

IMPORTANCE OF SALIVARY PROTEINS AND ENZYMES IN ORAL CAVITY - A REVIEW

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ABSTRACT

Saliva is a bio-fluid that has both specialized and contains physical, chemical, and biological characteristics that have a potential to protect dental health. Saliva contains various proteins and enzymes where it plays a major role in disease identification. Any change in the quality or quantity of the saliva can lead to disease condition in the oral cavity and is vice versa. Despite the fact that saliva has been researched extensively as a medium, very few labs have found this and used as an alternative diagnostic aid in place of blood. In this review we, mainly concentrated on the significance of several salivary proteins and enzymes and their characteristic features present in saliva.

KEYWORDS: Saliva, proteins, enzymes, diseases, oral cavity.

INTRODUCTION

Simple, unassuming fluid called saliva is crucial to a fundamental and important element of human health. An awareness of what has been lost makes it possible to live with insufficient amounts of this vital and complicated fluid.^[1] A number of homeostatic, behavioural, sensory,

and hedonistic elements can have an impact on the complicated process of eating. The way food is perceived in the mouth cavity is one of the key factors affecting dietary preferences and decisions. Saliva helps in this food chewing and taste mechanism.^[5]

TOTAL VOLUME OF SALIVA IN EACH GLAND

Gland	Secretion type	Components
Parotid	Serous	Amylase, Proline-rich-proteins, Agglutinins, Cystatins, Lysozymes, Extra parotid glycoproteins, Na,Ca,Cl,PO4,K, IgA (1)
Sublingual	Mucous	Mucins(MG1,MG2), Lysozymes, Na Ca,Cl, PO4, Amylase, IgA (1)
Submandibular	Mixed	Cystatins,Na,Ca,Cl,PO4,K,Amylase,IgA,Mucin,MG1(1)
Palatine	Mucous	Na,Ca,Cl,PO4,K, Amylase, Cystatins, IgA (1)

SALIVARY FUNCTIONS

- In conjunction with tooth mastication, saliva is helps with preparation of food.
- Protects oral cavity from minor pathogens.
- Moisturizes oral cavity.
- Helps in chewing, mastication and deglutition.

Although evidence this salivary amylase plays a relatively small function in the digestion of carbohydrates, it is a significant component of the parotid secretion and is also detectably present in submandibular fluid. In food retentive areas only does the oral cavity successful conversion of starch to maltose occur, which predominantly helps the plaque bacteria.^[8]

DIGESTIVE FUNCTIONS OF SALIVA

99% of the substance in saliva is water. It moistens dried foods and helps when chewing and bolus production. High glycosylated mucosal glycoprotein, lubricate the food and bolus make swallowing easier. Proteases, lipases, glycohydrolases are just a few of the enzymes found in saliva that start the limited ingestion of food substance. Numerous enzymes found activity come from sources other than the salivary gland.^[7]

Protective functions of saliva

Only the mouth has mineralized tissues that are exposed to the outside world, such as the enamel crowns of teeth. The teeth crowns do not obtain this protection after they have grown in to their final position. Saliva's buffering systems, which helps to neutralize acids and the salivary protein that bind to the surfaced of enamel to create the enamel pellicle, which protects enamel from acids are both crucial activities in their regard. Saliva is extremely

saturated with calcium and phosphate & its proline content is high.^[7]

In addition to helping to keep these electrolytes in solution, statherin also transports calcium to the surface of the enamel. So that it can rematerialize together with the pellicle proteins that have been adsorbed, there is a balance between demineralization and remineralization that prevents teeth from becoming decalcified & minimizes abrasive damage from food mastication.^[7]

Other functions of saliva

By acting as a diluent for pleasant chemicals, saliva may also help in other ways of tasting. Patients with xerostomia frequently experience a decrease of taste sharpness. One protein, once known as gustin. But now known as carbonic anhydrase VI, has been linked to taste perception. When the mouth becomes dry, saliva causes a thirst perception, aiding in the maintenance of bodily hydration. Primarily in the areas of behavior, social interaction & sexuality, which are visible in animals but may have almost disappeared in humans.^[7]

Hormone functions

The polypeptide hormone classified as an epidermal growth factor and human urogastrone are similar. Stomach cytoprotection and suppression of stomach acid output are two of urogastrone's main characteristics.^[8]

PELLICLE AND PLAQUE FORMATION

There are several different ways that saliva affects the deposition and activity of supragingival plaque. It is primarily engaged in the first stage of plaque development & this generated pellicle is actively involved in the second stage of formation, which is bacterial colonization.^[8]

PLAQUE MINERALIZATION AND CALCULUS FORMATION

A function is played by salivary proteins such as esterase, pyrophosphates and may be acid phosphatase. Saliva is used for calcium crystals, high quantities of salivary proteins (Glycoproteins) have been seen in those who frequently produce calculi.^[8]

CORRELATION BETWEEN SALIVA AND DENTAL CARIES

Due to vulnerable host, oral bacteria and high fermentable carbohydrates in the diet and an unbalanced mineralization of the tooth surface and the presence of nearby plaque causes interaction results in dental cavities development.^[9]

One of the acute and advancing forms of dental disease is early childhood caries. It also addressed as nursing caries or baby bottlesyndrome, is a clinical syndrome that affects infants and young children.^[2]

A significant public health issue is dental caries; all age groups are affected by dental caries, which significantly reduces people's quality of life and overall health.^[4]

1. PH and buffering systems were also raised by the increased flow rate.
2. Increased calcium and phosphorus content.
3. Greater ammonia concentrations.
4. ATP and fructose diphosphate are present in large amounts.
5. Increased bacterial O² absorption and aldose activity.
6. Elevated opsonin activity.
7. A rise in all around antibacterial activity.
8. Increased antibacterial activity specially against lactobacilli and streptococci.
9. Greater percentage of undamaged leukocytes.
10. Differing ratios of leukocytes to epithelial cells.^[8]

VARIOUS PROTEINS IN SALIVA

- Proline rich proteins
- Salivary mucins
- Lactoferrin
- Immunoglobulins
- Histatin
- Alpha and beta defensin
- Lysozyme
- Statherin
- Calprotectin
- Interleukins
- CD14 and CD63
- Various enzymes in saliva
- Amylase (Alpha Amylase)
- Lysozyme
- Lactoperoxidase
- Alkaline phosphatase
- Carbonic anhydrase
- Lactate dehydrogenase
- Glucosyltransferase B.^[2]

SALIVA AS DIAGNOSTIC AID

For many years, there has been a persistent hope that tests using saliva instead of blood may aid in non invasive diagnosis. Only if a blood component could be transferred across the salivary gland epithelium according to its concentration in blood could this happen. This holds free for the unbound steroid hormones, glucose and urea. Saliva has only proven effective as a concentration monitoring tool for a small number. The glandular cells consume glucose, which is present in saliva at a concentration of about tenth of that in the plasma, which is too low for simple detection.^[8]

CONCLUSION

A vital component of excellent health is saliva, that unassuming, versatile, multipurpose fluid. Since its absence is portrayed as a persistent source of increasing pain.^[1] A significant biochemical markers of periodontal inflammation may include salivary mucin, amylase and total protein.^[3]

The preservation of dental health and enamel protection for teeth are both aided by various salivary processes. Many salivary proteins are thought to be crucial for preserving the dentition's integrity and overall dental health. The relationship between the presence of these proteins and tooth caries has been examined in several research. Only a small number of studies have suggested a potential connection between a specific salivary protein or set of proteins and the presence of caries.^[9]

Hyposalivators reduced volume may be accompanied by a contemporaneous alteration in the makeup of their leftover saliva. In order to reestablish the damaged protective barrier, it may be necessary to use saliva replacements to fill in the gaps left by the mucosal pellicle and remaining saliva.^[10]

Dentists need to pay more attention to their patients' salivary function and use more disciplined preventative measures to lessen the impact of diminished salivary flow.^[8]

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