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BIOCHEMICAL CHANGES IN THE LIVER AND BLOOD OF A FRESHWATER FISH, RITA RITA, INFESTED WITH A TREMATODE OPISTHORCHIS PEDICELLATA

The effect of trematode infestations on the biochemical composition of the fish tissues has not yet been investigated. This communication presents values of some biochemical constituents of blood and liver of a freshwater cat fish, *Rita rita* (Ham.), which was found harbouring the trematode *Opisthorchis pedicellata* Verma, 1927. Eight specimens of *Rita rita* containing *Opisthorchis pedicellata* were found on three different ocassions. In one case, the intensity of infestation was so severe (26 trematodes) that the whole gall bladder of the fish was full of these parasites and even a few parasites invaded into the liver. Otherwise usually the parasites occupied a place within the gall bladder only. Live fishes were obtained from the local fish markets of Lucknow and Moradabad. In the laboratory, they were anesthetized by pithing, dissected, blood was collected from their caudal vein, liver was taken out, gall bladder was removed and then weighed after drying it with a piece of filter paper. Parasites, if present in gall bladder or liver, were taken out, put on a watch glass containing normal saline, counted and identified. The liver and blood samples were processed for various biochemical estimations as usual, following various methods for each parameter as given by Oser (in: Hawks Physiological Chemistry, 14 ed., McGraw Hill 1965).

A comparison of values obtained from healthy and parasitized fishes clearly reveals that the presence of *Opisthorchis pedicellata* in the host definitely causes conspicuous changes in the biochemical make up of the liver and blood. (Table 1). In the infected *Rita rita*, the protein, cholesterol, calcium, glucose and alkaline phosphatase contents of the whole blood were lower by about 42 %, 38 %, 20 %, 43 % and 21 %, respectively, than the normal values. Similarly, protein, glycogen, cholesterol, glucose, alkaline phosphatase and HSI values in the liver of parasitized fishes were lower by about 39 %, 59 %, 60 %, 14 %, 36 % and 40 %, respectively, when compared to the normal values. The lactic acid contents, however, in the both tissues, viz. the blood and liver of the infected fishes were found elevated by 19 % and 28 %, respectively.

Liver is a major source of carbohydrate metabolites maintaining their normal levels in blood. Hence, the fall in blood glucose contents of the infected fish has a direct correlation with the depleted glycogen contents of the liver. The most interesting aspect of depleting blood and liver values are those of proteins, cholesterol, calcium and phosphatase contents. The gall bladder releases bile into the intestine which helps not only in the processes of digestive

Table 1. Biochemical components of blood and liver of *Rita rita* in healthy and infected by *O. pedicellata* specimens. The values are mean ± S. D., for 8 observations each. Mean body wt. for all fishes = 560 ± 25.0 g

Status of tissue	Protein	Glycogen	Cholesterol	Calcium	Glucose	Lactic	Alkaline phosphatase (K. A. units) per. 100 ml.	HSI
	mg/100 gm or ml*							
Normal fish blood	921.2 ±30.6	—	507.2 ±40.7	14.5 ±3.8	80.7 ±13.5	11.4 ±3.8	6.6 ±1.2	—
Infested fish blood	540.6 ±21.8	—	317.7 ±28.6	11.7 ±2.9	46.5 ±11.9	14.1 ±4.7	5.2 ±1.2	—
Normal fish liver	1,350.7 ±56.8	4,160.5 ±92.6	912.0 ±60.2	—	60.5 ±21.3	2.3 ±0.2	5.7 ±0.8	3.9 ±1.0
Infested fish liver	826.3 ±39.7	1,842.3 ±80.5	370.8 ±35.4	—	52.1 ±14.0	3.2 ±1.1	3.7 ±1.6	2.2 ±0.8

* In case of blood.

physiology, but also facilitates the absorption of nutrient final products such as monosaccharides disaccharides, glycerols and fatty acids, besides the utilization of various vitamins. The amount of bile, due to the presence of a low or high number of parasites, would be definitely lower. Therefore, it is suggested that the real cause of depletion in the biochemical components of both tissues lies in the restriction or nonavailability of the bile secretions in the intestinal digestive processess. No other parasites were found in the gut. This means that all changes in the biochemical values were due to the presence of *Opisthorchis pedicellata* in the gall bladder (accidentally, in the liver) of the host. It can be mentioned that a fall in blood glucose, cholesterol and serum protein levels in certain fishes has also been reported to occur due to trypanosome infection (Smirnova L. I., Hydrobiol. 37: 1—6, 1971, Tandon R. S. and Joshi B. D., J. Inland Fish. Soc. 6: 81—82, 1974). The cause of a rise of lactate contents in liver and blood can be due to incomplete anaerobic glycolysis by the parasite for its energy requirements.

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