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RESEARCH ARTICLE

Histology and surface morphology of the olfactory epithelium in the freshwater teleost *Clupisoma garua* (Hamilton, 1822)

Saroj Kumar Ghosh

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Citation: Ghosh S.K. 2019 – Histology and surface morphology of the olfactory epithelium in the freshwater teleost *Clupisoma garua* (Hamilton, 1822) – Fish. Aquat. Life 27: 122-129.

Abstract. The anatomical structure of the olfactory organ and the organization of various cells lining the olfactory mucosa of *Clupisoma garua* (Siluriformes; Schilbeidae) were investigated with light and scanning electron microscopy. The olfactory organ was composed of numerous lamellae of various sizes, radiating outward from both sides of the narrow midline raphe, forming an elongated rosette. Each lamella consisted of the olfactory epithelium and a central lamellar space, the central core. The epithelium covering the surface of the rosette folds was differentiated into zones of sensory and indifferent epithelia. The sensory part of epithelium was characterized by three types of morphologically distinct receptor neurons: ciliated receptor cells, microvillous receptor cells, and rod receptor cells for receiving olfactory sensation from the aquatic environment. The indifferent epithelium comprising a large surface area of the lamella, was covered with compact non-sensory cilia. The non-sensory epithelium contained stratified epithelial cells with microridges, mucin secreting mucous cells, labyrinth cells, and basal cells, which were arranged in a layer at the base of the epithelium. Various cells on the olfactory epithelium were correlated with the functional significance of the fish concerned.

Keywords: *Clupisoma garua*, olfactory mucosa, receptor neurons, chemosensation

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Introduction

The olfactory system in fishes is a notable sensory organ because it is essentially a chemoreceptor for detecting and identifying water-soluble compounds to collect information about the surrounding aquatic ecosystem. Smell is one of the most significant senses, and it drives basic patterns of behaviors in most teleosts such as foraging, alarm response, predator avoidance, social communication, reproductive activity, and homing migration (Gayoso et al. 2012). Olfactory discrimination depends mainly on the spatial placement of sensory receptor cells lining the olfactory mucosa. A large number of researchers have studied the various aspects of the olfactory organ of fishes (Sarkar and De 2011, Kuciel et al. 2013, Kim et al. 2014, Paschenko and Kasumyan 2015, Kim and Park 2016, Nikonov et al. 2017, Ghosh 2018, Malick et al. 2018). The teleostean olfactory organ displays numerous species variations especially in gross structure and size depending on the life style of species. Teichmann (1954) reported important information on chemoreception in fishes and ordered fishes into three categories: nose fishes, eye-nose fishes and eye fishes based on their ecological niches. Depending on the arrangement of the lamellae against the central axis, Yamamoto (1982) classified the olfactory rosette of fishes into eight