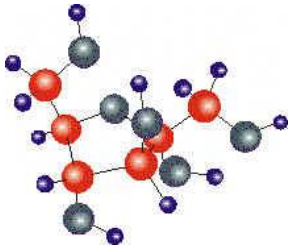
Alpha AAX

A Complete set of essental and nonessential amino acids

Alpha Nutrition Medical Foods

Alpha AAX



Alpha Nutrition Medical Foods

Alpha Nutrition specializes in elemental nutrient formulas, the pure expression of nutrient biochemistry. We use the concept of nutrient modules to create nutrient formulas. We provide a choice of nutrient modules so that food can be replaced, nutrient intake can be supplemented and balanced in a variety of ways. These precise nutrient sets are formulated by assembling nutrients into modules that supply energy, electrolytes, antioxidants, phosphate, vitamins, minerals, neurotransmitter substrates and amino acids as the protein building blocks. The formulas are all packaged as dry powders to be mixed with water or juices and taken orally.

Formula orders are place at Alpha Online

Alpha Nutrition is a registered trademark and a Division of Environmed Research Inc. Sechelt, British Columbia, Canada

Alpha AAX

Links to Online Resources

If you are using Alpha AAX and have not read the Alpha Nutrition Program, you can order the book online. A printed edition is essential if you need revision instructions. Order Book Online

For all formula Information See Modular Nutrition Online

See all our information online http://www.nutramed.com

Alpha Nutrient Formulas

Alpha Nutrition formulas provide a choice of nutrient modules so that nutrient intake can be supplemented and balanced in a variety of ways. While foods in the diet can sometimes supply complete and balanced nutrition, there are many circumstances when adding nutrients is desirable or necessary. We designed Alpha PMX to supply complete nutrition except for fat.

- Alpha ENF is the complete nutrient set for meal replacement.
- Alpha PMX is the complete nutrient set minus the oil component with increased amino acids.
- Alpha DMX is a subset of all vitamins, amino acids and minerals except sodium. The formula contains no energy in the form of fats.
- Alpha AAX is the complete amino acid module.

Contents

Alpha AAX

Alpha AAX contains a complete set of the nine essential amino acids...

Complemented by 10 of the non-essential amino acids. l-form amino acids are provided in Alpha AAX in powder form to be added to water, juices or food. The formula is useful for special nutritional needs. For example:

1. when protein intake is inadequate
2. when protein intake must be restricted
3. when protein absorption is impaired.
4. when a rational, known set of amino acids is required to correct metabolic and brain disorders

Amino acids are the real nutrients derived from proteins by digestion of food. Amino acids do not trigger immune responses. Free amino acids are more expensive than protein powders, and hydrolyzed proteins but free the immune system from protein challenge. Some of these amino acids are not destined to be included in body proteins but will be used as neurotransmitters.

- Tyrosine and phenylalanine are converted to dopamine, noradrenalin and adrenalin.
- Tryptophan is converted into serotonin.
- Glycine itself is a major neurotransmitter in the spinal cord.
- Glutamate is the most abundant amino acid neurotransmitter in the brain.

Sources: amino acids are individually added to an AAX are pure, l-form amino acids. The amino acids are produced by variety of techniques. The formulas are hypoallergenic and have been tolerated by people with food allergies.

AAX can be used whenever increased intake of amino acids is desirable. The dose range is 10 to 50 Grams per day in divided doses. The best time to take AAX is between meals, before and after workouts and body building exercises. AAX can be used to replace dietary protein when eating is reduced or digestion is impaired. AAX can be added to Alpha ENF and or Alpha PMX to boost amino acid intake. The caloric intake is minimal. There are no carbohydrates or fats in the formula.

Even with no food protein intake, a daily intake of 25 to 30 grams of free form amino acids will be adequate for most people, most of the time. RDA protein values are crude approximations based on food protein values. AAX is a precisely engineered amino acid set and the amino acids are 100% available, so that the total daily requirement for amino acids is lower the RDA values for protein intake. As a rule of thumb, we recommend calculating the RDA protein requirement in Grams and supplying 30 to 50% of that value as the Alpha blend of amino acids (Available separately in Alpha AAX or combines with other nutrients in Alpha ENF, Alpha PMX, and Alpha DMX.)

Alpha AAX

Amino Acids are the Alphabet of Life

Amino acids are the alphabet characters of body proteins. Proteins are chains of amino acids linked together like beads on a necklace. The individual amino acids fall into two groups: the essential AA's, which must be ingested, and the non-essential AA's, which can be synthesized in the body and need not appear in the food. A total of 9 amino acids are considered essential, while another 11 or so can be synthesized from the essential amino acids.

There are other amino acids that appear in nature that are not included in protein structure. These odd amino acids appear especially in plants, where they may have roles as insect deterrents. An occasional non-nutrient amino acid may be useful in the food supply, as an accessory nutrient - taurine is a prime candidate.

Essential amino acids : Histidine, isoleucine, Leucine, lysine, methionine phenylalanine, threonine tryptophan, and valine

Nonessential amino acids: Alanine, arginine, aspartic acid, cystine, glutamic acid, glycine, proline, serine, and tyrosine

Possible accessory nutrient amino acids: Taurine, l-ornithine, l-carnitine

Life is an exercise in molecular synthesis and control. The programs, which determine what we are and how we function, are coded in DNA molecules, housed in the nucleus of every cell. The DNA code consists of strings of 64 alphabet characters that specify amino acids in-groups of three characters (codones). A single character is a base pair that is visualized as the rung on a ladder, twisted into a helix. The entire range of cellular procedures of life consists of stringing amino acids together. The DNA alphabet (blueprint) is first translated into enzyme synthesis. Enzymes, in turn, orchestrate and control the synthesis of all molecules (construction procedures). This is an elegant, simple plan that permits the evolution of great complexity.

Molecular synthesis takes the form:

DNA---->RNA----> Enzyme Proteins

enzyme

Molecule 1 + Molecule 2 ---------> Products

vitamin + mineral cofactors

The amino acid sequence is read from the DNA molecule and transferred to the protein synthesis machinery in a cell by transfer RNA. Protein synthesis occurs at Ribosomes where free amino acids are taken form the cellular pool and then linked by enzymatic action to form proteins. The link between amino acids is as a peptide bond. The "Amino" of amino acids is a nitrogen-hydrogen group, NH2. Every amino acid has NH2 at one end and COOH, the acid, at the other end. The peptide bond links the NH2 with the COOH like this: -CO-NH-OC-

When the peptide bond is made, a surplus of two hydrogen and one oxygen atom is removed as H2O (water). We use a 3-letter abbreviation of the amino acid name to write an amino acid sequence which is the primary structure of a peptide or protein: Gly-Leu-Gly-Try- is a 4 amino acid sequence.

Short chains of amino acids are peptides; longer chains are polypeptides. Even longer chains are proteins. Peptides assume information characteristics at 3 or more AA lengths. As the AA chain elongates, its shape becomes more complex and more meaningful. A typical globular protein has about 350 amino acids. The long amino acid chains of proteins are folded into a shaped object. The shape is known as the tertiary structure of the protein.

Protein shape is information. The shape may determine where the protein can go in a cell or which biological membrane will let it pass. The shape determines its structural role. The shape of a protein is also its identity. Shape ID is recognized and remembered by the immune system and is the basis of the body's immune defense. A small error in the DNA code results in a large manufacturing error. The study of individual enzyme defects has given us insights into the control of molecular assembly. If a single gene, encoding the procedures for a single protein, is defective, the protein is missing or does not function properly.

Amino Acid Requirements & Intolerance

The need for specific amino acids is difficult to determine. There is a wide range of needs and tolerances among different individuals. Amino acids appear to be relatively easy to obtain in adequate amounts, even on simple vegetarian diets with no meat, fish, eggs, or milk, if different vegetables are combined. Mixing a legume with a grain or with a tuber should provide a complete amino acid mixture, as well as a good variety of vitamins and minerals.

Protein-deficiency anxiety is not well founded in affluent countries. Some of the non-essential AA's may become essential if their synthesis is blocked by enzyme deficiencies. In order for protein synthesis to proceed, all the amino acids must be supplied at the same time. Since we are mammals, all mammalian proteins tend to have the same set of AAs as our own. Plant proteins may be deficient in lysine, threonine, and tryptophan. Vegetables should be combined to achieve a complete the AA set. Corn or maize, for example, is deficient in lysine, although many years of corn-breeding research have produced hybrid corns with increased lysine content. The substitution of the newer corn hybrids may eliminate protein malnutrition where corn is a staple.

Some patients on very limited diets (rice and a few vegetables alone, for example) remain well, at least for several months although their food may be appear to be deficient in essential AAs. A minimal diet presents minimal problems to one's metabolism. A protein deficient diet may be better tolerated than a protein excess diet. The missing amino acids are supplied from internal reserves as protein is recycled every day. If you look at RDA values for protein, you get the wrong idea that amino acid intake level has to the same as protein intake but we believe that a daily intake of 25 grams of free form amino acids will be adequate most of the time. RDA protein values are approximations based on eating food. The proteins in foods have to be digested into dipeptides and free amino acids before nutrients are available and protein digestion is incomplete Some percentage of food protein is wasted in the digestive tract.

The trick is that if amino acids arrive in high concentrations, the liver is obligated to destroy most of them; so that high protein intake is wasteful if you want the amino acids to be utilized as protein building blocks and as neurotransmitter substrates. You have to know that the body recycles amino acids an becomes very efficient when protein intake is low; the loss of amino acids can drop to about 2 grams per day. You have to know that amino acid proportioning is relevant to how amino acids are admitted to cells and how they are utilized. The concept of protein quality is used to express the idea that all the 9 essential amino acids have to be present before any of them can be used to make proteins.

On the positive side of the equation, if a completely available, precisely engineered amino acid set is available, the total daily requirement is lower the RDA values for food protein intake As a rule of thumb we recommend calculating the RDA protein requirement in Grams and supplying 30 % to 50% of that value as Alpha AAX, a blend of amino acids (available separately in Alpha AAX or combined with other nutrients in Alpha ENF, Alpha PMX and Alpha DMX.)

Alpha AAX Ingredient List:

Amino Acids: l-leucine, l-lysine HCl, l-phenylalanine, l-arginine, l-aspartic acid, l-glycine, l-isoleucine, l-glutamine,-methionine, l-proline, l-threonine, l-alanine, l-tyrosine, l-valine, l-serine, l-histidine, l-glutamic acid, l-tryptophan, l-cystine

User Instructions

Free and pure l-form amino acids are provided in Alpha AAX.
Alpha AAX comes in powder form to be added to fresh or frozen fruits or vegetables or juices and mixed in a blender.

AAX can be used whenever increased intake of amino acids is desirable. AAX can be added to Alpha ENF and or Alpha PMX to boost amino acid intake. Adding amino acids to foods with high protein content does not makes sense since the liver destroys surplus amino acids as they are absorbed from the digestive tract. The maximum benefit from AAX is achieved when there is little or no protein intake. The best time to take AAX is between meals, before and after workouts and body building exercises.

AAX can be used to replace dietary protein when eating is reduced or digestion is impaired. Even with no food protein intake, a daily intake of 30 grams of free-form amino acids may be adequate for most people, most of the time. RDA protein values are crude approximations based on food protein values. AAX is a precisely engineered amino acid set and the amino acids are 100% available, so that the total daily requirement for amino acids is lower the RDA values for protein intake. The dose range is 10 to 30 Grams per day in divided doses.

As a rule of thumb, we recommend calculating the RDA protein requirement in Grams and supplying 30% of that value as the Alpha blend of amino acids (Available separately in Alpha AAX or combined with other nutrients in Alpha ENF, Alpha PMX, and Alpha DMX.). Individual requirements should be determined in consultation with a physician with expertise in amino acid metabolism.

Alpha AAX

Mixing AAX:

Amino acids are very active nutrients with physiological effects. The formula in the jar will have a granular , white appearance with little to no odor. Different amino acids taste differently. Overall, the taste is slightly bitter. We do not recommend mixing and drinking amino acids in water alone. It is much better mixing AAX with fresh or frozen vegetables or fruits, soya or rice milk in a blender. Blend for about 1 minute and drink. If AAX is mixed in water at room temperature some of the less soluble AA may settle out.

Proteins and Amino Acids

Proteins form a major part of our structure and are essential for all biosynthetic functions. Dietary requirements for protein increase with activity, growth, and protein losses, especially following injury or during illness. The average American diet supplies 10-14% of total calories as protein. Protein digestion and absorption are generally efficient. A minimum protein intake for a normal adult is approximately 25 grams.

Loss of protein-tissues occurs with malnutrition, following surgery, injury, and chronic illness. Adequate intake of energy molecules, both carbohydrate and fats, is said to "spare protein", permitting a small protein intake to maintain positive nitrogen balance. In metabolic studies, the total amount of nitrogen intake is compared with the total excretion of nitrogen to assess protein balance. Excess amino acids are converted to fuel.

When amino acids are "burned" as a fuel, ammonia (NH3] is the waste product. Ammonia must be carried to the liver, converted to urea and excreted by the kidneys. One of the penalties of amino acid excess is ammonia excess, a potential cause of body malfunction following a high protein meal. The blood measurement of urea nitrogen (BUN) shows the balance between urea production by the liver and excretion by the kidneys. The BUN rises in kidney failure and serves as a measure of ammonia or nitrogen. In liver disease, reduced ability to synthesize urea leads to ammonia accumulation.

Ammonia is neurotoxic and contributes to the syndrome of brain dysfunction in liver failure, hepatic encephalopathy. Patients with reduced kidney or liver function are required to restrict protein, since their ability to handle the nitrogen waste of oxidized amino acids is limited. Fluctuating levels of ammonia influences brain cell function; they should be considered whenever brain function is abnormal. Some children are born with metabolic abnormalities in the handling of amino acids and ammonia. They often present with malfunctioning brains.

Amino Acid Requirements & Intolerances

The need for specific amino acids is difficult to determine. There is a wide range of needs and tolerances among different individuals. Amino acids appear to be relatively easy to obtain in adequate amounts, even on simple vegetarian diets with no meat, fish, eggs, or milk, provided that different vegetables are combined. Mixing a legume with a grain or with a tuber should provide a complete amino acid mixture, as well as a good variety of vitamins and minerals.

Protein-deficiency anxiety is not well-founded in affluent countries. Some of the non-essential AA's may become essential if their synthesis is blocked by enzyme deficiencies. In order for protein synthesis to proceed, all the amino acids must be supplied at the same time. Since we are mammals, all mammalian proteins tend to have the same set of AAs as our own. Plant proteins may be deficient in lysine, threonine, and tryptophan. Vegetables should be combined to achieve a complete the AA set. Corn or maize, for example, is deficient in lysine, although many years of corn-breeding research have produced hybrid corns with increased lysine content. The substitution of the newer corn hybrids may eliminate protein malnutrition where this is a staple plant.

We have thought a lot about the relationship between the food intake of protein and the intakes of pure amino acids in one of our elemental nutrient formulas. A naive assumption is that amino acid intake and protein intake are the same. If you decide that a patient needs 75 Grams of protein per day and you want to replace the protein with amino acids, you assume you have to give them 75 grams of amino acids. Not so.

If you look at RDA values for protein, you get the wrong idea that amino acid intake level has to the same as protein intake but we believe that a daily intake of 25 to 30 grams of free form amino acids will be adequate for most people, most of the time. RDA protein values are crude approximations based on food protein values. The proteins in foods have to be digested into dipeptides and free amino acids before nutrients are available and protein digestion is incomplete Some percentage of food protein is wasted in the digestive tract. The trick is that if amino acids arrive in high concentrations, the liver is obligated to destroy most of them; so that high protein intake is wasteful if you want the amino acids to be utilized as protein building blocks and as neurotransmitter substrates.

You have to know that the body recycles amino acids and becomes every efficient when protein intake is low; the loss of amino acids can drop to about 2 grams per day. Amino acid proportioning is relevant to how amino acids are admitted to cells and how they are utilized. The concept of protein quality is used to express the idea that all the 9 essential amino acids have to be present before any of them can be used to make proteins. Plants may have incomplete amino acids sets, for example, and protein deficiency symptoms can appear even when the protein intake is adequate.

On the positive side of the equation, if a completely available, precisely engineered amino acid set is available, the total daily requirement is lower the RDA values for food protein intake As a rule of thumb we recommend calculating the RDA protein requirement in Grams and supplying about 30 % of that value as Alpha AAX, a blend of amino acids (available separately in Alpha AAX or combined with other nutrients in Alpha ENF, Alpha PMX, and Alpha DMX.)

Inborn Errors Of Metabolism

Some amino acid abnormalities are overt and abnormal amounts of an under-utilized amino acid or excessive amounts of an abnormal metabolite accumulate in the blood and are excreted in the urine. Specific disorders of amino acid intolerance are well described in infants and children with major and often life-threatening, disorders. These disorders occur when the DNA code is defective or not read properly into correct enzyme construction. The patterns of the major inborn errors of metabolism have minor versions in individuals who are less obviously dysfunctional. The major amino acid disorders are readily diagnosed by clinical and laboratory examinations; the minor

manifestations are difficult to detect. Disorders of amino acid metabolism demonstrate what happens when a specific enzyme is deficient or malfunctions.

There are two basic consequences:

1. An amino acid, which should be utilized, accumulates or follows another route of metabolism and produces toxicity.
2. The products usually made from the amino acid are unavailable with a defective enzyme system.

Amino acid intolerance in newborn infants shows up as failure to thrive or as grave life-threatening illnesses. The intolerance may be singular and specific, or it may be a more generalized inability to metabolize amino acids. All the branch-chain amino acids not incorporated into protein structure or functional molecules are processed through a common system, which is found in the mitochondria of all cells. We can call this Mitochondrial Amino Acid Processor, MAAP.

MAAP allows us to burn excess AA's as fuel by breaking down amino acids in a sequence which requires 3 enzymes and the co-factors, Biotin, Vitamin B12, and magnesium. If the enzymes are deficient or fail to function properly, amino acid processing is blocked. The more severe blocks result in a gravely ill infant who is sleepy or unconscious, projectile vomits, smells odd, and displays prolific growth of the yeast, candida, appearing in the mouth as "thrush" or on the skin as red scalded-looking areas, especially in the diaper area. The most afflicted infants die of dehydration and infection and not all can be saved, even by the most skilled management. Their urine shows abnormal amounts of amino acids (aminoaciduria) and ketosis, which results from the increased oxidation of fatty acids as a fuel.

MAAP may malfunction when the cofactors Biotin and VMB12 are missing. A good way to check the functional presence of VMB12 is to measure the urine excretion of Methylmalonic Acid, the second-step product of MAAPs processing, which accumulates if VMB12 deficiency limits its conversion to the step three product, Succinyl CoA. Succinyl CoA is the pivotal molecule, linking amino acid metabolism to carbohydrate metabolism. If your MAAP cannot turn amino acids into succinyl CoA, then you do not want to eat many of them.

Biotin is supplied in our food, but also by colon bacteria, as a by-product of their metabolism. Reduced dietary intake, coupled with interference with colon biotin production by antibiotics, colonics, or surgery is required before deficiency is manifest. Biotin deficiency will cause MAAP dysfunction. An interesting relationship is the interference of biotin absorption by a protein in egg white, Avidin. High intake of raw eggs can induce biotin deficiency. Some errors of metabolic processing of biotin are known and may be corrected by administering high daily doses of biotin.

Alpha AAX

The Strategy of Low to No Proteins

One of the therapeutic secrets of Alpha ENF, Alpha PMX Alpha AAX, and Alpha DMX is the avoidance of proteins or peptides. Proteins are the most reactive molecules in food allergic disease. Staple foods such as milk, eggs, wheat, corn, soy and meat contain proteins that frequently cause immune responses and are the problem in delayed patterns of food allergy.

Prominent allergist-immunologists such as Brennerman, Gerrard, Knicker, Hill, Brostoff and numerous others made conspicuous efforts to elucidate the delayed forms of food allergy which involve the most profound immune mechanisms. Delayed reactions begin in the gastrointestinal tract mucosa and spread inward to any body tissue if food proteins enter the circulation and interact with the circulating immune system. Incoming food protein/antigens tend to form immune complexes, and can injury target organs by triggering inflammatory responses in a variety of ways. Knicker stated : "Delayed adverse reactions to foods are exceedingly varied, and may involve virtually any organ system. Some reactions are classically allergic (the same list described for immediate reactions alone), and at times may reflect delayed IgE-mediated mechanisms. Others involve a single organ system, or multiple organ systems (e.g. the central nervous system, respiratory system, skin, musculoskeletal apparatus, gastrointestinal system, cardiovascular system etc.) with puzzling combination of symptoms."

Our focus is on the interface between things ingested and the inner body space.; The boundary is the wall of the gastrointestinal tract (GIT). This boundary selects molecules for entry into the private space of self. Understanding what crosses this boundary is critical to the new understanding of food allergy and; the diseases it causes. Coombs and McLaughlin summarized the problem:; "Food proteins in the gastrointestinal tract and their absorption into the body as antigenic molecules have immunologic significance both in

(i) initiating an allergic state and;

(ii) in the subsequent challenges,; a variety of mechanisms; may cause some form of 'food-allergic disease."

Proteins in Other Formulas

Meal replacement formulas, liquid diets and protein powders sold as "body-building" supplements can be a source of trouble. Protein powders are often made from cheap proteins such as milk protein (casein, caseinates, whey), egg white (albumin), soya proteins, or hydrolyzed vegetable proteins. Hydrolyzed proteins are only partially digested; by chemical means and retain allergenic properties. In addition small peptides have physiological properties and may cause unexpected problems both in the digestive tract and in the whole body.

Alpha AAX

Removing Protein Disease

Alpha AAX, ENF and PMX avoid all the protein problems by providing a balanced set of pure l-form amino acids - the real nutrients derived from proteins by digestion of food. Amino acids do not trigger immune responses and are therefore hypoallergenic. Free amino acids are more expensive than protein powders, but freeing the immune system from protein challenge is well worth the cost. AAX can be used whenever increased intake of amino acids is desirable. The dose range is 10 to 50 Grams per day in divided doses. The best time to take AAX is between meals, before and after workouts and body building exercises. AAX can be used to replace dietary protein when eating is reduced or digestion is impaired.; AAX can be added to Alpha ENF and or Alpha PMX to boost amino acid intake.

Even with no food protein intake, a daily intake of 20 to 30 grams of free form amino acids will be adequate for most people, most of the time. RDA protein values are crude approximations based on food protein values. AAX is a precisely engineered amino acid set and the amino acids are 100% available, so that the total daily requirement for amino acids is lower the RDA values for protein intake. As a rule of thumb, we recommend calculating the RDA protein requirement in Grams and supplying 30 to 50% of that value as the Alpha blend of amino acids (Available separately in Alpha AAX or combines with other nutrients in Alpha ENF, Alpha PMX, and Alpha DMX.)

Low Protein Diets

Patients with reduced kidney or liver function are required to restrict protein, since their ability to handle the nitrogen waste of oxidized amino acids is limited. In liver disease, reduced ability to synthesize urea leads to ammonia accumulation. Ammonia is neurotoxic and contributes to the syndrome of brain dysfunction in liver failure, hepatic encephalopathy. Patients with reduced kidney or liver function are required to restrict protein, since their ability to handle the nitrogen waste of oxidized amino acids is limited. Fluctuating levels of ammonia influences brain cell function; they should be considered whenever brain function is abnormal. Some children are born with metabolic abnormalities in the handling of amino acids and ammonia. They often present with malfunctioning brains.

The use of elemental nutrient formulas is useful in reducing or eliminating proteins from the diet. The formulas provide a precise intake of amino acids in a well balanced mixture – impossible to achieve with food.

- Use Alpha ENF when complete meal replacement is required.
- Use DMX as a partial meal replacement when food provides sufficient calories and fat.
- Use AAX to replace protein and supplement amino acid intake.

The substitution of pure amino acids for protein changes the intake rules. We believe that amino acids are more efficient than food protein at maintaining a positive nitrogen balance. Moreover, amino acids in their pure form tend to be completely absorbed and utilized as amino acids and not lost in the feces or burned as fuel. The amino acid mix in Alpha ENF, PMX, DMX and AAX is a complete balanced set of amino acids which means that “protein quality” is the highest available. No one has accurately determined the need for high quality amino acid intake, but our contention is that amino acid requirements may be a low as 20% of the recommended protein requirement

(meaning the amount of food protein in the diet). Adequate intake of energy molecules, both carbohydrate and fats, is said to “spare protein”, permitting a small protein intake to maintain positive nitrogen balance. In metabolic studies, the total amount of nitrogen intake is compared with the total excretion of nitrogen to assess protein balance. Excess amino acids are converted to fuel.

Free and pure l-form amino acids are provided in Alpha AAX. All Alpha Nutrition Formulas come in powder form to be added to juices or food, but avoid cooking. AAX contains a complete set of the nine essential amino acids, complemented by 10 of the non-essential amino acids. Amino acids are the real nutrients derived from proteins by digestion of food. Amino acids do not trigger immune responses. Free amino acids are much more expensive than protein powders, and hydrolyzed proteins but freeing the immune system from protein challenge is well-worth the cost.