

# Calf Notes.com by Dr. Jim Quigley Primer on Calf Nutrition Series

## Primer Number 100 – An Introduction to the Nutrients

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**Introduction.** The six classes of nutrients that are considered essential to performance, health and life are:

- Water
- Carbohydrates
- Fat
- Protein
- Vitamins
- Minerals

All of an animal's feed may be classified into one of these six categories. However, some compounds may contain combinations of two classes of these and so, don't fit easily into any one category.

Water is the most essential nutrient and is required in the greatest quantity of any nutrient. Water is involved in nearly every chemical reaction in the body. It serves to protect tissues, as a solute, to dissipate heat, and many other functions. Much of the growth of young animals (including calves) is water. For more information about water and its role in calf nutrition, see [APC Calf Note # 101, Water](#).

Carbohydrates are a class of compounds that contain carbon, hydrogen and oxygen. Examples of carbohydrates include sugars (glucose, sucrose, lactose), starch, glycogen, and cellulose. Many different carbohydrates that are consumed by animals are ultimately converted to glucose, which is an essential nutrient required by many tissues in the body. For more information about carbohydrates and their nutrition, see [APC Calf Note #102, Carbohydrates](#).

Fats are the primary energy storage nutrients. Their large size and high concentration of hydrogen provide the body with a highly efficient method of storing energy. In addition, fats are insoluble in water and serve important functions in cell membranes and other structural components. Finally, many important hormones and vitamins are soluble only in fat. For more information on fat nutrition, see [APC Calf Note #103, Fats](#).

Proteins are molecules comprised of chains of amino acids. Proteins form muscles, enzymes, organs, and many other components of the body. They are involved in almost every biochemical reaction in the body and are indispensable for growth and survival. Proteins are produced in the body by absorption of amino acids from the diet and formation of the amino acids into the proteins required by the body. The "template" for protein structures is contained in the animal's genetic code, or DNA. For more information about proteins, see [APC Calf Note #104, Protein](#).

Vitamins are organic molecules that have many diverse, but critical roles in the body. Vitamins may be divided into fat soluble and water soluble categories and each is unique in form and function. Some vitamins are produced by the body (or by microbes in the body), and thus, have no dietary

requirement. Others cannot be synthesized by animals, and must be included in the diet. For more information about vitamins, see [APC Calf Note #105, Vitamins](#).

Minerals are inorganic elements that are utilized in the body for highly specific functions. Some minerals (e.g., iron) are utilized in proteins (hemoglobin) to perform specific functions. Others (e.g., calcium) participate in many different reactions and are included in bone structure. Minerals are profoundly important in animal nutrition. For more information about minerals, see [APC Calf Note #106, Minerals](#).