

# An overview of amino acids: Understanding the foundations of life's basic amino acid.

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## Abstract

**Amino acids are the building blocks of life, playing a crucial role in the functioning of the human body. These organic compounds contain both a carboxyl group and an amino group, and are used to synthesize proteins and other essential biochemical in the body. There are 20 different types of amino acids that can be combined in different ways to form an almost limitless number of different proteins. Some of these amino acids are classified as essential, meaning that the body cannot produce them on its own and must obtain them through the diet. Other amino acids are classified as non-essential, as the body can produce them from other sources. In addition to their role in protein synthesis, amino acids also play important roles in many other biological processes, such as neurotransmitter synthesis, energy metabolism, and blood sugar regulation. For example, the amino acid tryptophan is a precursor to the neurotransmitter serotonin, which plays a role in regulating mood and sleep.**

**Keywords:** Amino acids, Proteins, Neurotransmitter synthesis, Energy metabolism.

## Introduction

Amino acids are found in a wide variety of food sources, including animal-based products such as meat, fish, poultry, and dairy, as well as plant-based products such as legumes, grains, and nuts. A balanced diet that includes a variety of protein-rich foods can help ensure that the body receives all of the essential amino acids it needs to function properly. Amino acids are the building blocks of life, playing essential roles in protein synthesis, neurotransmitter synthesis, energy metabolism, and many other biological processes. Obtaining a balanced diet that includes a variety of protein-rich foods can help ensure that the body receives all of the essential amino acids it needs to function properly. There are 20 types of amino acids commonly found in proteins: Alanine, Arginine, Asparagine, Aspartic Acid, Cysteine, Glutamic Acid, Glutamine, Glycine, Histidine, Isoleucine, Leucine, Lysine, Methionine, Phenylalanine, Proline, Serine, Threonine, Tryptophan, Tyrosine, Valine [1,2].

Of these 20, nine are considered essential amino acids because they cannot be synthesized by the human body and must be obtained from the diet. In metabolism, amino acids can be degraded to generate energy or used as precursors for the synthesis of other biomolecules such as neurotransmitters, hormones, or nucleotides. During protein synthesis, ribosomes translate messenger RNA (mRNA) into a specific sequence of amino acids to form a functional protein. Some amino acids also act as precursors for important metabolic pathways such as the citric acid cycle, urea cycle, and the synthesis

of non-essential amino acids. For example, the amino acid glutamine can be converted into glucose through a process called gluconeogenesis, and the amino acid tryptophan is the precursor for the synthesis of the neurotransmitter serotonin [3,4].

Overall, the biochemistry of amino acids is complex and plays a vital role in various physiological processes in the human body. Proteins play a crucial role in various metabolic processes in the body, including structural support, transport, and storage of nutrients, catalyzing chemical reactions (as enzymes), and regulating cellular activities. In metabolism, amino acids can be degraded to generate energy or used as precursors for the synthesis of other biomolecules. For example, the amino acid alanine can be converted into glucose through a process called gluconeogenesis, which is crucial during periods of fasting or low glucose levels. The amino acid tyrosine is the precursor for the synthesis of the neurotransmitters dopamine, norepinephrine, and epinephrine, which are important for regulating mood and stress response. During protein synthesis, ribosomes translate messenger RNA (mRNA) into a specific sequence of amino acids to form a functional protein [5].

## Conclusion

This process is controlled by genetic information encoded in DNA and is crucial for the growth and repair of tissues, as well as for the regulation of various cellular activities. Amino acids also play a crucial role in the regulation of

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Received: 24-Jan-2023, Manuscript No. AAFTP-23-88791; Editor assigned: 25-Jan-2023, PreQC No. AAFTP-23-88791 (PQ); Reviewed: 08-Feb-2023, QC No. AAFTP-23-88791;

Revised: 13-Feb-2023, Manuscript No. AAFTP-23-88791 (R); Published: 20-Feb-2023, DOI:10.35841/2591-796X-7.2.166

various physiological processes. For example, the amino acid arginine is a precursor for the synthesis of nitric oxide, which is important for regulating blood flow and blood pressure. The amino acid tryptophan is the precursor for the synthesis of the neurotransmitter serotonin, which regulates mood and sleep. In addition, some amino acids have antioxidant properties and play a role in protecting cells from oxidative stress. For example, the amino acid cysteine is a precursor for the synthesis of glutathione, which is one of the most important antioxidants in the body. In conclusion, the functioning of amino acids in the human body is complex and multifaceted. They play a crucial role in various metabolic processes, from generating energy to regulating physiological processes and maintaining overall health. Understanding the biochemistry of amino acids is crucial for a deeper appreciation of how the body functions and for the development of treatments for various diseases.

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