



Protein as Body Fuel

To understand the importance of protein as a nutrient in a dog's diet involves taking a journey into the science of cellular biology.

Protein is essential for the function and viability of cells. It provides biological catalysts necessary for vital chemical reactions in the cell as well as provides critical components for cellular structure. A dog's body runs on cellular machinery that works together according to blueprints of DNA, or deoxyribonucleic acid.

In the cell nucleus, DNA is transcribed into RNA or ribonucleic acid. This RNA carries the DNA's genetic message outside the nucleus of the cell when the machinery exists to translate this message and produce specific proteins. The functional proteins that are made within the cells are responsible for building, shaping and refining everything from toenails to chemical messengers in the brain.

The cell's ability to produce functional proteins based on the genetic message from DNA requires a readily available supply of amino acids, the building blocks of protein.

Protein Turnover

The body's own proteins provide the source of amino acids, and dietary proteins replenish the supply. Body protein is constantly being broken down and new protein produced in a process known as protein turnover.

Protein turnover is the synthesis (building) and catabolism (breakdown) of protein, which takes place almost continuously. Turnover provides the mechanism for the ongoing redistribution of amino acids to support immediate synthesis of proteins essential for life.

The rate of protein turnover is reduced when protein intake is deficient and is maximized with optimal protein intake. With optimal protein intake, the cellular machinery functions at full capacity and rapidly makes needed proteins.

If dietary protein is restricted, the body compensates for its reduced replenishment by slowing down protein turnover. This reduces the productivity of the body's factory and reduces the body's ability to respond quickly to bacterial or viral infections, injury or trauma.

Protein and amino acid metabolism in both muscle and the liver is profoundly affected by restricted dietary protein. Reduced rates of muscle protein synthesis and of liver protein synthesis occur quickly under a restricted protein diet. Changes are seen in body protein distribution, with skeletal muscle being most affected.

Immune System

A restricted protein diet also affects the functioning of a dog's immune system. To effectively protect and defend the body, the immune system must respond rapidly to disease. Amino acids from protein turnover are critical in producing the cells and components of the immune system, such as immunoglobulins and T-cells.

When protein turnover is reduced in dogs due to low protein intake, they are more sensitive to infections and other environmental stress. To maximize health and assure that a dog can develop to its potential, optimum protein intake is critical.

Desc:

Not sure why protein is so important for your dog? This article explains why your dog needs protein in his diet.