Abstract

Mastacembelus armatus (Lacepède, 1800) is a common spiny eel of South East Asia. The olfactory apparatus of *M. armatus* is studied under microscope to explore different subcellular elements of sensory components in relation to neurogenesis and neural degeneration, supported by macroanatomy, microanatomy, 3D surface topography analysis, transmission electron microscopy (TEM), TEM based energy dispersive X- ray microanalysis (EDX) respectively. The comparative analysis of variable subcellular elements has been correlated with the functional bioaccumulation of heavy metals within subcellular compartments of sensory cells. Apart from that this research contribution also addresses olfactory dysfunction of fish with various aspects of neural degeneration, effects heavy metal pollution respectively in lieu of variable neural diseases of higher vertebrates *viz*., Parkinson's, Alzheimer's, Huntington's, incidental Lewy Body disease, *etc.*