Chem. Senses 35: 89, 2010 doi:10.1093/chemse/bjp106

IN THIS ISSUE

Articles Highlighted

Crypt Cell Development in Sturgeons

Page 147

Like other vertebrates, fishes use olfactory cues to trigger important behavioral patterns including migration, alarm reaction, reproduction, and feeding. Besides ciliated and microvillous olfactory receptor neurons, fishes possess a third type of olfactory receptor neurons that is absent in higher vertebrates, the crypt cells. They are ovoid cells without dendrites that show few short cilia and apical microvilli as well as name-giving crypt-like invaginations. Crypt cell functions have not yet been identified. They have not even been observed in sturgeon embryos raising the question as to whether crypt cells develop along with other olfactory receptor neurons or appear later at juvenile stage. Based on optical and electron microscopy, Camacho et al. present a comprehensive study on the development of crypt cells in sturgeons from hatching to the time when the animals start feeding. The data show that crypt cells are present in the sensory epithelium from the first few posthatching days. The authors also discovered cells that show some but not all properties of crypt cells. They conclude that these cells are immature crypt cells in which the crypt, the final decisive morphological differentiation, has not yet formed.

Molecular Receptive Ranges of Human Bitter Taste Receptors

Page 157

Humans perceive thousands of compounds as bitter but possess only ~25 genes encoding bitter taste receptors (TAS2Rs) raising the question as to how the vast array of bitter chemicals can be detected by such a limited number of sensors. Meyerhof et al. addressed this question by challenging all 25 TAS2Rs expressed in heterologous cells with 104 natural or synthetic bitter substances. Nineteen TAS2Rs detected ~80% of the compounds with some receptors being sensitive to only one or few compounds but the majority to numerous, chemically diverse substances. Thus, 3 receptors recognized about 30% of the bitter chemicals each and together ~50%. Vice versa, 50% of the compounds stimulated only one receptor, whereas the other half activated 2–9 or even 15 TAS2Rs. The data suggest that the perception of the numerous bitter chemicals is related to the molecular receptive ranges of TAS2 bitter taste receptors.

Lrmp/Jaw1, a Candidate Regulator of Type III Inositol Trisphosphate Receptor in Sweet, Bitter, and Umami Taste Cells

Page 171

Inositol trisphosphate–calcium signaling is a crucial part of sweet, bitter, and umami signal transduction; yet, modulators of this pathway have, with the exception of calcium- and integrin-binding protein 1, not been identified in taste cells. In their attempt to isolate genes involved in taste signal transduction, the authors found mRNA of the gene for lymphoid-restricted membrane protein Lrmp/Jaw1 in a subset of taste bud cells of all 3 types of lingual chemosensory papillae. Double label in situ hybridization revealed this mRNA to be colocalized with that for transient receptor potential channel M5, a marker of cells expressing sweet, bitter, or umami receptors. Immunohistochemistry colocalized Lrmp/Jaw1 with type III inositol trisphosphate receptor known to be present in the very same cells. In heterologous expression assays, Lrmp/Jaw1 associated with the type III inositol trisphosphate receptor via its coiled-coil domain in the membrane of the endoplasmic reticulum. The present data suggest that Lrmp/Jaw1 regulates inositol trisphosphate–calcium signaling in taste cells that transduce sweet, bitter, or umami stimuli.

Wolfgang Meyerhof