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Immunohistological identification of crypt cells in differing freshwater fish

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Immunohistological identification of crypt cells in differing freshwater fish

Fish rely on their sense of smell (olfaction) to produce appropriate behavioural responses such as feeding, mating, and migration in relation to odourants encountered in their environment. Nestled within the nostril of the fish is the olfactory epithelium which contains different olfactory sensory neuron receptors that bind to and obtain information from odourants once contact occurs. The olfactory sensory neurons are intermingled together and include ciliated & microvillous olfactory neurons and the crypt cells which all send axonal projections into higher brain structures producing a relevant behavioural response; the crypt cell is the least understood olfactory sensory neuron currently under investigation but a role in sexually mature fish has been suggested. Crypt cells have been visualized by immunocytochemistry against the calcium binding S100 protein in fish; thus, this immunohistological technique was implemented to visualize the distribution of crypt cells in the olfactory epithelium in an array of wild and hatchery raised freshwater fish including Chinook & Atlantic salmon, goby, and dace species. S100 positive cells have been observed in all of the different species with differing and similar morphological features between these labeled cells and known crypt cells. This is significant in providing an understanding of the spatial organization of the olfactory system in non-model species and to further comprehend how fish use their olfactory system to assist with behaviours critical to survival, fitness, and successful reproduction which is essential in maintaining healthy sustainable populations contributing to fisheries economically by commercial or recreational avenues.