**SALIVA**

The body produces around 1.5 litres of saliva every day and it plays a vital role in **lubricating** food, digestion and protecting the oral environment.

**Constituents of saliva**

Saliva is made up from several components in varying concentrations:

* **Water**
* **Electrolytes** – sodium and chloride ions are usually at a lower concentration than the plasma (hypotonic). Potassium, calcium and iodide ions are usually at a higher concentration than plasma (hypertonic)
* **Bicarbonate** – present at a higher concentration than in plasma to maintain an alkaline environment
* **Bacteriostats**– chemicals that prevent the multiplication of bacteria. These include lysozymes, lactoferrin, immunoglobulin A as well as salivary lactoperoxidase.
* **Mucus-**aids to moisten food contents and eases swallowing.
* **Enzymes** – salivary amylase, lingual lipase and kallikrein (helps to produce bradykinin-> a vasodilator)

Composition of Saliva:

It consists of three main components –

1. Water: 99.5%
2. Organic Substances
3. Inorganic Substance

Organic Substances:

**Proteins**: Alpha Amylase, Maltase, Lingual Lipase, Immunoglobulin, Agglutinin, Other polypeptides – Proline rich protein, Slatherins, Cystatins, Histatins

**Immunoglobulins**: IgG – 1.5 mg/100 ml, igM – 0.2 mg/ml from crevicular fluid, igA comprises of 90% of the total with 20 mg/100 ml.

**Non- Immunologic Protein**: Antibacterial Proteins – Lysozymes, Lactoferrin, Sialoperoxidase, Glycoproteing (MG1 and MG2), Von Ebner’s gland protein, Secretory leucocyte proteinase inhibitor, Chitinase, Calprotein, chromogranin.

Other Organic Compounds:

**Urea** – 12-20 mg/100ml – Hydrolyzed by bacteria with release of Ammonia, Rise in pH

**Glucose**: 0.5 – 1mg/100ml – Too low for bacterial growth, increase in D.M

**Vitamins**: Water soluble vitamins

**Free Amino Acids**: Below 0.1 mg/100ml, too low to provide nutrient source for bacterial growth

Inorganic Substances

* Sodium
* Bicarbonate
* Calcium
* Chloride
* Fluoride
* Phosphate
* Potassium
* Thiocynate

**Cells:**

* Epithelial cells
* Leucocytes – Polymorphs, Lymphocyte, Monocyte
* Bacteria: Facultative and Obligatory
* Yeast and Protozoa
* Amoeba Salivaris

**Gases**: Oxygen, Nitrogen, Carbon Dioxide

* **Salivary glands**
* There are three paired salivary glands that are responsible for the production of saliva, the submandibular glands, the sublingual glands and the parotid glands. They are all ducted, **exocrine** glands.
* Each of the glands produces a slightly different secretion. The parotid glands produce **serous** saliva: a watery secretion that is rich in enzymes. The secretion from the sub-lingual glands is known as **mucous** saliva; a viscous secretion containing no enzymes and large amounts of mucus. Finally the sub-mandibular glands produce a **mixed** secretion,that is both serous and mucous.

|  |  |
| --- | --- |
| **Salivary gland** | **Proportion of total saliva secreted** |
| Submandibular | 70% |
| Parotid | 25% |
| Sublingual | 5% |

**Functions of contents of Saliva:**

**Salivary Amylase** is one of the most important components of Saliva which acts as an amylolytic which starts the Digestion of Starch in the mouth, the rest of which is completed in the Lower Gastro Intestinal tract. The rest of the digestion is completed by Pancreatic amylase

**Maltase**: It helps in converting maltose into glucose

**Immunoglobulins**: Saliva consists of IgG, IgM and IgA out of which IgA is the most predominant. IgA helps in reducing bacterial growth by binding to specific bacterial antigen, affects specific enzymes essential for bacterial metabolism and inhibits bacterial colonization.

**Lysozymes**: It acts as anti bacterial by attacking the cell wall component or lysis of the cell wall, it is seen to act on Streptococci mutans. It is seen in new born babies as well giving pre-eruptive antimicrobial function.  Gram-negative bacteria are resistant to this enzyme because of the lipopolysaccharide layer.

**Lactoferrin**: It acts as bacteriostatic as it reduces the amount of free iron in the blood which is required for metabolism.

**6.2-7.6 with 6.7 being the average pH**

**SEMINAL FLUID**

**Secretion:**

Semen, also called seminal fluid, fluid that is emitted from the male reproductive tract and that contains sperm cells, which are capable of fertilizing the female’s eggs. Semen also contains liquids that combine to form seminal plasma, which helps keep the sperm cells viable.

In the sexually mature human male, sperm cells are produced by the testes (singular, testis); they constitute only about 2 to 5 percent of the total semen volume. As sperm travel through the male reproductive tract, they are bathed in fluids produced and secreted by the various tubules and glands of the reproductive system. After emerging from the testes, sperm are stored in the epididymis, in which secretions of potassium, sodium, and glycerylphosphorylcholine (an energy source for sperm) are contributed to the sperm cells. Sperm mature in the epididymis. They then pass through a long tube, called the ductus deferens, or vas deferens, to another storage area, the ampulla. The ampulla secretes a yellowish fluid, ergothioneine, a substance that reduces (removes oxygen from) chemical compounds, and the ampulla also secretes fructose, a sugar that nourishes the sperm.

**7.2-7.6 with 6.7 being the average pH.**

**URINE**

**Composition of Urine**

Urine is made up of different products like 95% water and 5% nitrogenous waste. These nitrogenous wastes including urea, ammonia, creatinine are excreted in the urine. Along with that other substance like potassium and sodium is also present in the urine.

**A normal adult excretes daily from 1000 ml to 1800 ml of urine. The average is 1500 ml containing 60 gm. of solids.**

**The mixed sample of normal urine in 24 hours has a pH 6.0. Individual samples vary from 4.6 to 8.0.**

****