www.sureshkumarbio.wordpress.com

# ENZYME

## DEFINITION

Proteins which act as biological catalyst that speed up biochemical reactions in the cell.

## TYPES

1. Intracellular enzymes
-formed and used within the cell
Example
-the enzyme inside the erythrocyte:

$$CO_2 + H_2O \underset{}{\overset{\text{Carbonic anhydrase}}{\rightleftharpoons}} H_2CO_3$$

2. Extracellular enzymes
-produced in the cell and used outside the cell
Example
-the enzyme that digest starch in the mouth:

$$\text{Starch} \overset{\text{Salivary amylase}}{\rightleftharpoons} \text{maltose}$$

## FACTORS THAT AFFECT

1. Temperature
-low temperature: enzymes not active
-high temperature, above 40°C, enzymes not active as bonds startto break
-above 60°C, enzyme molecule bonds break completely. Enzymes denature.

2. pH
-enzymes are sensitive to the changes in pH values
-different enzymes have different optimum pH values.
Example:
Amylase……..nearly neutral
Pepsin and Rennin…….acidic
Trypsin…….alkaline

3. Enzyme concentration
-if enzyme concentration is more than substrate concentration: Rate of reaction increases

5. .Substrate concentration
-if substrate concentration is more than enzyme concentration: Rate of reaction decreases

## GENERAL CHARACTERISTICS

1. made of protein
2. produced in living cells
3. only required in small quantities
4. not changed at the end of reaction
5. not damaged at the end of reaction
6. specific: usually one enzyme for one substrate
7. substrate: the molecule that enzyme reacts with
8.can react in two direction
Example:

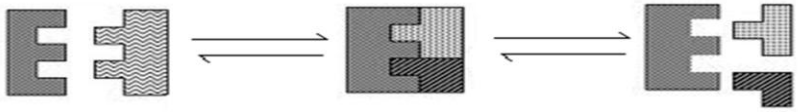
$$\text{Starch} \overset{\text{amylase}}{\rightleftharpoons} \text{maltose}$$

9. name usually ends with 'ase'
Example: sucrose, maltase, lipase
But some do not, example rennin, pepsin, trypsin

## USES

1. Protease
-tenderisation of meat in meat Industries
2. Lipase
-removal of organic stains in biological detergents
3. Ligninase
-removal of lignin from pulp in paper industries
4. Rennin
-coagulant in cheese production in dairy industries
5. Trypsin
-pre digests baby food
6. Pectinase
-clarifies fruit juices
7. Amylase
-converts starch into glucose and various syrups
8. Cellulase
-used to break cell wall of the sea weeds to extract agar

## ACTION MECHANISM

Known as Lock and Key Hypothesis

Enzyme Substrate Enzyme –substrate complex Enzyme Products