

NOMENCLATURE & CLASSIFICATION OF ENZYMES

**UG-05
SEMESTER-3RD**

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ENZYMES

- ⦿ *Enzymes can be defined as biological polymers that catalyze biochemical reactions.”*
- ⦿ Biological catalysts which speed up the rate of reaction without becoming part of the reaction but themselves cannot initiate any chemical reaction
- ⦿ Enzymes are biological polymers which catalyse biochemical reactions
- ⦿ Enzymes help organisms by carrying out chemical processes effectively and precisely even under low-stress circumstances.

SYSTEMATIC NAME

- ⊙ According to the International union Of Biochemistry an enzyme name has two parts:
 - First part** is the name of the substrates for the enzyme.
 - Second part** is the type of reaction catalyzed by the enzyme. This part ends with the suffix “ase”.

Example: Lactate dehydrogenase

CHARACTERISTICS OF ENZYMES

- Enzymes are catalytically active proteins that take part in several activities.
- Enzymes play a major role in the cell's metabolic activities and other chemical reactions.
- The enzymes reacting molecule is called as substrate and convert substrate into other distinct molecules, or products.
- Enzymes regulates different life processes in living organisms at cellular level.

CLASSIFICATION OF ENZYMES

Formulated by the enzyme commission of I.U.B six major classes based on the type of reactions catalyzed

1. Oxidoreductases

- Catalyzing oxidation reduction reactions

2. Transferases

- Catalyzing group transfer

3. Hydrolases

- catalyzing hydrolytic breakdown

4. Lyases

- Catalysing removal of groups by mechanism other than hydrolysis and leaving behind double bonds

5. Isomerases

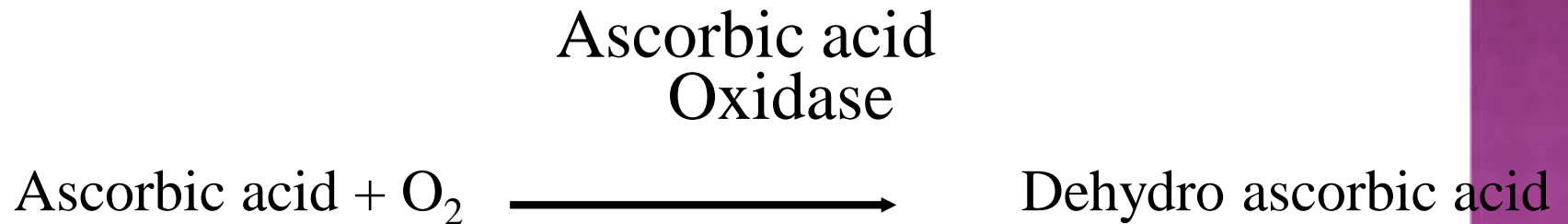
- Catalysing interconversion of isomers

6. Ligases

- Catalysing formation of bonds and new compounds

CLASSIFICATION OF ENZYMES

1. Oxidases. Catalyzing oxidation of the substrate and atomic oxygen acts as recipient of hydrogen e.g.
Ascorbic acid oxidase, Cytochrome oxidase, Tyrosinase



TRANSFERASES

Phosphotransferases. Catalyzing transfer of phosphate group to substrates e.g. Hexokinase, glucokinase

2.7.1.1 ATP D hexose 6 phosphotransferase [Hexokinase]

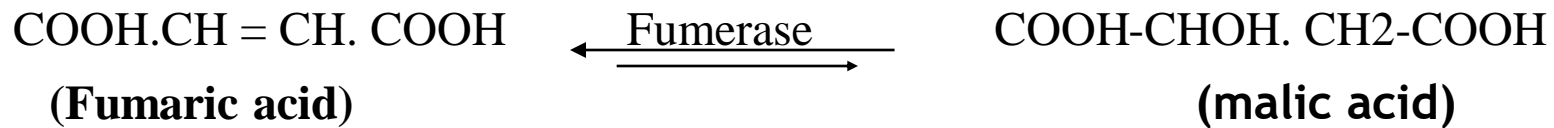
ATP + Glucose Hexokinase \rightarrow ADP + D-Glucose -6-P

Acetyltransferase. Catalyzing transfer of acetyl group to substrates e.g. choline acetyltransferase

Acetyl-CoA + Choline \rightarrow CoA + Acetyl- Choline

4. LYASES

- Catalysing reactions in which groups are removed without hydrolysis leaving a double bond or add groups to already existing double bonds.



5. ISOMERASES

- Involved in inter conversion of pair of isomeric compounds

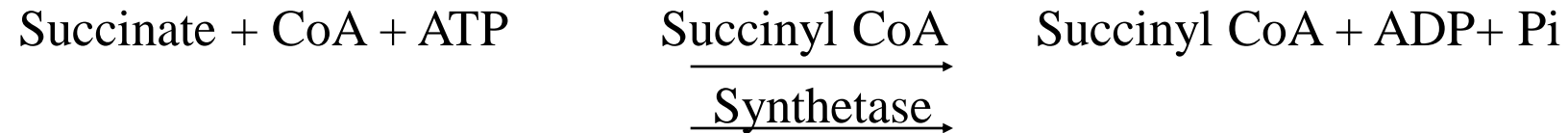
- Glucose 6. P $\xrightleftharpoons{\text{Phosphoglucos mutase}}$ glucose I.P

- Glucose 6.P Phosphohexose isomerase Fructose 6.P

- All trans retinene $\xrightarrow{\text{Retinene Isomerase}}$ 11- CIS retinene

6. LIGASES

- Catalyze reactions in which linking together of two molecules occur coupled with the breakdown of a high energy phosphate bonds like ATP, GTP



EXAMPLES OF ENZYMES

- **Lipases:** This family of enzymes aids in the breakdown of lipids.
- **Amylase:** Amylase aids in the conversion of carbohydrates to sugars in the saliva
- **Maltase:** This substance, which is also found in saliva, converts the sugar maltose into glucose.
- **Trypsin:** This enzyme converts proteins into amino acids.
- **Lactase:** This enzyme converts lactose, a milk sugar, into glucose and galactose.
- **Helicase:** DNA is unravelled by helicase enzymes.
- **DNA polymerase:** This enzyme produces DNA from deoxy ribonucleic acid

SUMMARY

- Enzymes play a major role in daily life to sustain plants or any living organisms.
- They play a crucial role in functioning several life processes.
- They can function at optimum PH and temperatures.
- Enzymes are substances that are found in little amounts in cells and have the ability to catalyse or speed up chemical reactions so that they happen quickly enough to support life by the regulation of various physiological and metabolic reactions.

Thank you