

## Original Article

# Histological characterization of the olfactory organ in Schilbid Catfish, *Clupisoma garua* (Hamilton, 1822)

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**Abstract:** Fishes have a good sense of smell and are able to ascertain odour with the help of a pair of olfactory organs connected to the olfactory lobes of the forebrain by means of olfactory tracts. The functional anatomy and structural characterization of olfactory organ in the freshwater Indian Catfish *Clupisoma garua* (Hamilton, 1822) was investigated by light microscopy. The paired well-developed olfactory organs were located in nasal cavity having two exterior apertures: incurrent and excurrent nares. The olfactory rosettes were elongated structure, possessed  $40 \pm 02$  lamellae on each side of the narrow median raphe. Histologically, each lamella consisted of two principal layers: an epithelium consisted of sensory and non-sensory cells and a central core, which was composed of connective tissues, nerve fibers and blood vessels. The sensory epithelium was composed of three types of receptor cells: two described as classical bearing cilia or microvilli and third bearing rod like dendritic terminal. Synapses between primary and secondary neurons were formed. The indifferent epithelium comprised the greater surface area of the olfactory lamella, was typified with ciliated non-sensory cells, secretory mucous cells, mast cells and supporting cells. Undifferentiated basal cells were scattered in the deeper part of the epithelium above the basement membrane. Organization of various cells on the olfactory epithelium was correlated with essential life process of the fish concerned.

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## Introduction

Olfactory organ in fishes is of primary importance because it is innately a chemoreceptor and performs an indispensable role in detection and location of food, recognition of sex, exposure of predators, parental behaviour and migration. Olfaction results from stimulation of the sensory receptor cells lining the olfactory mucosa, which is innervated by the olfactory nerve. A large number of researchers investigated diverse views of the olfactory organ of teleosts (Fishelson, 1995; Hansen and Zielinski, 2005; Sinha, 2008; Chakrabarti and Ghosh, 2009; 2010; Waryani et al., 2013, Kim and Park, 2016; Ghosh, 2018). Variation in the morphology of the olfactory organ correlates with the enormous diversity of life-styles among fish species, the long, divergent evolutionary history of primary aquatic vertebrates and their inferred actual ecological adaptations (Zeiske et al., 2009). The knowledge of the cellular organization of

the olfactory organs in schilbid catfish is almost unknown. Considering the dearth of information, the present study was undertaken to describe the morphology and histoarchitecture of the olfactory epithelium of *Clupisoma garua* (Siluriformes; Schilbeidae); a bottom dweller river catfish which feeds on mollusks, insects, small fishes and decaying matter (Talwar and Jhingran, 1991).

## Materials and Methods

This study used 16 samples of adult *C. garua* ( $17 \pm 1.57$  cm in total length), caught from the river Ganga at Kalyani, Nadia, West Bengal. The fishes were deeply anaesthetized with benzocaine (4 mg/L) and decapitated following the guidelines of the institutional animal ethics committee. The olfactory apparatus with the brain was dissected out under a Zeiss Stemi 2000-C stereoscopic binocular microscope and further processed for respective

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