

Chapter 4

Applied Physiology of the Parotid Gland

ABSTRACT

The major function of salivary glands is the production of saliva, which performs many functions including lubrication of the food bolus, maintaining the oral cavity pH within 6 to 7, maintaining teeth integrity, fighting bacteria, aiding taste and digestion, and providing a continuous lavaging biofilm for the oral cavity. Saliva is actively produced in high volumes relative to the mass of the salivary glands and is almost completely controlled extrinsically by both parasympathetic and sympathetic divisions of the autonomic nervous system. Some researchers used bilateral tympanic neurectomy for patients with ptyalism (drooling) with good initial results. Others advocated bilateral parotid duct rerouting ± bilateral submandibular gland excision for long-term treatment of drooling. Intra-glandular Botulinum toxin may also have good results for patients with hyper-sialorrhea. Most resting salivary gland flow arises from the submandibular glands and surgery should focus on this gland to control uncontrolled sialorrhea.

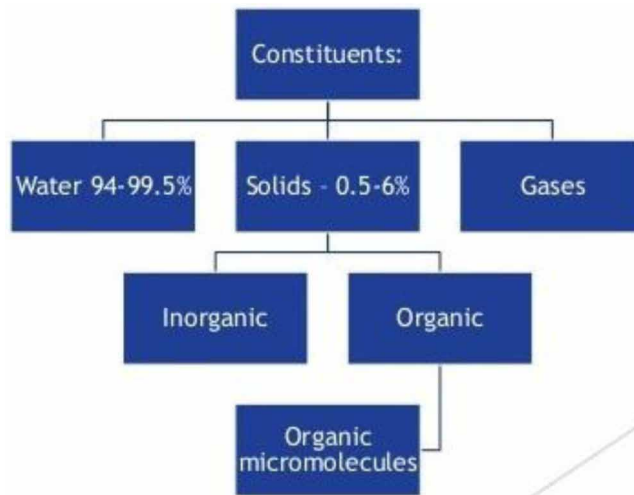
CONSTITUENTS (COMPOSITION) OF SALIVA

Saliva contains both inorganic and organic compounds and is characterized by its high volume compared to salivary gland weight, high potassium concentration, and low osmolarity (Figure 1). The large relative volume of

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saliva production is due to its high secretion rate, which can go up to 1 ml/g of salivary gland/minute.

Figure 1. Constituents of saliva secreted by the parotid gland



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Saliva is mostly hypotonic to plasma due to the fact that reabsorption of Na^+ and Cl^- is greater than the secretion of K^+ and HCO_3^- within the salivary ducts.

Several organic compounds present in saliva include α -amylase, lingual lipase, mucus, lysozymes, glycoproteins, lactoferrin, and the IgA secretory piece. Saliva is also comprised of the organic *blood group antigens* A, B, AB, and O. *Kallikrein* is secreted by the salivary glands during increased metabolic activity. Kallikrein enzymatically converts plasma protein into bradykinin, a vasodilator, in order to increase blood flow to the glands. Saliva contains approximately one tenth the total amount of protein as that found in plasma.

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