

Protein for the Athlete

Where's The Beef?

By Dr. T. P. Turner

Greetings V.C.ers and eavesdroppers. Can you believe its already racing season? Well, it is. It's also time to finish our three part series on macronutrients. So on to protein.

Next to water, proteins are the most abundant substances in most cells. About 3/4 of our bodies solids are proteins. There are two types, structural and globular. Structural proteins are the type that make up the contractile mechanism of muscles, the fibers of connective tissue, blood vessels, tendons and ligaments.

Globular proteins are mostly individual protein molecules or small "globs" of molecules suspended in the fluid cells. They are mostly enzymes which come into direct contact with other substances in the cell and catalyze chemical reactions. Some perform special functions. For example, hemoglobin and myoglobin carry oxygen in the red blood cells and muscle cells respectively. Antibodies are proteins that help protect us from diseases, allergies and toxins.

There is a constant breakdown of proteins in our bodies during regular activity. This amounts to about 20 - 30 grams of protein loss per day under normal sedentary conditions. During exercise 5 - 10% of our energy comes from the breakdown of the proteins by a process called gluconeogenesis. There is also significant loss of protein from muscle during exercise related to microtrauma and pH buffering.

Scientists have not determined the exact amount of protein breakdown and loss in athletes but best guesses range from 0.8 -

1.7 grams/kilograms of body weight/ day depending upon the volume of exercise. That translates to losses of about 65 - 135 grams/day for a 175 pounder. This protein has to be replaced daily.

Proteins are made up of amino acids. There are twenty that are regularly found in our tissues. Ten of these either can't be manufactured by the body or at least not in large enough quantities. They are called essential amino acids because they are essential in the diet.

Cells form either whole proteins or none at all. So, it is also essential that these ten amino acids are in the proper ratio in the diet. Dietary proteins with the proper ratio of essential amino acids are called complete proteins. Those with one or more in short supply are called incomplete.

Meats, eggs and cheeses are great protein sources because animals have about the same amino acid ratios as humans. Vegetarian sources, on the other hand, are incomplete and need to be combined with complimentary sources to supply complete proteins. The old standby for this information is "[Diet For A Small Planet](#)".

Four ounces of beef supply about 20 - 30 grams of complete protein. Four ounces of beans and rice supply 8 - 10 grams. With the exception of folks with eating disorders and those on restricted or fad diets, most of us get adequate protein to supply our basic needs. In fact, a good many sedentary Americans get too much. The extra is converted to fat.

In the last few years, there has been some interesting work done on amino acids and exercise. For example, our friend Dr. John Ivy who did the study on carbohydrate drinks and recovery drinks stimulates extra

insulin secretion. This causes greater intake of both carbohydrate and protein into muscle cells speeding recovery.

This discovery has led to the production of a new line of products called "metabolic optimizers". Products like Endura Optimizer, Metaol II, Muscle Pep and Pro Optibol are now available at the shop and in health food stores. Remember, it is still important to use these products within 15 - 30 mins after your ride.

Another interesting study has shown that large amounts of glutamine and alanine are released from the breakdown of intramuscular proteins during and immediately after intense exercise. Also, the body prefers glutamine for gluconeogenesis and breaks down muscle tissue to get it. Taking extra glutamine should be muscle sparing, but when glutamine is put directly into the stomach it breaks down into ammonia (not good).

Adding alpha-ketoglutarate to optimizers has been found to be a good alternative. It is glutamine sparing and also is an ammonia scavenger.

Recently, there have been a bunch of studies looking at the immunosuppressive effects of intense exercise. Dr. Richard Kreider and Dr. Brian Leutholtz reviewed the results of 62 studies and concluded that supplementation with branch-chain amino acids including leucine, isoleucine, valine, alanine and glutamine "may reduce net protein degradation, hasten muscle recovery and glycogen restoration ... and improve immune status during training."

Now, to recap our dietary plan. The base is a 40-30-30 (carbohydrate-protein-fat) by calorie count diet, using mostly complex instead of simple carbohydrates, quality

natural unsaturated fats instead of hydrogenated or partially hydrogenated fats and complete proteins. Eat regularly.

Add to that carbohydrate drinks and/or energy bars or equivalent substitutes on rides lasting 2 hours or longer. Most importantly, high carbohydrate and moderate protein optimizer replacement formula immediately following high intensity efforts or any long efforts.

Include enough water to maintain our weight and keep our urine nice and clear and we should have our macronutrients handled.