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Basic Science Question:

How do salivary glands function?

Report:

In order to begin discussion on the function of salivary glands, it is helpful to first introduce the major glands and their respective secretions. The three major salivary glands in the human oral cavity include the parotid glands, submandibular gland, and sublingual gland. The Parotid glands are responsible for roughly 20% of the total saliva secreted in the mouth which is composed exclusively of serous fluid. This type of saliva is thin, aqueous, and contains amylase which aids in the chemical digestion of carbohydrates. The submandibular gland secretes the greatest volume of saliva out of all three glands, roughly 65%. This saliva is a mixture of serous fluid and mucous, a thicker substance that aids in lubricating the mouth. The sublingual gland, only responsible for about 5% of total secretion, also secretes a mixture of serous fluid and mucus. However, the majority of this saliva is mucus.

Salivary glands are innervated by the autonomic nervous system which ultimately controls most of the salivary output in the oral cavity. Stimulation of the glands by either the sympathetic or parasympathetic nervous system increases the amount of saliva produced, although it is much smaller during sympathetic stimulation. During parasympathetic stimulation, acetylcholine binds to M1 and M3 receptors on acinar cells and causes the release of high flow, fluid rich saliva that travels through ductal cells and into the mouth. In contrast, sympathetic stimulation of beta-adrenergic receptors on acinar cells produces a thicker, low flow saliva. Parasympathetic innervation is high during times of resting as well as eating. Therefore, this high flow saliva released by parasympathetic stimulation is important in wetting the bolus and beginning chemical digestion of food in the mouth. Reflex pathways that include receptors such as olfactory, gustatory, and mechanoreceptors also control the release of saliva in the mouth. For example, upon mastication, mechanoreceptors on the periodontal ligament will send signals to salivary centers of the brain that will induce salivary secretion. The same is true during smelling, taste, and pain.

References:

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