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Short Communication

Classification and Functions of Enzymes Based on Catalyzed Reactions

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DESCRIPTION

Enzymes are proteins that play a crucial role in biological processes by facilitating chemical reactions in living organisms. They are catalysts that speed up reactions without being consumed or altered in the process. Enzymes are involved in everything from digestion and metabolism to DNA replication and protein synthesis. Understanding enzyme classification is key to understanding their functions and how they work [1,2].

Enzyme classification is based on several criteria, including the type of reaction they catalyze, the structure of the enzyme, and the type of molecule they act on. The most commonly used system for enzyme classification is the Enzyme Commission (EC) system, which was developed by the International Union of Biochemistry and Molecular Biology (IUBMB).

Classification of enzymes

The EC system divides enzymes into six classes based on the type of reaction they catalyze.

Oxidoreductases: These enzymes catalyze oxidation-reduction reactions, which involve electron transfer from one molecule to another. Examples include alcohol dehydrogenase, which converts alcohols to aldehydes or ketones, and cytochrome c oxidase, which is involved in the electron transport chain in mitochondria [3].

Transferases: These enzymes catalyze the transfer of functional groups, such as phosphate, methyl, or amino groups, from one molecule to another. Examples include kinase enzymes, which transfer a phosphate group from ATP to a substrate, and transaminases, which transfer an amino group from one molecule to another [4].

Hydrolases: These enzymes catalyze the hydrolysis of a chemical bond, which involves the addition of water. Examples include lipases, which break down lipids into fatty acids and glycerol, and proteases, which break down proteins into amino acids [5].

Lyases: These enzymes catalyze the cleavage of a chemical bond without the addition of water or the transfer of electrons. Examples include decarboxylases, which remove a carboxyl group from a substrate, and synthases, which catalyze the synthesis of new molecules [6].

Isomerases: These enzymes catalyze the conversion of one isomer to another, which involves rearranging the atoms in a molecule. Examples include epimerases, which convert one epimer to another, and racemases, which convert one enantiomer to another [7].

Ligases: These enzymes catalyze the formation of a bond between two molecules, which requires the input of energy. Examples include DNA ligase, which joins DNA fragments together during DNA replication, and ATP synthase, which synthesizes ATP from ADP and phosphate [8].

Enzymes can also be classified based on their structure, which is determined by the sequence of amino acids that make up the protein. Enzymes can be classified as globular or fibrous, depending on their shape. Globular enzymes have a spherical shape, while fibrous enzymes have a long, fibrous shape. Enzymes can also be classified as simple or complex, depending on whether they consist of a single protein or multiple proteins [9,10].

Finally, enzymes can be classified based on the type of molecule they act on. For example, enzymes that act on carbohydrates are called carbohydrases, enzymes that act on lipids are called lipases, and enzymes that act on proteins are called proteases.

CONCLUSION

Enzymes are essential for life and play a crucial role in a wide range of biological processes. Understanding enzyme classification is important for understanding their functions and how they work. The EC system is the most commonly used system for enzyme classification, which divides enzymes into six classes based on the type of reaction they catalyze. Enzymes can also be classified based on their structure, globular or fibrous, simple or complex and the type of molecule.

REFERENCES

1. Tao Z, Dong B, Teng Z, Zhao Y. The classification of enzymes by deep learning. IEEE. 2020;8:89802-11.

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2. Almonacid DE, Babbitt PC. Toward mechanistic classification of enzyme functions. Curr Opin Chem Biol. 2011;15(3):435-42.
3. de Souza Vandenberghe LP, Karp SG, Pagnoncelli MG, von Linsingen Tavares M, Junior NL, Diestra KV, et al. Classification of enzymes and catalytic properties. Biomas, biofu, biochem. 2020;2020:11-30. Elsevier.
4. Yadav SK, Tiwari AK. Classification of enzymes using machine learning based approaches: a review. Mac Learn Appl. 2015;2(3/4): 30-49.
5. Arpigny JL, Jaeger KE. Bacterial lipolytic enzymes: classification and properties. Biochem J. 1999;343(1):177-83.
6. Aszalos AA. Classification of enzymes. Enz Anesthesiol. 1978:71-88.
7. Kovacic F, Babic N, Krauss U, Jaeger KE. Classification of lipolytic enzymes from bacteria. Aerob Utiliz Hydrocarb. 2019;24:255-89.
8. Nielsen CF, Lange L, Meyer AS. Classification and enzyme kinetics of formate dehydrogenases for biomanufacturing via CO2 utilization. Biotechnol Adv. 2019;37(7):107408.
9. Capper D, Reifenberger G. Classification of gliomas: current progress and perspectives. Nervenarzt. 2015;86:672-83.
10. Cuesta SM, Rahman SA, Furnham N, Thornton JM. The classification and evolution of enzyme function. Biophys J. 2015;109(6):1082-6.