Enzyme Types

There are six fundamental types of enzymes. Lyases catalyze bond cleavage (typically C-C, C-N, or C-O) through elimination, which leaves double bonds or rings. Hydrolases also catalyze bond cleavage, but do so through the addition of water across the bond (one side gets an OH while the other side gets an H). Transferases catalyze the transfer of a group (i.e. methyl) from one compound to another. Isomerases catalyze structural or geometric changes within a molecule, in essence reordering the molecule. Oxidoreductases catalyze oxidation and reduction reactions in molecules. Finally, ligases catalyze the joining of two molecules, typically coupled with the hydrolysis of a phosphate bond from ATP. Almost all enzymes can be classified into these six categories, which are based on the types of reactions they catalyze. Kinases are a notable exception, which catalyze the phosphoryl transfer reaction from a phosphate donor to a receiving molecule.



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Characteristics

Lyases
Laser breaking 007-Bond
Lyase enzymes typically catalyze the breakdown of chemical bonds through a double bond or ring formation.

Hydrolases
Hydrant-laser breaking 007-Bond
Hydrolase enzymes catalyze the hydrolysis of chemical bonds. They cleave bonds by adding water.

Transferases
Trans-farmer Transferring-asses
Transferase enzymes catalyze the transfer of a group from one compound to another compound, such as methyl, phospho or glycosyl groups.

Isomerases
Ice-Smurf switching blocks
Isomerase enzymes catalyze the structural rearrangement of isomers. Isomers are compounds with the same molecular formula but different structural formulas, and isomerases convert a molecule from one isomer to another.

Oxidoreductases
Ox-dough to Red-duck
Oxidoreductase enzymes catalyze oxidation and reduction reactions. This is the transfer of electrons (e-) from the oxidized molecule to the reduced molecule. Common names include dehydrogenase, reductase and oxidase.

Ligases
Lion-tiger-ass
Ligase enzymes catalyze the joining of two larger molecules by forming a chemical bond.

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