

## HIRUDO MEDICINALIS L. AND COXIELLA BURNETII

The transfer of rickettsiae by worms has been dealt with in a single paper (Shevkunova E. A., Pchelkina A. A., Med. parazit. (Moskva) 27: 699, 1958). *Hirudo medicinalis* infected on quinea pigs was capable to transfer *C. burnetii* till day 53 after infection. This paper inspired us to a detailed study of the significance of these worms in the circulation of *C. burnetii* in nature.

For this purpose we have examined the contents of the digestive tract of leeches collected in nature and carried out experimental infections of leeches by *C. burnetii* studying the length of survival, distribution in organs, possibility of transfer of the infection during sucking on guinea pigs and excretion of the agent with excrements of leeches.

The leeches were collected in summer months in a forest pond near Bratislava and were kept in 5 litre glass flasks with tap water. The water temperature was about 19 °C. The water was changed at intervals of 2—3 weeks.

For experimental infection, the first phase of *C. burnetii*, Florian strain, was used. The leeches were infected either naturally by sucking on guinea pigs harbouring rickettsiae (titre  $10^{6.5} \text{ ID}_{50} \text{ ml}$ ) or artificially by injection of a suspension of rickettsiae (blood of guinea pigs) into body cavities of worms. The presence of rickettsiae in guinea pigs on which the leeches had fed, in the leeches and in the water where the leeches were kept was detected on the basis of the formation of antibodies against *C. burnetii* in guinea pigs on which the leeches sucked or in guinea pigs inoculated with the tested material.

A total of 100 specimens of leeches were collected in Záhorie (Bratislava—country) and examined for the presence of rickettsiae. This is the only region in Slovakia where *H. medicinalis* occurs. The leeches fed on the following hosts: 53 % of leeches fed on fish (*Tinca tinca*, *Carassius carassius*), 34 % on birds (among them 19 % on Anseriformes), 9 % on Amphibia, 3 % on Mammalia (Rodentia) and 1 % on Reptilia. No rickettsiae were found in the worms (the detection was based on antibody formation in guinea pigs). The negative results may be explained by the fact that *C. burnetii* does not occur in the studied locality at present.

The persistence of *C. burnetii* in leeches was studied in two experiments. The rickettsiae were found in the digestive tract and in organs (mixture of nerves, kidneys and muscles) of leeches infected by sucking or injection till day

390 after infection. The titre of rickettsiae gradually decreased from the day of infection till the last day of detection which indicates that the rickettsiae probably did not multiply inside the worms.

In two experiments dealing with the transfer of *Coxiella* by sucking of leeches we managed to transfer the agent to healthy guinea pigs within 14 days after sucking on specimens infected with rickettsiae. We assume that the transfer occurred by regurgitation of the infected food from the digestive tract or by excrements of leeches by the contact of contaminated surface of worms from the water polluted with rickettsiae through the scarified skin of host animals.

In the experiment on the excretion of *C. burnetii* into water positive results were obtained till day 151 after the beginning of the experiment. During the first weeks the water was polluted by *Coxiella* most probably after contamination of leeches during sucking on the contaminated body surface of infected guinea pigs, in the following weeks the infection probably originated from faeces or from regurgitation from the digestive tract.

The results show that *H. medicinalis* could participate actively in the circulation of the causative agent directly in the focus of the Q-fever. It is capable of feeding practically on all animals. When the infected animals bleed from the wounds produced by leeches, other animals may get infected by licking them (alimentary transfer), or their blood contaminates the water and the animals may get infected while drinking the water or through a wounded body surface. The leech itself may get infected, keep the agent in its body for a long time and transfer it while sucking on animals or when they are crushed or swallowed by other animals. The polluted water may become a source of infection to animals drinking it or even to man during bathing.

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