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Composition, Properties and Secretion of Human Saliva

Babu M.^{1*}, Ashok K.¹, Nivedhini V.² and Gautham B.²

¹Department of Microbiology and Biotechnology, School of Basic Sciences, Bharath Institute of Higher Education and Research (BIHER), Chennai, Tamil Nadu, India

²Department of Biochemistry, Sree Balaji Medical College and Hospital, Bharath Institute of Higher Education and Research (BIHER), Chennai, Tamil Nadu, India

**Corresponding Author*

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Abstract: Saliva has one of the important functions in the body. It must make it easier to taste and identify nutritional meals in the body, while also protecting mucosa from infection with the always-present bacteria in the mouth. These functions are achieved by a complicated structure and multifarious physical characteristics. The protein and ion components turn a solution consisting of 99% water into a viscoelastic solution that is able to perform many different functions, such as lubrication and antibacterial treatments, protect teeth from dissolving, facilitates the digestion and taste. This review discusses the brain control of fluid, protein and ion secretion of salivary secretion, some of the components and physical features of saliva and tries to link them with the functions of saliva.

Keywords: Saliva, Salivary gland, Cholesterol, Protein, Mucin

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Introduction

Human saliva has a buffering capability to protect the teeth from demineralisation, which is important to keep pH values in the oral environment over the critical pH of hydroxyapatite. The salivary amylase enzyme works on cooked (polysaccharides) starches and transforms them into maltose disaccharide. Depending on the flow rate, the pH varies between 5.4 and 7.5. The faster is the saliva flow, the greater is the pH. The best pH for effect on salivary amylase is 6.8 (Petti and Scully, 2009).

Minerals in Saliva:

Saliva comprises more than 99 per cent of water and protects the body against tooth decay and gum disease (Schenkels *et al.*, 1995). The saliva's minerals are the same as those in the teeth, which means that saliva assists teeth to heal. Stimulation of the saliva may neutralise acids and demineralize the teeth more often.

Chemical and Physical Properties:

It is described that human parotid saliva has produced a highly purified phosphoprotein

(formerly known as protein C). Protein C was chemically and physically characterised and protein C's qualities were compared to the relative protein A features. Protein C comprises 83% of the total residues of glycine, proline and dicarboxylic amino acids, with 2.0 mol of p/mol protein, most often phosphoserine. The protein has 1.2% glucose, and does not include hexosamine (Champatray *et al.*, 2015).

The ultracentrifugation molecular weight is 16300. The existence of polypyrrolone structure does not exhibit circulatory dichroism or nuclear magnetic resonance and no conformational change is detectable in the submandibular and parotid saliva under a range of C proteins, but only a partial identification of A and C proteins occurs. It is envisaged that the C-terminus of protein would be supported by an extra length of peptide at the location of the difference between protein A and C (Carpenter, 2013).

Compositions:

Saliva is the combined secretions of the salivary glands and the tiny mucus glands. Saliva is a water-containing fluid of 99.5% and solids of 0.5%. Cell components are yeast cells, bacterial cells, protozoa, leukocytes polymorphonuclear, epithelial desquamate, etc. NaCl, KCl, sodium, acid and alkaline phosphate, CaCO₃, calcium phosphate, thiocyanate and potassium are around 0.2 per cent of inorganic salts. Thiocyanate is rich in saliva of smoker. The organic content of saliva is about 0.3%. The enzymes are ptyalin, lipase, carbohydrase, phosphatase and lysozyme.

Mucin, amino acids, cholesterol and vitamins are additional organic substances in small amounts in the saliva. Also organic ingredients in saliva are the soluble particular blood group compounds which have the same properties as agglutinin in the erythrocyte. The A, B, O and Lea materials have been shown in human beings. They are 10 to 20 mg per litre in saliva (Carpenter, 2013; Riedlinger *et al.*, 2020). Gases are also present-- 1 ml of oxygen and 2.5 ml of CO₂ per 100 ml of saliva. The buffers are bicarbonates,

phosphates and proteins. Thiocyanate (KCNS) is an excretion product which consists of cynogen-derived protein radicles in the body. This development is a detoxification process for harmful cyanides and is therefore an example of protective synthesis. It provides a deep brown colour with ferric chloride (Keremi *et al.*, 2017).

The saliva works on plasma protein for the production of a chemical called kallidin or bradykinin which has an enzyme kallikrein. This causes salivary gland vastness in the secretion (Butterworth *et al.*, 2011).

Cholesterol:

Cholesterol is a complex secondary monohydrous alcohol that is an essential part of the class of sterols. Its waxes are made of fatty acids (Mehansho *et al.*, 1987). It is stable in water but quickly soluble in chloroform, ether; alcohol and other fatty solvents. The crystals, with one corner broken off, have a rhombic or rectangular form. Cholesterol is used to absorb high volume oil emulsions when combined with fats and oils. This sterol is rich in nerve tissue and is a poor electric conductor.

Karjalainen *et al.* (1997) have reported that in men saliva cholesterol level (1.36 ± 0.85 $\mu\text{mol/l}$) is higher than women (1.06 ± 0.64 $\mu\text{mol/l}$). Eom *et al.* (2020) have developed a simple enzyme-based electrochemical biosensor which can detect salivary cholesterol.

Urea:

It has been reported that there is a steady concentration of urea in saliva at 30 per cent, when the plasma value flow rate surpasses 1 ml/min/gland. Plasma urea approaches fluid levels of 0.3 ml/min with the salivary urea. In circumstances of increased permeability of the canal wall owing to inflammation, radiation etc., this dependent urea gradient will eventually disappear (Mese and Matsuo, 2007).

Protein:

In the production of many proteins, salivary

glands play an active role. Abnormal proteins, such as tumour growth and nutritional deficiencies, are also generated under extraordinary situations. The α -amylase is the exocrine secretion. The proline-rich proteins, immunoproteins and growth factors – are other components. The latter two are predominantly generated in the ductules, as in the treatment of glycoproteins. The transepithelial pathway is used by other compounds such as certain blood protein and steroids (Soares Nunes *et al.*, 2015).

The mucins are largely founded by the sublingual and the numerous smaller glands, which play an essential part in oral activities. Inherited mucin disorders will cause major health issues. These diseases are recognised for cystic fibrosis (Schumacher *et al.*, 2013). In secretion granules with specific membrane properties, the condensed protein chains are kept. Unresolved inclusions occur in saliva as 'spherulae.' The milky looks in the resting saliva and rises of enhanced sodium reabsorption can be attributed to these spherulas (Abduljabbar *et al.*, 2020). The specific acinar role of secretory protein production, storage and discharge is primarily influenced by the nervous system (Anilkumar and Monisha, 2012). Such automatic disruption of the neurological system quickly leads to decomposition often overcome by aberrant storage and acinar enlargement. The clinical impact of the enlargement in parotid or submandibular areas of the entire gland is bilateral (Abduljabbar *et al.*, 2020).

Incidents of hunger and acinar breakdown and degeneration of acinar cells occur at low amylase concentrations. In case of anomalous water loss of ductal water, high α -amylase and full protein is predicted. In addition, acute gland irritation caused by the large glandular leakage leads to increased plasma and urine amylase (Chen, 2015).

Bicarbonate:

In the oral cavity, bicarbonate is a major buffer system. The reabsorption occurs largely in the course of the intralobular duct. Typically, low

levels of bicarbonate and low sodium occur. However, low levels are seen in combination with low levels of sequestration, when sodium is abundant, such inflammation or radiation incidents. No acid-base balance was observed (Beale *et al.*, 2017) with the exception of severe circumstances.

Conclusion

The saliva contains a multitude of constituents. The multi-functionality of salivary proteins has also hindered the study of each protein's function. This intricacy is still probably essential so that we can eat as many things as possible. More and more experts are examining the roles of saliva in food. Further analyses may assist to determine why food preferences are so diverse and how choice varies while age is growing.

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