

## Short Communication

# Anatomical, histoarchitectural and topological studies on the olfactory organ of freshwater garfish, *Xenentodon cancila* (Hamilton, 1822)

Saroj Kumar Ghosh\*

Department of Zoology, Bejoy Narayan Mahavidyalaya, Itachuna, Hooghly-712 147, West Bengal, India.

**Abstract:** The olfactory structure of *Xenentodon cancila* (Hamilton, 1822) were explored by advancement in microtomy, staining and ultrastructural practices. The unique feature of the olfactory system was that the olfactory cavity, an open groove with an obtruding sole lamella, no rosette like organization. The lamella was constituted of the central core, lined on both sides by well-organized epithelium. The central core usually consisted of connective tissue fibres and blood capillaries. The epithelium exhibited compact cellular distribution and made up of receptor cells, supporting cells, lymphatic cells, inner most basal cells and almost never mucous cells. Morphologically specific two types of receptor neurons were recognizable: ciliated and microvillous, comprising sensory terminals. The cellular constitution of olfactory mucosa was explained with olfactory sensitivity of the fish necessitated.

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## Introduction

Olfaction is the crucial chemosensory channel, playing essential role in the behaviour of teleosts. It is involved in food finding, enemies' recognition, mate selection, parental behaviour, shoaling, migration and in many more approaches (Song, 1987). Olfaction is accomplished by olfactory receptor cells on the mucosal surface which remains directly exposure to surrounding aquatic environment (Singh et al., 1995). Among vertebrates, fishes exhibit considerable variations in the anatomical and morphological features of the olfactory organ as depicted by Kasumyan (2004), Hansen and Zielinski (2005), Ghosh (2012), Kuciel et al. (2013), and Oliver and Oliver (2019). Olfactory mucosa consists of a mosaic of sensory cells, classified as ciliar, microvillar, rod and crypt receptor neurons which have high particularity and sensitivity to chemical stimulation. In teleostean fishes, the structural specialization and function of olfactory organ is related to their ecological niche (Hara, 1994). The structural peculiarity of the olfactory organ in needlefishes has been attracted by researchers (Singh, 1972, 1977;

Theisen et al., 1980).

*Xenentodon cancila* (Hamilton, 1822) is a carnivorous silver needlefish, feeds preferably on insects, crustaceans and small fishes (Gupta and Banerjee, 2017). There is no report about the cellular details in the olfactory mucosa of Asian garfish. Thus an attempt has been taken to investigate the olfactory structure in *X. cancila* (Beloniformes: Belonidae) at the light and scanning electron microscopic level.

## Materials and Methods

**Collection of sample:** A total fourteen mature specimens of *X. cancila* (18.5-24.5 cm) were collected from Damodar River, nearby Jamalpur (23.061089°N, 87.992584°E) of Purba Bardhaman, West Bengal. The specimens were identified based on Misra (2003). Fishes were anaesthetized with 0.01% ethyl 3-aminobenzoate methanesulfonate (MS-222; Merck) solution and sacrificed following the protocol of the institutional animal ethics committee. The olfactory organs were dissected out precisely to display the position under a stereoscopic binocular microscope (Magnus MS24) and rapidly processed for histology

\*Correspondence: Saroj Kumar Ghosh  
E-mail: [saroj.fisherylab@gmail.com](mailto:saroj.fisherylab@gmail.com)