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Short Communication

HISTOLOGICAL STUDIES ON THE MYENTERIC PLEXUS IN RABBIT

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SUMMARY

The present research work was planned to demonstrate the histological characters of myenteric plexus in rabbit. It was present within the tunica muscularis of intestine between the longitudinal and circular smooth muscle layers. Histologically, it appeared in the form of ganglions that comprised of ganglionic neurons, glial cells and nerve fibers surrounded on periphery by telocytes. Thin layer of collagen fibers ensheathed the whole ganglia.

Keywords: Histology, Intestine, Myenteric plexus, Rabbit

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The enteric nervous system (ENS), a part of autonomic nervous system (ANS) covers the entire length of the mammalian gastro-intestinal tract and play an important role in coordinating the activities of gastro-intestinal tract such as absorption, secretion, motility and microvasculature. Two basic plexuses of the ENS are interconnected and arranged within the layers of the intestine. The first is the myenteric plexus, also known as Auerbach's plexus that lies within the tunica muscularis specifically between the longitudinal and circular smooth muscle layers. The second is the submucosal plexus (Meissner's plexus) located within the submucosal layer. Myenteric plexus has been reported toregulate the intestinal motility (Mandic *et al.*, 2016). Diseases of the ENS may lead to severe altered bowel motility due to changes within the structure of the myenteric plexus. Hence, the present work was designed to study the basic histological details of myenteric plexus in rabbit as the rabbit intestines are anatomically similar to the human gastrointestinal tract (Amiry *et al.*, 2019) that can provide the basic information for researchers focusing on the diseased state of the intestine using the pre-clinical rabbit model.

The present work was carried out on six adult rabbits between body weights of 1.0 to 1.5 kg as per the IAEC guidelines. The animals were euthanized and the tissue samples were collected from intestine and quickly fixed in 10% Neutral buffered formalin (10% NBF) and Bouin's fixatives after properly washing in 0.9% normal saline solution. Processing of tissue samples was done by acetone-benzene schedule and 5-6 µm thick sections were obtained on clean glass slides. These tissue sections were stained with Haematoxylin and eosin to identify the cellular details, Masson's trichrome stain for collagen fibers, Gridley's stain for reticular fibers and Weigert's stain for elastic fibers (Luna, 1968). Photography of the stained slides was done in Leica DM 2000 microscope.

In the present study, the myenteric plexus was found in the tunica muscularis layer of the intestine, specifically between the outer longitudinal and inner circular smooth muscle layers (Fig. 1). It appeared in the form of ganglions that comprised of ganglionic neurons, glial cells and nerve fibers surrounded on periphery by telocytes (Fig. 2). Similar observations were reported by Verres *et al.* (2022). Theganglia were irregular in shape and ensheathed by thin layer of collagen fibers (Fig. 3) which was in accordance with the reports of Serenini *et al.* (2020). The reticular and elastic fibers were not observed around or within the ganglia.

The ganglionic cell bodies had prominent, relatively euchromatic, eccentric, spherical nuclei with prominent nucleoli and granular eosinophilic cytoplasm. These ganglionic cell bodies were surrounded by glial cells. The nerve fibrils formed a hazy network around the cells. The glial cells (ganglionic gliocytes) surrounding the neuronal cell bodies had ovoid heterochromatic nuclei. On the periphery of the ganglions, were present, very thin cells known astelocytes with long filamentous telopodes with spindle shaped and darkly stained nuclei (Fig. 2) which was in accordance with the reports of Verres et al. (2022). Rosa et al. (2021) reported presence of telocytesas newly identified interstitial cells having telopodesas thin and long cytoplasmic processes and considered to be a part of

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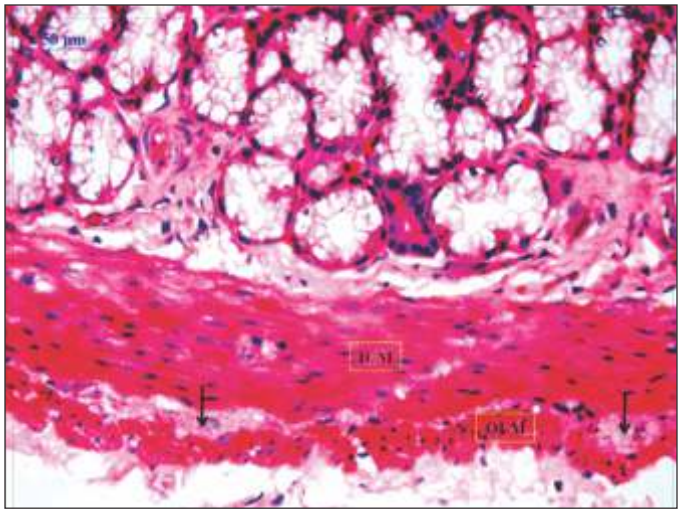

Fig. 1. Photomicrograph of rabbit intestine showing presence of myenteric plexus (arrow) within the tunica muscularis specifically between the inner circular (ICM) and outer longitudinal (OLM) smooth muscle layers. H&E 40x.

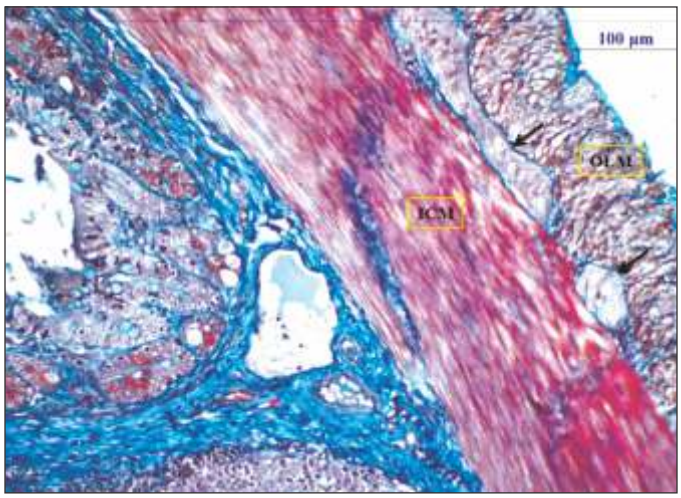

Fig. 3. Photomicrograph of rabbit intestine showing presence of myenteric plexus within the tunica muscularis specifically between the inner circular (ICM) and outer longitudinal (OLM) smooth muscle layers and ensheathed by a thin layer of collagen fibers (arrow). MT 20x.

stem cell niches in the intestine. They have been described in the myenteric plexus region where they surround gangliaand enteric nerves and among the smoothmuscle bundle layers.

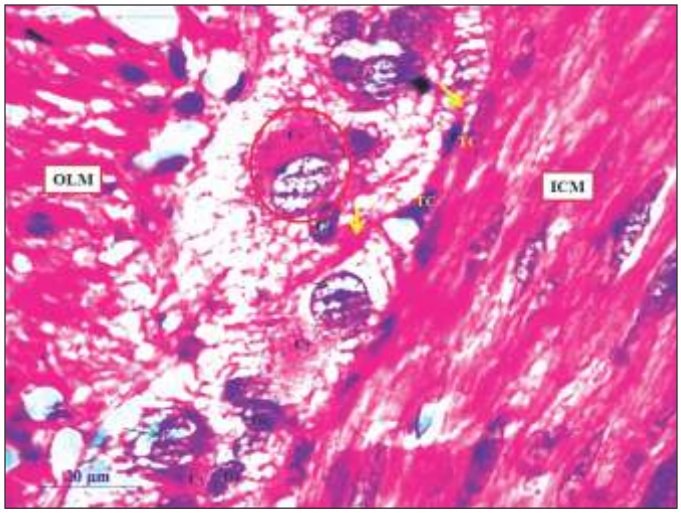

Fig. 2. Photomicrograph of a ganglion of myenteric plexus with ganglionic neuronal cell body (red circle), having a prominent eccentric, euchromatic, spherical nucleus (arrow) and granular eosinophilic cytoplasm (Cy). The neuronal cells are surrounded by gliocytes (Gc) with oval, heterochromatic nucleus. The neuronal fibres are hazy in appearance. The telocytes (Tc) are present at the periphery of the ganglion with thin telopodes (yellow arrow). The smooth muscle layers are marked as ICM and OLM. H&E 100x.

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