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Research Paper

Comparative Histology of the Mehlis' Gland of Immature and Mature Orthocoelium Scoliocoelium (Trematoda: Digenea)

Biomedical.

KEYWORDS: Orthocoelium scoliocoelium, Mehlis' gland, ootype S1 and S2 cells.

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ABSTRACT

Light microscopy of the amphistomes Orthocoelium scoliocoelium clearly reveals that there are clear differences in the Mehlis' gland of immature and mature worms. The Mehlis' glands were neither fully formed nor functional in immature worm. Contrary to this, mature amphistomes had prominent structure, fully formed and functional Mehlis' gland. Therefore, the present study is great significance from medico-veterinary standpoint

INTRODUCTI ON

Comparison of the histology and histochemistry of diverse tissues of the amphistomes receive little attention (Sharma et al., 1981; Sharma and Hora, 1983; Gupta et al., 1987 Swarnakar and Sharma 1992 and Swarnakar & Soni 2004). The comparison of the light microscope' histology of Mehlis' glands of immature and mature flukes as well as tissues of different adult flukes are hardly available. Even the ultrastructure of reproductive ducts and accessory glands of a few trematodes have been studied (Hanumantha-Rao, 1959; Burton, 1967; Threadgold and Irwin, 1970; Spence and Silk, 1971; Orido, 1991; Swarnakar and Sharma, 1997 and Swarnakar, 2010).

In view of the lacuna indicated above in the study of immature and mature amphistomes, it was decided to undertake comparative light microscope histology of Mehlis glands of Orthocoelium scoliocoelium infecting the rumen of water buffaloes.

MATERIALS AND METHODS

The amphistomes Orthocoelium scoliocoelium were collected from rumen of the freshly slaughtered buffalo (Bubalus bubalis) at local zoo abattoir in Udaipur. Mature worms were retrieved between July to September and immature worms from the remaining months of the year. The amphistomes were washed several times in normal saline water, fixed for 24 hrs. in alcoholic Bouin's fixative, washed in running tap water for at least 24 hrs, dehydrated in ascending series of alcohols, cleared in xylene, in filtered with and embedded in wax, sectioned at 6 µm and stained in Harris haematoxylin and eosin for general histology.

RESULTS

Mehlis gland of O. scoliocoelium is madeup of two types of secretory unicellular gland cells. They have been named as S1 and S2 cells. These cells are radially arranged around the ootype. The S1 type gland cells are comparatively larger in size and number and located away from the ootype forming the periphery of a Mehlis' gland. Whereas the S2 type cells are few in number, oval in shape, smaller in size and located near the ootype. Both the cell types are supported by parenchymatous cells. S1 and S2 type of cells discharge their secretion into the lumen of ootype through their ducts. The duct is funnel shaped. The gland opens into funnel like part of the duct which then narrows, becomes tubular, penetrate the musculature of ootype and open into its lumen.

The wall of the ootype is composed of syncytial tegument which bears a striated luminal border towards the lumen. The syncytial lining of ootype is supported externally by musculature. It consists of outer circular and inner longitudinal muscle layers. In case of immature worm musculature is highly developed as a result of which the lumen of ootype becomes considerably narrower (Fig. 1). The structure of Mehlis' gland of immature and mature worm exhibits differences in them. S1 and S2 gland cells are observed equal in size and numbers in Mehlis' gland of immature worm; the parenchymalous cells between them appear quite prominent and also larger in number. In mature worms, on the contrary the S2 gland cells and parenchymal cells are few in number and smaller in size. While S1 gland cells are larger in size (Pear 'shaped) and abounded in number (Fig. 2). The Mehlis gland of mature worm is thus larger in size and secretory in nature, whereas in immature stages, it is smaller in size and nonfunctional**.**

DISCUSSION

The Mehlis' gland of O. scoliocoelium is composed of two cell types S1 and S2 in a mature worm. The S1 cells are quite large and pear shaped and they also differ in staining properties with S2 cell type. The S2 type cells are few in number and located near the wall of ootype. In this respect the Mehlis' gland of Orthocoelium scoliocoelium differ from Ceylonocotyl scoliocoelium in which the Mehlis' gland has been reported to be composed of single types of cells (Sharma et al., 1981 and Swarnakar and Soni 2004). The present observation however, is in full agreement in thsi regard with the Mehlis' gland of Fasciola hepatica (Threadgold and Irwin, 1970), Haematolocchus medioplexus (Burton, 1967) and Mehlis' gland in the lung fluke, Paragonimus ohirai (Orido, 1991). The function of Mehlis' gland in (i) the formation of membranes to enclose the oocyte and vitelline cells (Hanumantha-Rao,1959); (ii) lubrication of the capsule filled uterus or stimulation of spermatozoa (Burton,1967); (iii) finally, one or other of the secretions may play a part in the actual tanning process, which results in a highly resistant egg shell, either by triggering off the enzymatic process that results in tanning or adding some essential cofactors for the process (Threadgold and Irwin, 1970).

Information is limited to a few trematodes such as fasciola (Threadgold and Irwin, 1970; Haewatoloechus (Burton, 1967) and Schistosoma (Spence and Silk, 1971). In immature worm the Mehlis' gland is not well developed as is evident from its histology. The S1 and S2 type of cells are almost equal in number and they have not reached the functional stage to elaborate the secretory material.

REFERENCE

Burton, P.R. (1967). Fine structure of the reproductive system of a frog lung fuke. I Mehlis' gland and associated ducts. J. Parasitol. 53, 540-555. Gupta, B. C., Parshad, VR. and Guraya, SS. 1987. Morphological and histochemical observations on the vitelline cells of developing and adult Paramphistomum cervi (Trematoda: Digenea). ICMR Advanced Centre in Reproduction, Department of Zoology, Punjab Agricultural University, Ludhiana, India. J Helminthol. Dec; 61(4): 297-305. Hanumanth-Rao, K 1959. Histochemistry of Mehlis' gland and egg shell formation in the liver fluke Fasciola hepatica. L. Experimentia 15: 464 – 465. Orido, Y. 1991. Ultrastructure of Mehlis' gland in the lung fluke, Paragonimus ohirai (Trematoda: Troglotrematidae). J. Morphol. Jan. 207(1): 9 – 16. Swarnakar, G. and Sharma, P.N. 1992. Comparison of the histochemical distribution of non-enzymatic substances in the reproductive tissues of Cotylophoron cotylophorum. J. of Parasitol. and Appli. An. Biol. 1, 143-149. Sharma, P. N. Mandawat, S. and Sharma, A. N. (1981). Cytochemistry of Mehlis' gland in ceylonocotyle scoliocoelium. J. of Helminthology. 55, 141-148. Sharma, P. N. and Hora (1983). Role of oesophageal gland in the digestive physiology of two rumen amphistomes Orthocoelium scoliocoelium and Paramphistomum cervi, Journal of Helminthology. 57, 11-20. Swarnakar, G. 2010. Ultrastructural study on spermatogenesis in rumen amphistome Orthocoelium scoliocoelium (Amphistome: Digenea), International J. of The Bioscan. 5(3), 547 – 553.