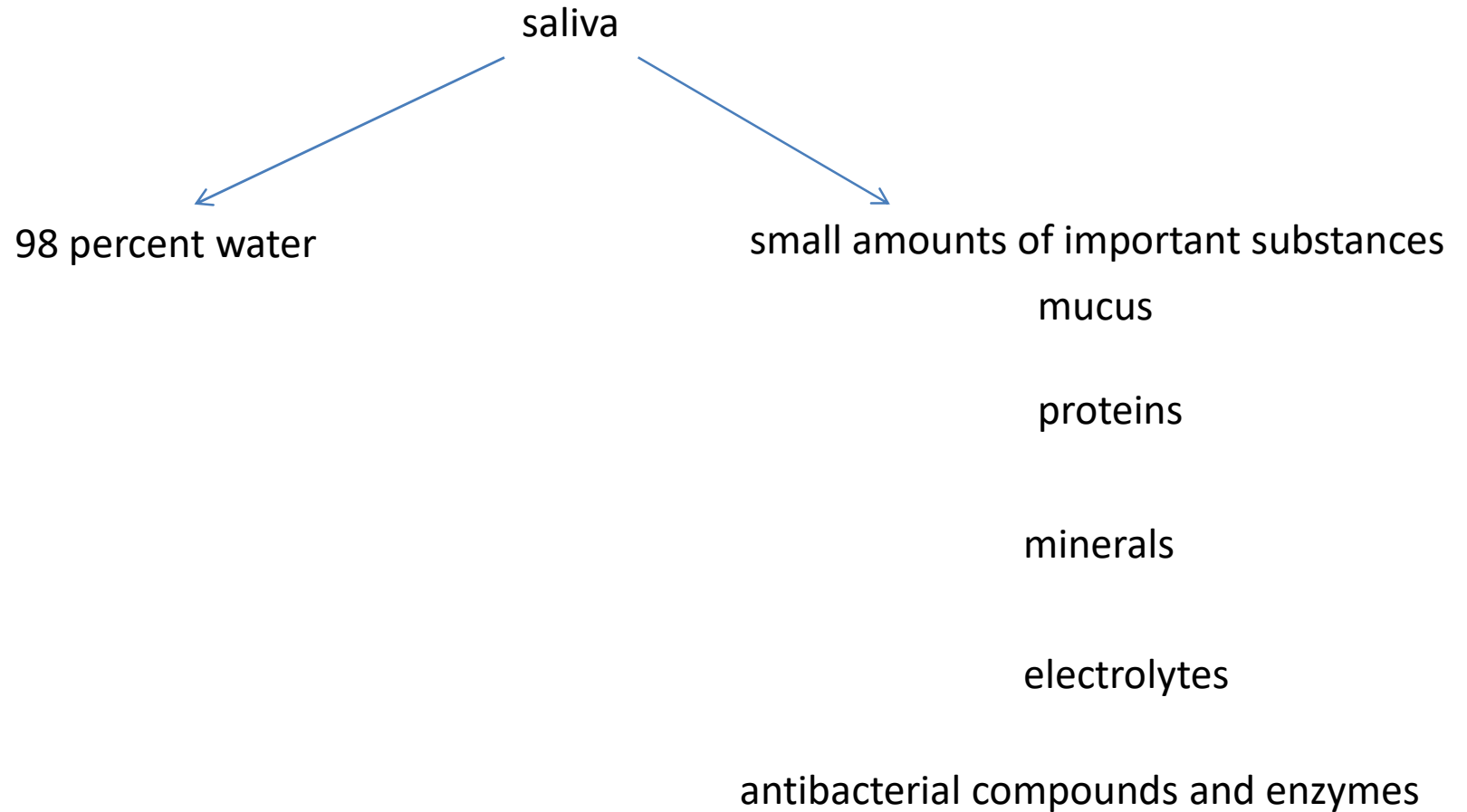


The importance of living metal ions in saliva and teeth



Saliva is an important part of a healthy body

- protects against gum disease
- tooth decay
- oral infections
- neutralizes acids
- Remineralization When acid damages enamel, saliva repairs the tooth's protective surface

Chemical composition of teeth

96 wt.% inorganic materia

4 wt. % organic material and water

enamelin proteins

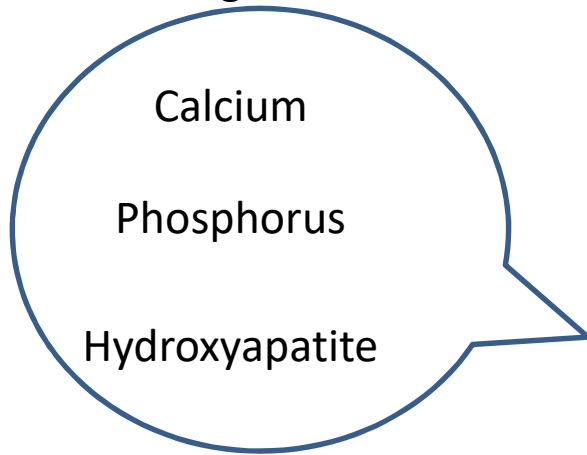
Calcium

Phosphorus

Hydroxyapatite

70 wt.%

Other element 30 wt. % Na, Cl and Mg



FLUORINE

F

9

18.998



NON-STICK PANS



Fluorine is found in Teflon (poly(tetrafluoroethene)) which is used to make non-stick cookware.

REACTIVE



Fluorine is the most reactive element – it even forms compounds with some noble gases.

TOOTHPASTE



Fluoride compounds such as tin(II) fluoride are added to toothpastes to prevent tooth decay.

Fluoride

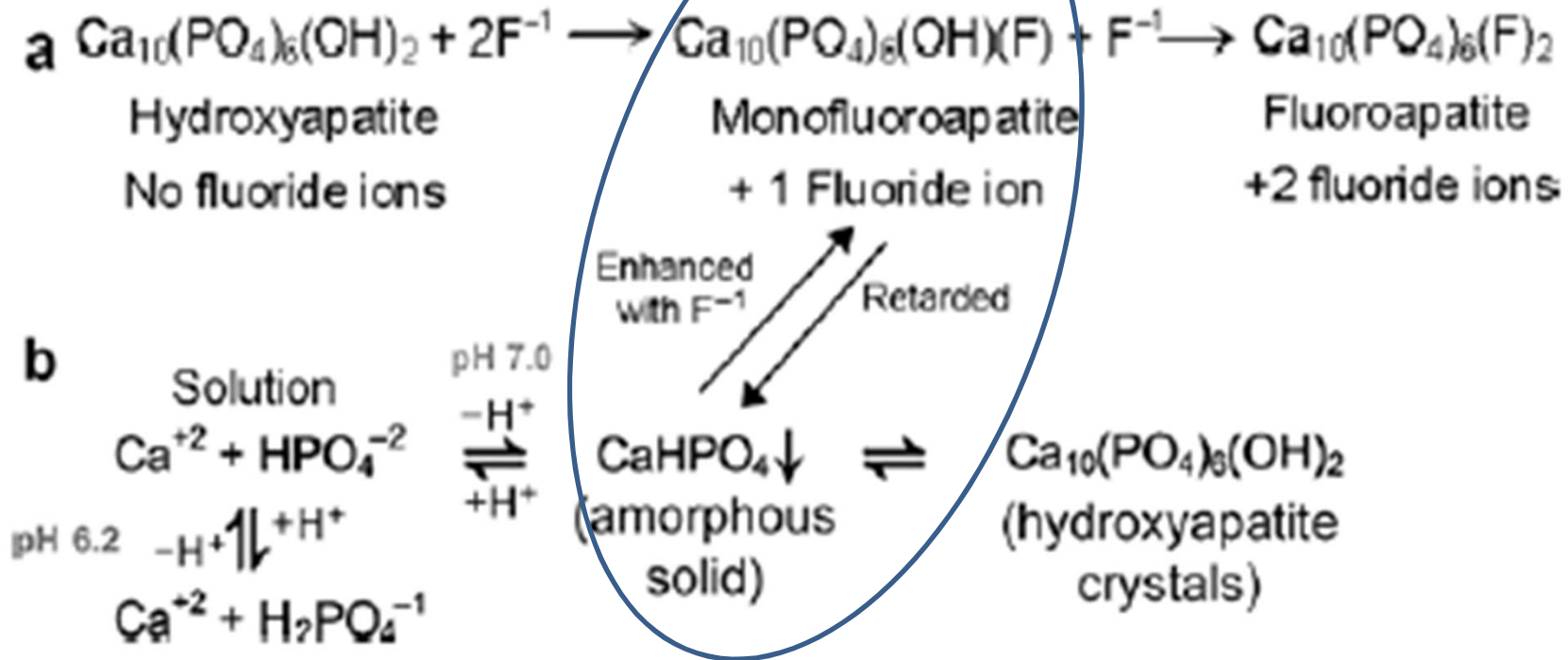
- ❖ Fluoride is the ionic form of the element fluorine.
- ❖ Fluoride is a mineral found throughout the earth's crust and widely distributed in nature.
- ❖ Found in soils rich in fluorspar, cryolite, and other minerals.

1 µg fluoride/mL (1 part/million) in the water provides caries protection with minimal enamel fluorosis

Mechanisms of Fluoride Protection from Caries

slows the transformation to amorphous calcium monohydrogen phosphate.

Inhibits lactate production.



fluoride ions have two effects on enamel that protect from caries:

1. they slow enamel dissolution in lactic acid
2. promote its re-precipitation and crystallization when the lactic acid is neutralized.

Summary of Anti-Caries Activity of Fluoride.

- Fluoride prevents demineralization.
- Fluoride enhances remineralization.
- Fluoride alters the action of plaque bacteria.
- Fluoride aids in post-eruptive maturation of enamel.
- Fluoride reduces enamel solubility.

Fluoride prevents demineralization

- Formation of fluorohydroxyapatite (FAP).
- Inhibition of mineral loss from enamel.

Fluoride enhances re mineralization

- formation of a fluoride reservoir.
- creation of supersaturated solutions.

Fluoride alters the action of plaque bacteria

- At low pH, fluoride combines with hydrogen ions and diffuses into oral bacteria as hydrogen fluoride (HF)
- Inside the cell HF dissociates, acidifying the cell and releasing fluoride ions
- Fluoride ions inhibit glycolysis
- As fluoride is trapped inside the cell this becomes a cumulative process