Dr. Minakshi Kumari

P.G. Dept. Of Zoology,

Maharaja College, ARA.

P. G. Sem-II

Zoology, (CC-7)

Unit -IV,

Enzyme Biochemistry

Nomenclature of enzymes :

The nomenclature of enzymes is derived from their substrates or the catalyzed chemical reactions, and "ase" is usually added as a suffix. Enzymes can be indexed with letters and numbers **according to International Union of Biochemistry and Molecular Biology:** the letter EC plus four numbers representing four elements. The first number represents enzymes that are classified according to the mechanism of enzymatic reaction. Enzymes are usually named according to the reaction they carry out.

To generate the name of an enzyme, the suffix -ase is added to the name of its substrate .

- (e.g., lactase is the enzyme that cleaves lactose.)
- or the type of reaction (e.g., DNA polymerase forms DNA polymers).

1. Based on the type of reaction catalysed (followed by the suffix -ase).

- Dehydrogenase
- Protease
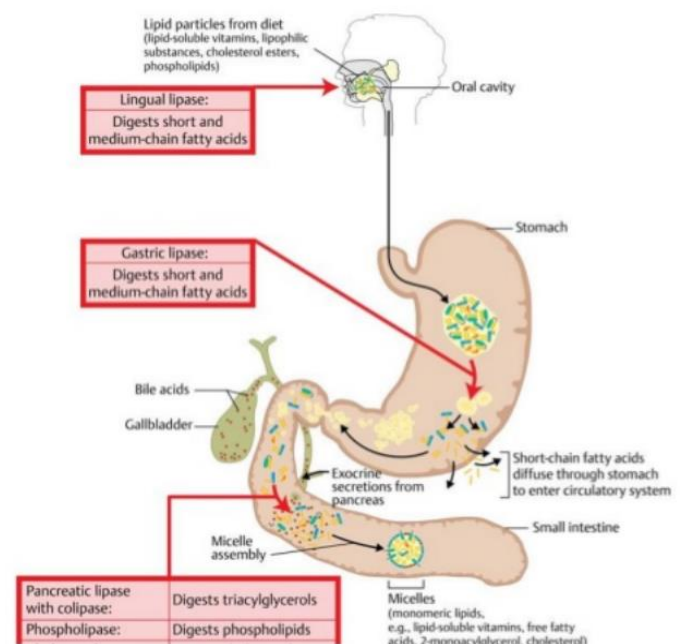- Isomerase
- Reductase
- Transferase

2. Based on the nature of substrate

- Glucokinase
- Hexokinase
- Xanthine oxidase
- Alcohol dehydrogenase
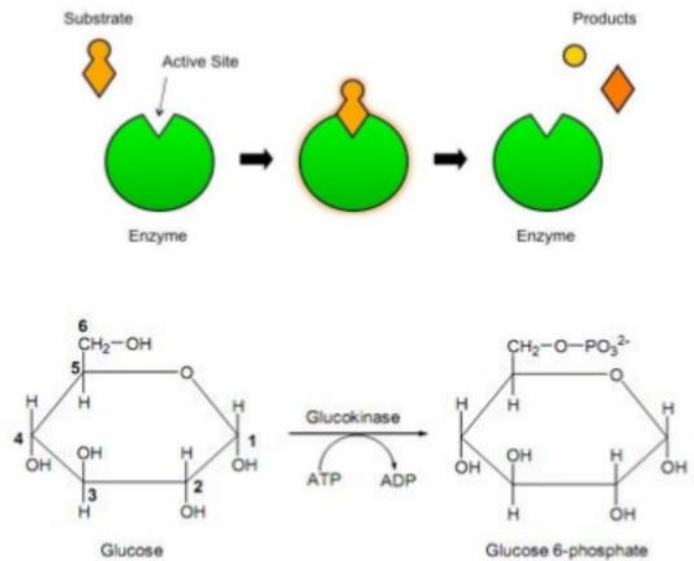
3. Based on the source of enzyme

- Pancreatic lipase
- Gastric lipase
- Salivary amylase
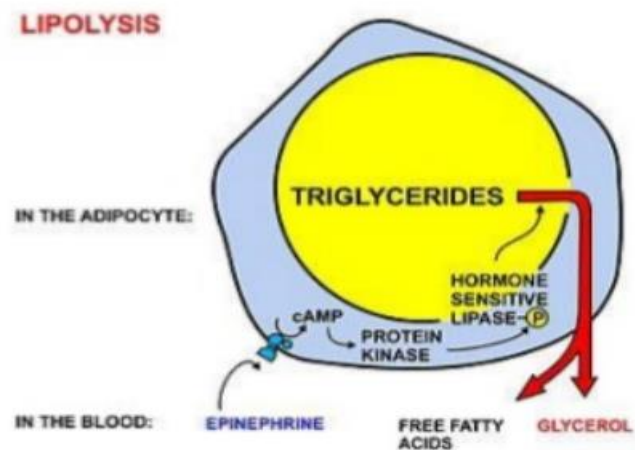- Muscle phosphorylase
- Hepatic phosphorylase

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4. Based on its regulation
 	
- Hormone specific lipase
 	
   Random names
 	
   • Trypsin
 	
   • Pepsin
 	
   • Thrombin
	LIPOLYSIS
	
	IN THE ADIPOCYTE:
	
	TRIGLYCERIDES
	
	HORMONE SENSITIVE LIPASE-Ⓟ
	
	cAMP PROTEIN KINASE
	
	IN THE BLOOD: EPINEPHRINE FREE FATTY ACIDS GLYCEROL

Classification of Enzymes :

According to the type of reactions that the enzymes catalyze, enzymes are classified into **seven categories,** which are oxidoreductases, transferases, hydrolases, lyases, isomerases, ligases, and translocases. Oxidoreductases, transferases and hydrolases are the most abundant forms of enzymes. Individual enzyme classes are further classified systematically based on the chemical name of the substrate and its reaction mechanism.

The 7 major classes of enzymes with some important examples from some subclasses are described below:	
1. Oxidoreductases	5. Isomerases
2. Transferases	6. Ligases or Synthetases
3. Hydrolases	7. Translocases
4. Lyases	

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                         ┌─── Oxidoreductases
                         │
                         ├─── Transferases
                         │
                         ├─── Hydrolases
                         │
         Enzymes ────────┼─── Lyases
                         │
                         ├─── Isomerases
                         │
                         ├─── Ligases
                         │
                         └─── Translocases
```
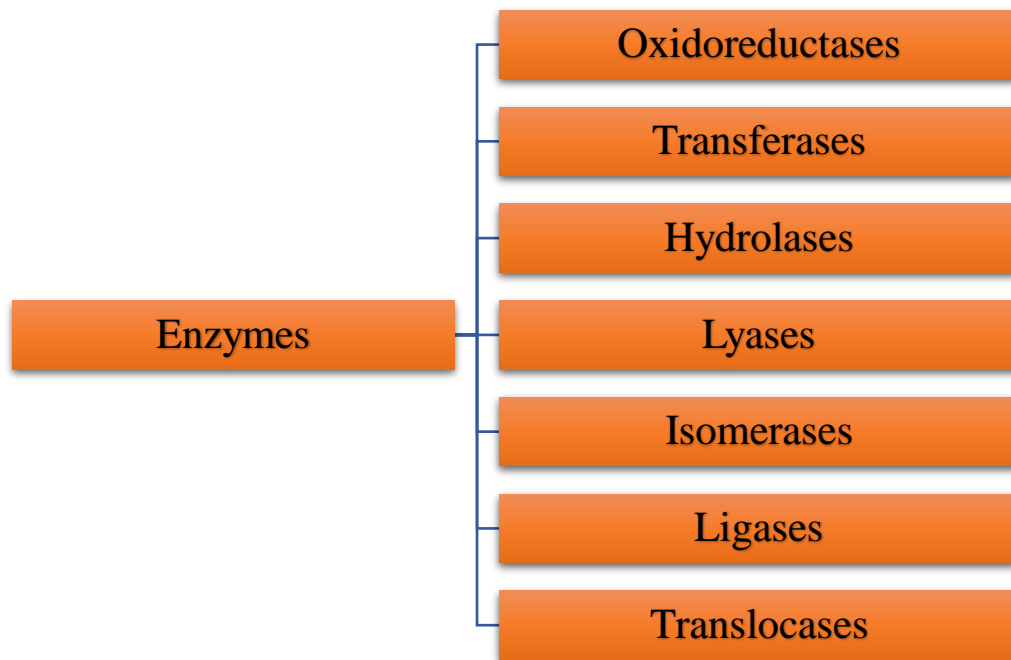
EC numbers : **The Enzyme Commission Number (EC Number)** is a numerical classification scheme for enzymes, based on the chemical reactions they catalyze. The chemical reaction catalyzed is the specific property that distinguishes one enzyme from another. EC numbers specify enzyme-catalysed reactions. The EC numbers are assigned by the <u>Nomenclature Committee of the International Union of Biochemistry and Molecular Biology</u>.

- EC numbers are four digits, for example 1.2.3.4, where "1" is the class, "2" is the subclass, "3" is the sub-subclass, and "4" is the serial number of the enzyme in its sub-subclass.

The "2" and "3" digits describe the reaction, while the "4" digit is used to distinguish between different enzymes of the same function based on the actual substrate in the reaction.