

# Food Source that becomes Incorporated into the Proteins of the Organism's Body

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## Description

Peptides longer than four amino acids are generally not absorbed during digestion. Even after absorption into the gastrointestinal absorptive cells, the majority of peptides undergo breakdown into individual amino acids. The gastrointestinal tract is responsible for the assimilation of amino acids and their derivatives resulting from the breakdown of dietary protein. The absorption rates of individual amino acids vary depending on the protein source, such as the differences observed between soy and milk proteins and among different milk proteins like beta-lactoglobulin and casein. For milk proteins, approximately 50% of ingested protein is absorbed between the stomach and the jejunum, with 90% absorbed by the time the digested food reaches the ileum. Biological value serves as a measure of the proportion of ingested protein from a food source that becomes integrated into the proteins of the organism's body.

## Immune response components

Proteins constitute a significant portion of most nitrogen-containing foods, whereas fats, carbohydrates and dietary fiber do not contain nitrogen. The total protein content is determined by multiplying the nitrogen content by a factor depending on the types of proteins present in the food, yielding what is termed as the crude protein content. On food labels, protein content is expressed by the nitrogen multiplied by 6.25, based on the typical nitrogen content of proteins being approximately 16%. Proteins also serve as constituents in structures like glycoproteins. Once broken down into amino acids, they serve as precursors to nucleic acids, co-enzymes, enzymes, immune response components, cellular repair and other essential molecules for life. Moreover, proteins are necessary for the formation of blood cells. A wide variety of foods contain protein, with plant-based protein sources contributing more than 60% of the per capita supply of protein globally. In North America, animal-derived foods account for around 70% of protein sources. Insects serve as a protein source in many parts of the

world, with up to 50% of dietary protein in certain African regions derived from insects. Incidental contamination and intentional adulteration of protein meals with non-protein nitrogen sources have been known to occur in the food industry. To ensure food quality, consumers of protein meals often conduct quality control tests designed to detect common non-protein nitrogen contaminants such as urea and ammonium nitrate. Meat, dairy, eggs, soy, fish, whole grains and cereals are all sources of protein. Photovoltaic-driven microbial protein production utilizes solar energy and carbon dioxide to create fuel for microorganisms, which are grown in bioreactor tanks and then processed into dry protein powders.

## Polymer chains

Digestion typically begins in the stomach with the conversion of pepsinogen to pepsin by hydrochloric acid and continues in the small intestine with trypsin and chymotrypsin. By the time proteins are absorbed in the small intestine, most are already reduced to single amino acids or peptides of several amino acids. Proteins are polymer chains composed of amino acids linked together by peptide bonds. During human digestion, proteins are broken down in the stomach into smaller polypeptide chains through the actions of hydrochloric acid and proteases. This breakdown is crucial for the absorption of essential amino acids that cannot be synthesized by the body. There are nine essential amino acids that humans must obtain from their diet to prevent protein-energy malnutrition and resulting death. There are five amino acids that humans can synthesize in the body. These five are alanine, aspartic acid, asparagine, glutamic acid and serine. Additionally, there are six conditionally essential amino acids whose synthesis can be limited under special pathophysiological conditions, such as prematurity in infants or individuals in severe catabolic distress. These six are arginine, cysteine, glycine, glutamine, proline and tyrosine. Dietary sources of protein include grains, legumes, nuts, seeds, beans, meats, dairy products, fish, eggs, edible insects and seaweed.