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Original Article

The olfactory organ in the Gangetic catfish *Ailia coila* (Hamilton, 1822): structural and functional aspects

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Abstract

A study of the olfactory organ, with marked observation on cellular morphology of neuroepithelium was carried out in riverine catfish *Ailia coila* (Hamilton, 1822) using light and scanning electron microscopy. The elongated olfactory rosette within olfactory chamber was made up of 16 ± 2 leaf lets, the lamellae which connected laterally on the longitudinal central axis. The lamella consisted of two layers of epithelium enclosing the central core which contained connective tissue stroma along with blood vessels and nerve fibres. The epithelial lining displayed unequal compactness, was comprised of sensory receptor cells, undifferentiated basal cells, secretory mucous cells and two types of supporting cells differentiated as ciliated columnar or nonciliated oval type. Olfactory cells were identified by their staining emphasis, architecture, surface feature and distribution pattern in the mucosa. The surface of sensory epithelium was embossed with structurally distinct ciliated, microvillous and rod receptor cells for procuring olfactory stimuli from aquatic surroundings. The structural composition of the olfactory organ was dissertated with chemosensory system of the fish involved.

Keywords: *Ailia coila*; cellular feature; chemo sensation; microanatomy; olfactory epithelium

1 | INTRODUCTION

In fish, olfaction is the most significant chemical senses which carry through olfactory apparatus. This receptor organ is better flourished or specialised in nocturnal carnivorous fishes and those remain in dark aquatic habitat or in cloudy muddy surroundings. The sense of smell is concerned with feeding, predator avoidance, sex recognition, nest finding, migration and other behaviour of teleosts (Camacho *et al.* 2010). Receptor neurons of the olfactory lining are stimulated when they are touched with chemical cues carried through water and transmit signals directly to the central nervous system by the cranial nerve-I (Lara 2008). The structure and function of the olfactory organs in teleostean fishes has been previously reported by several researchers (*e.g.* Hansen and Zielinski 2005; Kudo *et al.* 2009; Chakrabarti and Guin 2011; Sarkar *et al.* 2014; Kim *et al.* 2016; Malick *et al.* 2018; Ghosh and Das 2020). In the face of differential ecological niche inhabited by fishes, the olfactory organs show variation at least morphologically and contain identical arrangement of olfactory cells (Datta and Das 1980). Olfactory lamellae are intensified in number gradually with the age in re-