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Age-related Cytological Changes of Fibroblast Cell and Fila Olfactoria in Fish: [*Pseudapocryptes lanceolatus* (Bloch and Schneider)]

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The fibroblast cell is an important cellular component of olfactory lamina propria of *Pseudapocryptes lanceolatus* (Bloch and Schneider) which plays a significant role to constitute the *fila olfactoria* [1]. The present study is emphasized on the fine structural details on fibroblast cell to unfold the subcellular basis of age-related consequences of the fila olfactoria in olfactory neuroepithelial system in fish [*P. lanceolatus*].

The olfactory apparatus of adult *P. lanceolatus* was fixed in 2.5% glutaraldehyde in 0.1 (M) phosphate buffer (pH. 7.2) at 4°C for 2hours (primary fixation) and 1% osmium tetraoxide in the same buffer for 1 hour (secondary fixation). The ultrathin sections (70 - 90) nm of olfactory tissues were stained with uranyl acetate and lead citrate, examined under transmission electron microscope [TEM: MORGAGNI -268D] operated at 40kV [SAIF, All India Institute of Medical Sciences (AIIMS), New Delhi].

The lamina propria of *P. lanceolatus* is situated just beneath the basal lamina of the olfactory neuroepithelium. This region is characterized with aggregations of unmyelinated axons of different sensory receptor cells (constituting the neural fesicles or *fila olfactoria*), collagen fibers, fibroblast cells, blood capillaries with erythrocyte cells, *etc.* [Figs. 1 and 2]. The fibroblast cells are characterized as polarized and fusiform shaped cell. Elliptical chromatinized nucleus, mitochondria with prominent cristea, free ribosomes, poly ribosomes, rough endoplasmic reticulum (rER), Golgi complex, vesicle with fibrous materials, *etc.* are also well noted within the cytoplasm of fibroblast cell [Fig. 1]. The extracellular matrix of the peripheral part of neural fesicles or fila olfactoria is guarded by dense collagen fibres [Fig. 2]. The multilobed nuclei with fragmented chromatin fibres, dilation of mitochondrial cristea and rough endoplasmic reticulum (rER) with irregular arrangement of ribosomes, extreme vacuolation in cytoplasm, primary and secondary lysosomes, *etc.* are the prime characteristic features of apoptotic fibroblast cells in lamina propria [Figs. 3 and 4]. Arrangement of collagen fibres around the fila olfactoria becomes unfastened [Fig. 5]. The necrotic neural fesicles or fila olfactoria (having dilated cytoskeletal parts within electron lucent vesicular cytoplasm and membrane blebs) are also subsequently marked within the lamina propria of *P. lanceolatus* [Fig. 5].

The apoptosis of fibroblast cell in lamina propria of *P. lanceolatus* may responsible for the alteration of collagen synthesis which finally leads to the necrosis of neural fascicles or fila olfactoria of unmyelinated olfactory neuron and causes sensory dysfunction in fish. Therefore the fibroblast cell in lamina propria of *P. lanceotus* is not only responsible for maintain the integrity of the ground matrix of olfactory neuroepitheial system but also helps to protect the neural fascicles or fila olfactoria from neural ageing [2].

References:

[1] De SK and Sarkar SK, Chem. Senses **31** (2011), p. A22.
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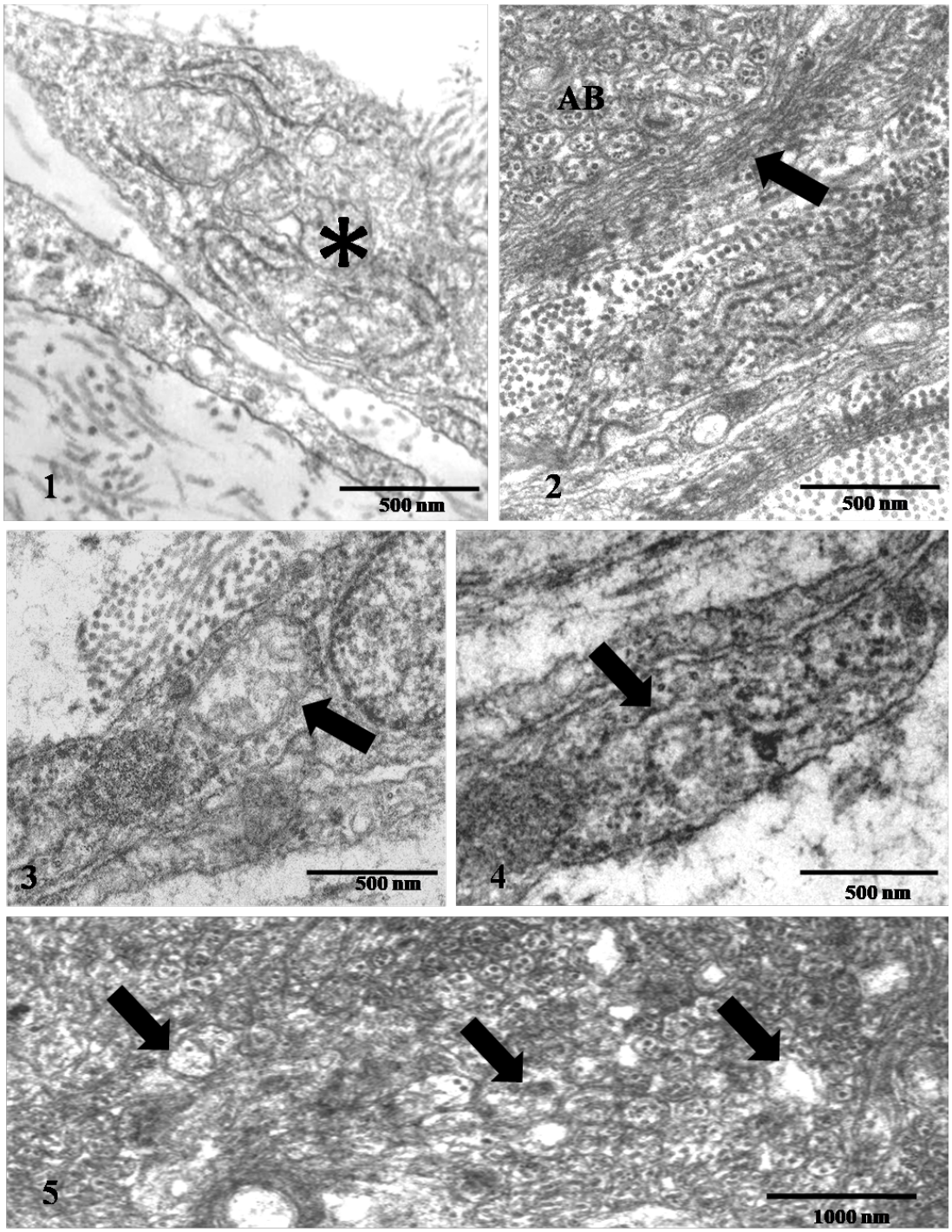

Figure 1. The electron micrograph indicates Fibroblast cell associated with collagen fibres (star) within the lamina propria of P. lanceolatus.
Figure 2. The axonal bundles (AB) are surrounded by dense collagen fibres and forming neural fesicles or fila olfactoria.
Figure 3. The mitochondria with dilated cristea (arrow) are marked under TEM within the apoptotic fibroblast cell of lamina propria.
Figure 4. The irregular distribution of ribosomes on rough endoplasmic reticulum (rER) (arrow) is remarkable noted within the vacuolated cytoplasm of apoptotic fibroblast cell.
Figure 5. The photomicrograph indicates degenerating neural fesicles or fila olfactoria is characteristically identified in lamina propria of *P. lanceolatus*.

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