

## HISTOCHEMISTRY OF THE TREMATODE HASSTILESIA OVIS (TREMATODA: HASSTILESIIDAE)

T. N. SOBOLEVA and Z. ŽĎÁRSKÁ

Institute of Zoology, Academy of Sciences of the Kazakh SSSR, Alma-Ata, and Institute of Parasitology, Czechoslovak Academy of Sciences, Prague

**Abstract.** Trematodes *H. ovis* collected from infected sheep were studied by means of 20 histochemical methods and the contents of mucosubstances, proteins and enzymes were demonstrated. The body tegument contains neutral mucosubstances, acid mucosubstances and proteins with tyrosine, tryptophane and SH and SS groups. It does not exhibit any activity of alkaline and acid phosphatase and non-specific esterase. A large amount of tyrosine is present in the eggs, vitellaria and gonads. Hydrophilic lipids were detected in body tegument and vitellaria, hydrophobic lipids in the basal layer of intestine, suckers, pharynx and gonads. The muscular and basal layers of intestine contain proteins with tyrosine, tryptophan, cystine and cysteine. The microvilli exhibit a strong reaction for alkaline phosphatase and acid mucosubstances and a weaker reaction for neutral mucosubstances. In contrast to the metacercariae of *H. ovis*, which are poor in proteins, carbohydrates and enzymes, adult trematodes contain all substances necessary for parasitizing in the intestine of the definitive host.

The trematodes *H. ovis* parasitize in the small intestine of sheep and goats in mountainous pasturelands in Kazakhstan and Kirghizia. The intensity of infection is even 50—60 % in some of the sheep-breeding farms. In spite of the fact that the trematodes are very small, about 1.00 mm, they are so numerous that the mucosa of the small intestine, particularly its middle part, is completely covered with the parasites. The presence of 10—12 thousand worms necessarily evokes a question of the negative effect on the organism of the host.

The pathogenicity of *H. ovis* and the changes in the sheep intestine caused by this trematode had not been studied until recently. In all manuals available only a catarrhal inflammation of intestine was mentioned. As it has been recently demonstrated, the changes induced by this parasite are very specific. Vsevolodov and Gvozdev (1976) described pathomorphological changes in the intestine of *Ochotona rutila* caused by a relative species *H. ochotoniae*. It was found that the parasites penetrating among the villi of the mucosa induce hyperplastic changes manifesting themselves in the increase and proliferation of cells in the epithelium of villi and crypts.

Vsevolodov and Soboleva (1981), who studied the pathomorphology of intestine in sheep infected with *H. ovis* and compared it with that in *Ochotona rutila*, came to the conclusion that a common feature is the tendency to the development of a productive type of inflammatory reaction in the mucosa. The reactions in sheep, however, are much stronger. The pathological process induced by *H. ovis* in the sheep intestine is characterized by desquamative and atrophic changes in the intestinal epithelium with marked infiltration and proliferation, which prevail. Even these preliminary results suggest the pathogenic role of the trematodes and the disease caused by them — hasstilesiasis.

This paper is a part of complex studies on hasstilesiasis. The elucidation of histochemical peculiarities of *H. ovis* is significant for the analysis of the parasite-host relationship and for recommendation of measures in the control of this disease.



The high lipid content in the intestinal wall corresponds to the literary data (Harris and Cheng 1973 a). Most probably they are the endproducts of glycolysis and are excreted from the organism as excretory fat.

The activity of some enzymes in the digestive system of trematodes was demonstrated by several authors (Bogitsh 1972, Bogitsh et al. 1968, Bogitsh and Shannon 1971, Davis and Bogitsh, 1971 a, b). Our results confirm it.

Comparing the adult specimens of *H. ovis* with the cercariae and metacercariae of the same species, which are very poor in proteins, carbohydrates and enzymes (Žďárská and Soboleva 1981), it may be concluded that the adult trematodes *H. ovis* possess all substances necessary for the parasitism in the organism of the definitive host.

# ГИСТОХИМИЯ ТРЕМАТОДЫ *HASSTILESIA OVIS* (TREMATODA: HASSTILESIIDAE)

Т. Н. Соболева и З. Ждярска

**Резюме.** Трематоды *H. ovis* собранные от зараженных овец были использованы для гистохимического исследования. При помощи 20 гистохимических тестов выявлено содержание мукосубстанций, белков и энзимов. Замечено, что тегумент тела содержит нейтральные мукосубстанции, кислые мукосубстанции и протеины с тирозином, триптофаном и SH и SS группами. Тегумент тела не проявляет щелочную фосфатазную активность. Тирозин в значительном количестве находится в яйцах трематод, более в желточниках и гонадах. Гидрофильные липиды — в тегументе тела и желточниках, а гидрофобные — в базальном слое кишечника, в присосках, фаринксе и гонадах. Мышечный и базальный слои кишечника содержат протеины с тирозином, триптофаном, цистином и цистеином. Микровиллы дают сильную реакцию на кислые и слабее на нейтральные мукосубстанции. Выстилающий слой кишечника показывает высокую активность щелочной фосфатазы. Таким образом, по сравнению с метацеркариями *H. ovis*, которые бедны белками, углеводами и ферментами, мариты содержат все необходимые вещества для паразитирования в кишечнике окончательного хозяина.

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T. N. S., Zoological Institute, Academy of Sciences of the Kazakh SSR, 480032 Alma-Ata, SSSR

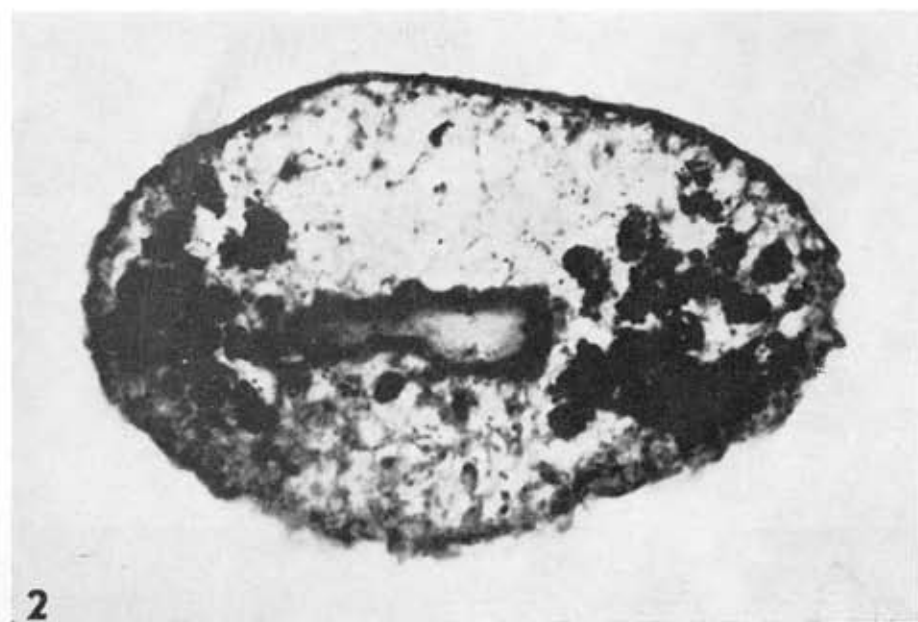
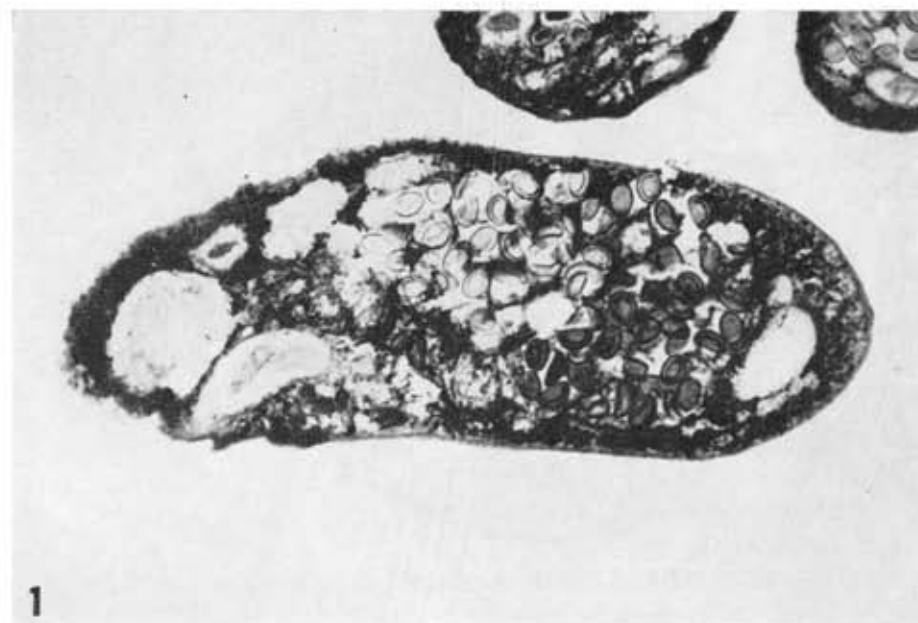


Fig. 1. Oblique section through posterior part of body of *H. ovis*. The parenchyma around the gonads contains a large amount of glycogen. PAS ( $\times 170$ ). Fig. 2. The tegument, vitellaria (right and left) and intestine (middle) of *H. ovis* are strongly positive for tyrosine in Morel-Sisley's test. ( $\times 400$ ).

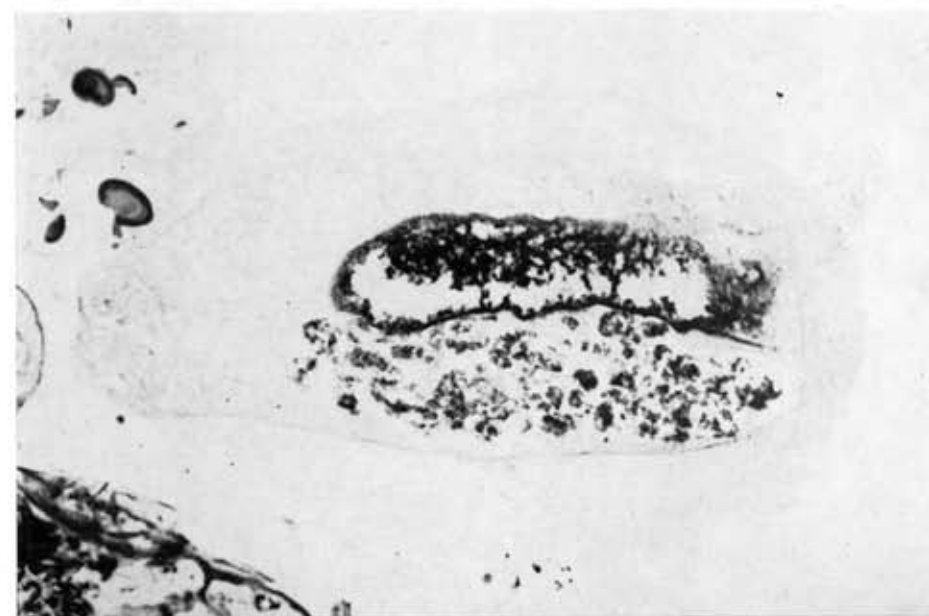
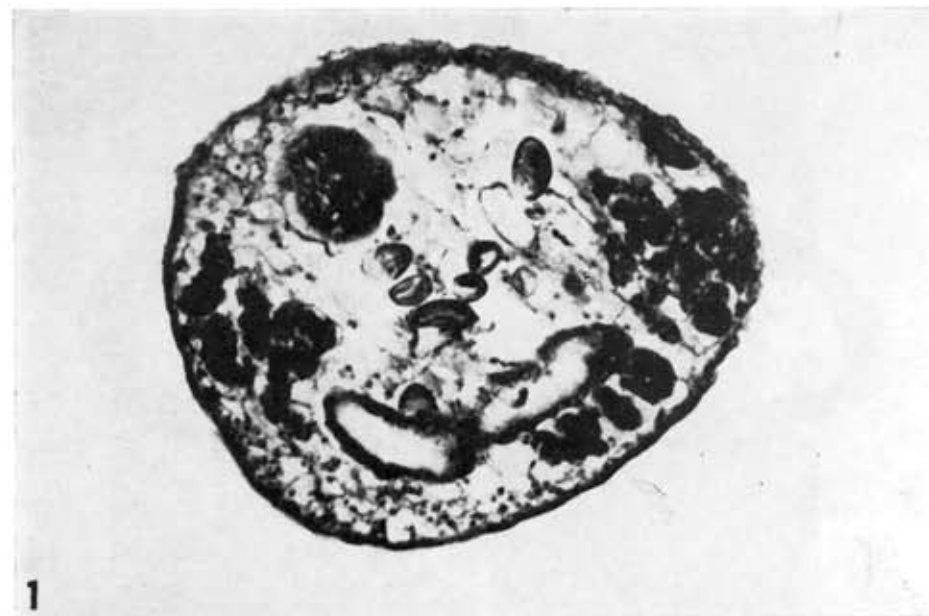


Fig. 1. The intestinal wall (at the bottom) and vitellaria (right and left) are most strongly positive for hydrophilic lipids in Sudan black B (paraffin) method. ( $\times 350$ ). Fig. 2. Longitudinal section through a part of *H. ovis* body. Only intestinal branches exhibit a high activity of alkaline phosphatase.  $\alpha$  — naphthyl phosphate + Fast blue BB ( $\times 270$ ).