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Editorial Article

The Relationship Between Biochemistry and Nutrition

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Abstract

Biochemistry is closely linked to nutrition, as it provides the scientific explanation for how the body digests food, absorbs nutrients, converts them into energy, and builds cells. This relationship is known as nutritional biochemistry, which studies the interaction of nutrients with the body's biological processes.

Aspects of the Relationship Between Biochemistry and Nutrition

Keywords: Metabolism, Food into Energy, Biological Processes, Catabolism and Anabolism.

1. Metabolism

Biochemistry tracks the pathways through which carbohydrates, fats, and proteins are converted into energy and other beneficial substances.

Metabolism is the fundamental link between biochemistry and nutrition. It represents the set of chemical reactions within cells that convert food and drink into energy and building blocks, based on the laws and pathways of biochemistry, which nutrition studies to precisely determine the body's needs.

*The Role of Metabolism as a Link

- **Converting Food into Energy:** Metabolic processes break down nutrients to produce the energy necessary for bodily functions.
- **Explaining Biological Processes:** Biochemistry explains how the body processes proteins, fats, and carbohydrates at a precise molecular level.
- **Determining Nutritional Requirements:** Nutrition links the type and quantity of food to the efficiency of metabolic pathways in maintaining health or treating disease.

*Aspects of Scientific Integration:

- **Catabolism and Anabolism:** Metabolism is divided into the breakdown of molecules to produce energy and the synthesis of new molecules for tissue growth.
- **The Role of Enzymes and Hormones:** Enzymes and chemical reactions control the speed and efficiency of these metabolic transformations.

*The Role of Vitamins and Minerals:

Determining their functions as coenzymes in intracellular biochemical reactions.

Vitamins and minerals play a vital role as catalysts and cofactors for the body's enzymes in biochemical reactions. Biochemistry connects nutrition by explaining how the body converts nutrients into energy, builds tissues, and regulates vital processes. A deficiency in these micronutrients is a direct cause of metabolic dysfunction and disease.

*The Biochemical Role of Vitamins:

- **Enzyme Coenzymes:**

- B-complex vitamins act as coenzymes for enzymes involved in energy production and the breakdown of carbohydrates and fats.
- **Antioxidants:** Vitamins C and E protect cells from damage caused by free radicals.
- **Gene Expression:** Vitamins D and A regulate gene transcription, cell growth, and differentiation.

*The Biochemical Role of Minerals:

- **Cofactors:**

Minerals such as zinc and magnesium activate thousands of enzymatic reactions and protein synthesis.

- **Signal Transmission:** Calcium, potassium, and sodium regulate nerve impulses, muscle contraction, and fluid balance.
- **Oxygen Transport:** Iron is a component of hemoglobin, which transports oxygen in the blood.

3- Disease Treatment:

Understanding the causes of diseases resulting from nutrient

deficiencies allows for the development of precise therapeutic diets.

Biochemistry is linked to nutrition in disease treatment; it explains how the body processes nutrients and converts them into energy or uses them to build cells. This precise understanding enables the design of accurate therapeutic nutrition plans for the prevention and effective treatment of chronic diseases such as diabetes and heart disease.

Disease Prevention and Management

- **Chronic Diseases:** Controlling blood sugar and cholesterol levels through appropriate portion control.
- **Immune Support:** Boosting overall health with antioxidant-rich foods to reduce inflammation.
- **Reducing Side Effects:** Helping medications work more effectively and minimizing their side effects through balanced dietary strategies.

By Dr. Hadi Qassem, PhD in Biochemistry