Immunohistochemical investigation of innervation in Papilla regions of Petromyzon marinus

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Degree of Innervation in Papilla Regions of *Petromyzon marinus*

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Poster presentation

Safeguarding Healthy Great Lakes: Sea Lampreys are an invasive species of the Great Lakes; they are responsible for declines in lake trout populations since their introduction in the 1920's, and pose an ecological and economic threat to the Great Lakes region. Currently, sea lamprey control applies a mixed tactics approach of barriers, traps and lamprey specific toxins, which have produced insufficient results. A strategy based on targeting chemoreception systems can provide a more effective approach, with the overarching goal of using chemical signals to bring the spread of sea lampreys under control.

Abstract

Sea Lampreys are an invasive species of the Great Lakes; they are responsible for declines in lake trout populations since their introduction, and pose an ecological and economic threat. Current sea lamprey control systems apply a combination of approaches including the use of barriers, traps and lamprey specific toxins, which have produced insufficient results. A strategy based on targeting chemical sensory systems can provide a more effective approach, with the overarching goal of using chemical signals to bring the

spread of sea lampreys under control. Like other aquatic species, sea lampreys rely predominantly on chemical detection systems like smell and taste, to navigate their surroundings and behave in an adaptive fashion. One of the chemosensory systems, the diffuse chemosensory system, is comprised of solitary chemosensory cells (SCC), which are specialized epithelial cells that morphologically and biochemically resemble taste cells. Understanding the structural organization of nerve fibres in regions containing solitary chemosensory cells can provide new insights about their function, and allow the detection and recording of electrophysiological signals coming from papillae regions. Using markers for nerve fibres and solitary chemosensory cells, we were able to observe innervation in the epithelia of four identified SCC regions in the sea lamprey. We conclude that nerve fibres extend far into the epithelium, where the solitary chemosensory cells are located, in all four papilla-containing regions. Using this knowledge we can target the diffuse chemosensory system to manipulate lamprey behavior in favor of population control.