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The Journal of Basic and Applied Zoology

RESEARCH Open Access

The olfactory organ of schilbid catfish *Eutropiichthys vacha* (Hamilton, 1822): morphological and ultrastructural studies

Saroj Kumar Ghosh

Abstract

Background: A study of the olfactory organ structure in freshwater catfish, *Eutropiichthys vacha*, was carried out to explore the cellular constituents by aid of light as well as scanning and transmission electron microscopy.

Results: The paired elongated olfactory organs were situated on the dorsolateral facet of the head in the mold of simple pits. The olfactory organ was made up of a series of leaflets, the lamellae, which embedded into both sideways of slender central raphe, forming a rosette distinguished with sensory and nonsensory areas. The sensory receptor cells were present on sideward surface and linguiform process of olfactory lamella while the rest of the portion of the lamella was lined with nonsensory epithelium. Olfactory cells were characterized by their staining intensity, outline, surface features, and comprehensive morphology in the epithelium. The sensory mucosa was defined by the occurrence of three types of neuron: classic types bearing either cilia or numerous microvilli and third type having rod-shaped architecture. The nonsensory epithelium was composed of mucous cells, labyrinth cells, mast cells, and two types of supporting cells categorized as ciliated or nonciliated. Basal cells lie deep in the olfactory lining, near the central core.

Conclusion: The structural components of the olfactory apparatus crucial for olfaction were correlated with the behavioral activities of fish.

Keywords: Bacha fish, Chemoreception, Olfactory epithelium, Histomicroscopy, SEM, TEM

Background

Smell is a significant sensory mediator to recognize the chemical cues and concerned with variant behaviors of fish. Survival in aquatic surroundings, usually deficient of light but abundant with dissolved substances, teleostei possess well-developed chemical sensors and signaling system (Hara, 1994a). Olfactory and gustatory are the main chemosensory pathways that allow the fish to sustain in an aquatic habitat. Sense of olfaction is typically discriminated as a distance chemical receptor with high sensitivity and selectivity while gustation is basically a connection or close territory sense with limited sensitivity (Hara, 1994b). Olfactory taste and chemical information are detected by the sensory terminals of receptor cells in the olfactory organ which transmit signals directly to the central nervous system by the olfactory tract. The olfactory organ plays an essential role in the lives of fishes such as food finding, predator avoiding, parental caring, migration, propagation, and reproduction (Nikonov et al., 2017). Macroscopic and microscopic features of the olfactory organs association with ecological compatibility are reported in different teleostean fishes (Ghosh, 2019; Hamdani & Døving, 2007; Kasumyan, 2004; Kim et al., 2016; Malick et al., 2018; Miyasaka et al., 2013; Pashchenko & Kasumyan, 2015; Sarkar et al., 2014). Wide diversity occurs in the olfactory organs of teleosts due to disparities in their habit and habitats. The bottom of nasal cavity is lined by epithelium which is thrown up into lamellae comprising

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