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Mini Review

Medical Biochemistry: Types of Medical Reactions and Mechanisms

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Abstract

The study of the biochemical pathways that lead to health and disease as well as the molecular basis of disease is known as medical biochemistry. It includes the study of the chemical reactions that take place in cells and how they are influenced by various drugs and therapeutic interventions. It also includes the study of the biochemical processes that take place in the human body and how they are affected by various diseases. Clinical organic chemistry assumes a basic part in current medication, as it gives the logical establishment to numerous symptomatic and restorative systems. For instance, clinical natural chemists utilize various strategies to dissect blood, pee, and other organic liquids to analyze infections and screen the viability of medicines. They also create and test new medicines and treatments that target specific disease-causing biochemical pathways.

The area of biochemistry known as medical biochemistry is concerned with the chemical reactions that take place within living things. By providing a deeper comprehension of the molecular mechanisms underlying diseases and the effects of drugs and other therapeutic interventions, it plays a crucial role in medicine. We will investigate the connection between medical biochemistry, medicine, and mechanism in this article.

The study of the human body's biochemical processes and their connection to health and disease is known as medical biochemistry. It assumes an essential part in the determination, treatment, and counteraction of sicknesses, giving a basic comprehension of the fundamental natural components included. The study of the body's biochemical processes is essential for the development of effective treatments, and biochemical testing and analysis are frequently utilized in disease diagnosis.

Keywords: Medical biochemistry, Health and disease, Modern medicine, Diagnosis, Treatment, Biochemical testing

INTRODUCTION

Numerous molecules, such as proteins, lipids, carbohydrates, and nucleic acids, are involved in the intricate biochemical processes that take place within the human body. Within the body, these molecules play a variety of roles, including providing energy, forming structural components, and acting as signalling molecules. Medical biochemists investigate the structure, function, and interactions of these molecules with other molecules in order to comprehend their function in health and disease. Understanding the biochemical basis of disease is one of medical biochemistry's primary objectives. This entails investigating the underlying molecular mechanisms of various diseases like diabetes, heart disease, and cancer (Sun Y, 2020).

Biochemists in medicine look into how diseases can be caused by changes in the structure and function of proteins, lipids, and other biomolecules, as well as how these changes can be reversed or prevented with specific treatments. The study of enzymes, which are biological catalysts that accelerate chemical reactions in the body, is another important area of medical biochemistry. Numerous biochemical pathways are dependent on enzymes, and their

absence can result in a wide range of diseases (Cai C, 2022).

Clinical natural chemists concentrate on the construction and capability of catalysts, as well as the elements that impact their movement, to foster new medications and treatments that can adjust chemical action and treat infections. The study of metabolism, which is the series of chemical reactions that take place in cells to transform nutrients into energy and other molecules the body requires, is also closely related to medical biochemistry. Medical biochemists work to comprehend the underlying biochemical mechanisms that are involved in these diseases in order to develop new treatments. Abnormalities in metabolism can result in a variety of diseases, including metabolic disorders like diabetes (Wang HX et al., 2021).

Because it serves as the foundation for the creation of brand-new therapies and treatments, medical biochemistry is an essential component of medicine. For instance, targeted therapies that specifically target the molecules involved in cancer growth and proliferation have been developed as a result of the study of the molecular mechanisms underlying diseases like cancer. Immunotherapies that can be used to treat a variety of diseases, including cancer and autoimmune disorders, have also been developed as a result of the study of the biochemical processes that are involved in the immune system. Additionally, biochemical testing plays a crucial role in disease diagnosis. For instance, various molecules in the blood, such as glucose, cholesterol, and enzymes, can be measured using blood tests. Diabetes, cardiovascular disease, and liver disease are all conditions for which abnormal levels of these molecules may be a sign (JJ Liu, 2020).

DISCUSSION

The study of various biomolecules, such as proteins, carbohydrates, lipids, and nucleic acids, as well as their interactions within the body is the focus of medical biochemistry. It provides a foundation for comprehending the disease's molecular basis, which is necessary for the creation of novel diagnostic and therapeutic strategies. The study of enzymes and metabolic pathways, for instance, can assist in determining the disease's underlying cause and direct the development of targeted therapies. The study of enzymes is one of medical biochemistry's most important subfields. Catalysts are proteins that catalyze biochemical responses in the body, and their breakdown can prompt a scope of sicknesses. For instance, controlling blood glucose levels necessitates the enzyme glucose-6-phosphatase. A rare genetic disorder known as glycogen storage disease type I can result from a lack of this enzyme. This disorder causes growth retardation, damage to the liver and kidneys, and hypoglycemia. The study of signalling pathways is another area of medical biochemistry. The communication between cells and the regulation of cellular processes like cell growth and differentiation are both part of these pathways. Dysregulation of flagging pathways can prompt a scope of illnesses, including malignant growth. For instance, cancer cells frequently exhibit dysregulation of the Mitogen-Activated Protein Kinase (MAPK) pathway, which results in uncontrolled cell growth and proliferation (Kou K, 2019) (ZX He et al., 2020).

Additionally, medical biochemistry is a crucial component in the creation of new diagnostic tools. Technology advancements have resulted in the creation of increasingly specific and sensitive diagnostic tests that are capable of early disease detection. The development of next-generation sequencing technologies, for instance, has revolutionized molecular diagnostics by making it possible to identify genetic mutations linked to diseases like cancer. Medical biochemistry can be used in a lot of different ways outside of just diagnosing and treating diseases. Biosensors and lab-on-a-chip devices, for instance, are new diagnostic tools and technologies developed and tested by medical biochemists that can quickly and accurately detect disease markers in bodily fluids. Additionally, they work to develop novel drug delivery strategies, such as nanotechnology-based drug delivery systems, that can enhance the safety and efficacy of current treatments (Pan H et al., 2021) (Singh A, 2004).

CONCLUSION

In general, medical biochemistry is a fascinating and dynamic field that is crucial to modern medicine. Medical biochemists are working on developing new diagnostic tools and therapies that can improve the lives of millions of people worldwide by studying the biochemical pathways that lead to health and disease as well as the molecular basis of disease. Because it provides a fundamental understanding of the biochemical processes that are involved in both health and disease, medical biochemistry is an essential component of medicine. It is an essential field for enhancing human health and well-being due to its role in the creation of new treatments, diagnostic tools, and public health policies. Clinical natural chemistry likewise assumes a significant part in drug revelation and advancement. Researchers can develop targeted drugs that specifically interact with the biomolecules involved in the disease process by comprehending the disease's molecular mechanisms (Premsia C, 2000) (Kanpur D et al., 2004).

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CONFLICT OF INTEREST

None

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