

Enzyme Definition and Classification

Definition

An enzyme is a protein or RNA produced by living cells, which is highly specific. Enzymes are a very important type of macromolecular biological catalyst. Most biochemical reactions in organisms can also be carried out efficiently and specifically by enzymes.

Nomenclature

The nomenclature of enzymes is derived from their substrates or the reaction they catalyze, with a suffix '-ase' added as a suffix. Enzymes can be indexed with letters and numbers according to the International Union of Pure and Applied Chemistry (IUPAC) system. In Molecular Biology, the letter EC plus four numbers representing four levels of classification are used. Enzymes are classified according to the mechanism of enzymatic reaction.

Classification

According to the type of reactions that the enzymes catalyze, enzymes are classified into six major classes: oxidoreductases, transferases, hydrolases, lyases, isomerases, and ligases. Among these, hydrolases are the most abundant forms of enzymes. Individual enzymes are named based on the chemical name of the substrate and its reaction mechanism.

| Enzyme class | Reaction type |
|-------------------------------------------------------|------------------------------------------------------------------------------------|
| EC 1 Oxidoreductases (/resource/Oxidoreductase- | $A_{\text{red}} + B_{\text{ox}} \rightleftharpoons A_{\text{ox}} + B_{\text{red}}$ |

| | | |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|
| EC 2 Transferases (/resource/Transferase- Introduction_20.html) | $A-B + C \longrightarrow A + B-C$ | Catalyze the transfer or e groups among some sub |
| EC 3 Hydrolases (/resource/Hydrolase- Introduction_21.html) | $A-B + H_2O \longrightarrow A-H + B-OH$ | Accelerate the hydrolysis |
| EC 4 Lyases (/resource/Lyase- Introduction_22.html) | $A-B \rightleftharpoons A + B$ (reverse reaction: synthase) | Promote the removal of substrate to leave a dou catalyze its reverse react |
| EC 5 Isomerases (/resource/Isomerase- Introduction_23.html) | $A-B-C \rightleftharpoons A-C-B$ | Facilitate the conversion isomers or optical isome |
| EC 6 Ligases (/resource/Ligase- Introduction_24.html) | $A + B + ATP \longrightarrow A-B + ADP + P_i$ | Catalyze the synthesis o into one molecular com energy |
| EC 7 Translocases (/resource/Enzyme- Definition-And- Classification_42.html) | | Catalyze the movemen across membranes or t membranes |

According to the unified classification principle of enzymes published by the International Soc
group of enzymes in the above seven categories can be further divided into several subgroup
characteristics of the functional groups or bonds in the substrates. In order to show the proper
reactants more accurately, each subclass is further divided into subclasses and directly contain

Moreover, on the basis of the molecular composition, enzymes can be divided into pure enzy
enzymes containing only protein are called pure enzymes. Binding enzymes are composed of
when the two components are combined, can the enzyme have catalytic activity.