

Enzymes

Enzymes :- are proteins catalyst for chemical reaction in biological system .

Catalysts :- substances that accelerate chemical reactions.

Enzymes catalyst specific reaction , they are produced by living organisms and usually present in small amount in various cells , they can also exhibit their activity when they have been extracted from the source .

The main important feature of enzymes is the highly specificity i.e. they are selective for certain substrate or to group of enzymes
general properties of enzymes.

General properties of enzymes :-

1-All enzymes are protein .

2-Enzymes accelerate the reaction , but :-

a. not altering the reaction equilibrium .

b. being required in small amount .

c. being not consumed in over all reactions.

3-They have a high power for catalysis .

4-They are highly specific for their substrates .

5-They active sites at which interaction with substrates takes place

6-Enzymes catalytic activity involves the transformation of enzyme – substrate complex as an important intermediate in their action

Enzyme + substrate \longrightarrow enzyme – substrate complex
~~enzyme + product .~~

7-Certain enzymes required for their action one or more non – protein compound ants , they are called " Co enzyme or Cofactor "

Complete enzyme = Apo enzyme + Co enzyme
(protein part) (non-protein)

Factors altering enzyme activity :-

- 1-Concentration of enzyme .
- 2-Concentration of substrate .
- 3-Contact between enzyme and substrate .
- 4-Concentration of product .
- 5-PH.
- 6-Temperature .

Classification of enzyme :-

According to the international unit of biochemistry (I.U.B) there are six classes of enzymes which are :-

a-Oxides - reductases :- catalyze oxidation and reduction reaction like oxidase .

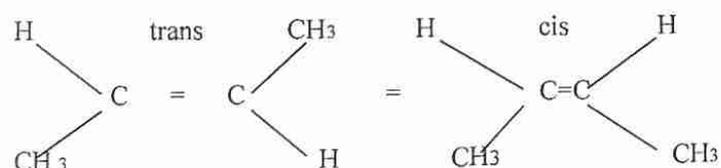
b-Transferees :- catalyst transfer of some group from one molecule to another .

c-Hydrolyses :- catalyze the hydrolysis of substrate by addition of water molecule .

an acyl choline + H₂O = choline + antacid

d-lysases :- catalyze the addition or remove of groups from substrate without hydrolysis.

e-Isomerases :- catalyze the conversion of compound in to isomer



f-lidases :- catalyze formation of bonds or linking molecules together .

Important enzymes in clinical "biochemistry"

Alkaline phosphates (ALP)

The ALP enzyme is present in practically many tissues especially liver and bone which secrete this enzyme into the blood stream .

Normal value of it = 3----13k.A.U/100ml (King Armstrong unit/100ml of serum)

Clinical significance :-

Serum ALP estimations are of interest in the diagnosis of two groups of conditions :-

1-Hepatobiliary disease :- in these diseases ALP levels increase like in obstructive jaundice may reach to 30 IU/100ml .

2-Bone disease :- is associated with high serum ALP levels such as Paget's disease ,rickets .

Amino transferase (GOT , GPT)

GOT = Glutamate Oxaloacetate transaminase also called aspartate transaminase (AST)

GPT= Glutamate pyruvate transaminase also called alanine transaminase (ALT)

Both GOT & GPT are present in human plasma , bile , cerebrospinal fluid (CSF).

GOT is present a greatest concentration in cardiac muscle , liver , skeletal muscle and kidney .

GPT is present a greatest concentration in liver , but other tissues such as kidney , heart also have lower concentration.

Clinical significance :-

GOT estimation is of great interest in three groups of disease :-

- 1-heat disease – cardiac damage , myocardial infarction .
- 2-liver disease – viral hepatitis , liver cancer ,cirrhosis .
- 3- muscle diseases - muscular dystrophy .

N.V of GOT = 2-----20 I.U/L

GPT is the more liver – specific enzyme ,its level increase in hepatitis and liver disease in general .

N.V of GPT=2-----15 I.U/L

Amylase

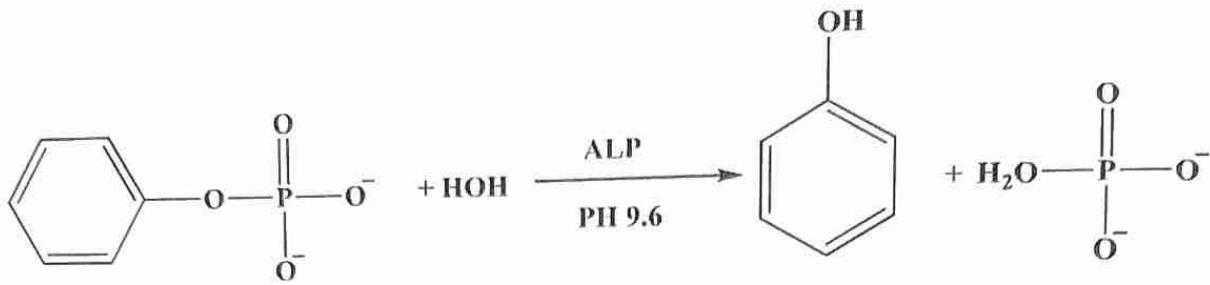
Amylase is synthesize in three human origins , pancreas is the major producer of amylase , then salivary gland & liver in which production is small .

N.V of amylase = 60 -----180 unit /100 ml of serum .

Clinical significant :-

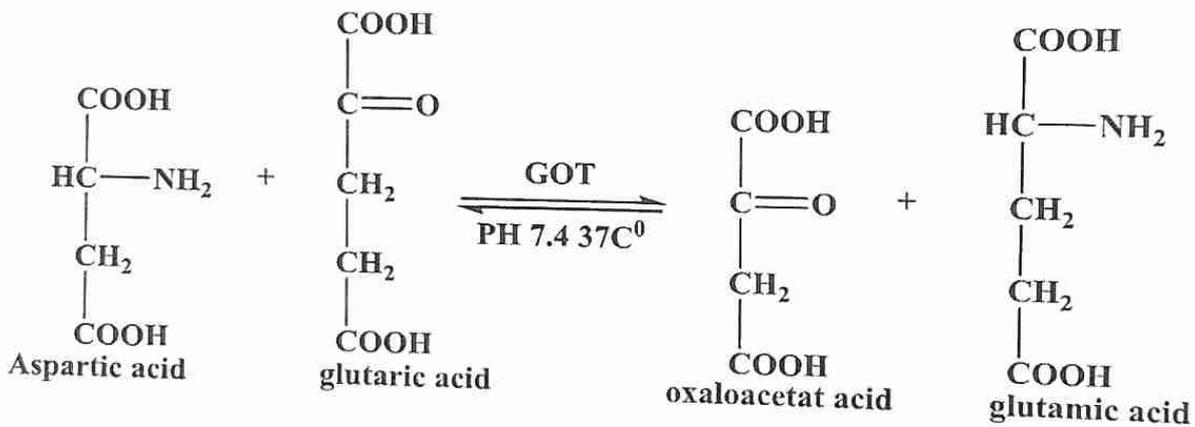
- 1-Amylase level increase in acute pancreatitis .
- 2-Mumps and peptic ulcers .

s. alkaline phosphatase



phenyl phosphate

S. GOT



S. GPT

