Contribution of oral Sensory Receptors to Palatability

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Summary
The oral cavity is the entrance of the digestive system, and its most important function is ingestion to maintain life. Palatability improves quality of life (QOL), and palatability is a complex sensation involving all sensory modalities. Thus, proper functioning of all sensory receptors is needed for palatability. In the present review, I focused on the development of two types of sensory receptors in the oral cavity: periodontal mechanoreceptors that recognize the texture of food, and gustatory receptors. The periodontal ligament, a dense collagenous tissue between tooth and alveolar bone, contains nociceptive free endings and mechanoreceptors, in particular, Ruffini endings. Periodontal Ruffini endings consist of expanded axon terminals and specialized Schwann cells, called terminal Schwann cells. Unlike cutaneous Ruffini endings, periodontal Ruffini endings lack collagenous encapsulation. The morphological maturation of periodontal Ruffini endings is closely related to tooth eruption: the terminal arborization of the periodontal Ruffini ending of the incisor takes place after the eruption of incisors, and is completed shortly after the commencement of the molar occlusion. Reduction of occlusal forces cause the morphological alterations of the periodontal ligament, thus proper mechanical stimulation is required for development and maintenance of periodontal Ruffini endings. The development of taste buds in the oral cavity is not homologous; taste buds with distinct taste pores are found at the late prenatal period in soft palate, while lingual taste buds mature after birth. RT-PCR analysis of gustatory epithelium of rodent circumvallate papilla revealed mRNAs of molecules related to reception of the five basic tastes begin to be expressed prenatally: mRNAs for molecules contributing sweet and umami reception express earlier (at embryonic day 16) than those related to acid, salt and bitter reception (E18).
I hope that this review provides further direction for research on palatability, and encourages the readers of this issue to further research in the development of palatability.