

Protein and Amino Acids Play an Important Role in Equine Nutrition.

Building Your Horse's Engine

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High-protein, low-carbohydrate diets, such as the Atkins diet and the South Beach diet, have been quite popular over the past few years. Although most of us don't go to that extreme when formulating our horse's diet, protein is often overfed or blamed for a variety of physical and behavioral problems in horses.

This article will address this misunderstood nutrient, including the role of proteins in the body and guidelines for meeting your horse's protein requirement. Some of the myths associated with protein are discussed in the sidebar "Myth Defying."

Links in a Chain

Proteins are made up of many individual amino acids that have been linked together in a chain. The specific amino acids included in the chain, the order in which they appear, and the length of the chain all dictate the function of that particular protein.

Protein can be found throughout the body and plays a role in virtually all of the horse's vital processes. Proteins form muscle, skin, hair, and bone, as well as cartilage, tendons, and ligaments. Furthermore, as hormones, enzymes and neurotransmitters, proteins play a role in the regulation of growth, sleep, appetite, blood clotting, and blood pressure, just to name a few.

Building the Chain

Proteins are continuously being broken down and rebuilt in the body. This constant turnover of protein requires a steady supply of amino acids. While the horse has the ability to synthesize some of the amino acids needed to make body proteins, those amino acids it can't make are "essential" and must be supplied in the diet.

Dietary protein ingested by the horse is broken up in the stomach and small intestine by digestive enzymes and acids. The individual amino acids are absorbed through the wall of the small intestine and into the bloodstream. Amino acids are carried by the blood to sites throughout the body where they are needed and are reassembled into specific body proteins.

The Missing Link

In order for the horse's body to build the required protein, amino acids

must be available in the correct amounts. If a particular amino acid is not present, the building of the protein chain stops, and the partially completed chain cannot function as a protein.

The protein ingested by the horse is not always made up of the same amino acids needed to make body proteins. In other words, some amino acids in the feed are provided in abundance, while others are found in limited quantities. Those found in limited quantities are referred to as "limiting amino acids" because their absence will limit the formation of many proteins in the horse's body.

Using the feed ingredients commonly fed to horses, lysine is the amino acid most likely to be deficient. Therefore, lysine is referred to as the first limiting amino acid. Another amino acid that may be provided in limited supply in horse diets is threonine, which is referred to as the second limiting amino acid. If the diet does not provide adequate lysine (or threonine), synthesis of many body proteins will stop, even if all the other amino acids needed to make that protein are present.