly midgut has no antibacterial activity against gram-negative bacteria. The findings and conclusions presented in this paper were cited in more than twenty recent articles related to bacterial microflora of sand flies.

Previously, it was assumed that these microorganisms can not survive the drastic physiological changes during pupation and the adults emerge with sterile digestive tract. Today it is, however, clear that some bacteria can survive the insect metamorphosis. Scientists consider that these bacteria could be used in biological control of sand flies or transmitted *Leishmania* parasites. This novel strategy of biological control (called "paratransgenesis") uses the bacteria as carriers of genes for antileishmanial molecules. Transgenic bacteria eaten by sand flies and their larvae would proliferate in their gut and produce selected molecules with antiparasitic effect. For this purpose, it seems appropriate to use the symbiotic, commensal or other bacteria that can survive metamorphosis of the insects.

Keywords:

Leishmaniasis, *Phlebotomus*, *Lutzomyia*, gut bacteria, *Ochrobactrum*, antimicrobial molecules.