**L-histidine**

L-Histidine is an amino acid widely distributed in proteins and enzymes. It is a metabolic intermediate in the production of Histamine, a compound involved in smooth muscle contraction and vasodilation; neurotransmission (stimulation of adenylate cyclase activity); and the stimulation of gastric secretion (29).

Oral administration of L-Histidine has been useful in the diagnosis of ulcers of the digestive tract and gastric secretory disorders. In addition, L-Histidine is quite beneficial in the management of rheumatoid arthritis; these patients have blood levels of L-Histidine averaging one quarter those of normal individuals (10, 11, 18).

**L-lysine**

L-lysine is an essential amino acid that often limits the quality of vegetarian diets due, in part, to its low availability in wheat, rice, oat, millet and sesame protein. It is especially important for the optimal growth and development of children.

L-lysine is widely distributed in body proteins and enzymes and is involved in the synthesis of collagen (a vital component of tendons and connective tissue), pipecolic acid (a neurotransmitter) and carnitine, a compound required for the utilization of fatty acids in energy production. For this reason, L-lysine plays an important role in growth and repair mechanisms throughout life.

This amino acid has been shown to be efficacious in the management of herpes simplex, especially with concomitant administration of ascorbic acid. L-lysine interferes with the body’s metabolism of L-arginine, a compound vital for replication of the virus. This results in a decrease in both the frequency and severity of outbreaks of herpes (15, 27).

**L-methionine**

L-methionine, an essential amino acid, is, like L-cysteine, a sulphur-containing compound and a powerful antioxidant that protects cells from the ravages of dangerous free radical molecules (20).

Vitamin B6 helps to maintain this free radical scavenging capacity (21).

L-methionine also functions in the initiation of endogenous protein synthesis and in the biochemical transfer of methyl groups, a process that is important in the production of many compounds including choline, creatine, and adrenaline (21). It is also needed in the production of lecithin and is the limiting amino acid in many foods including soya beans, peanuts, cottonseeds and potatoes. A deficiency of L-methionine may result in anaemia, retarded protein synthesis and fatty infiltration of the liver. Like L-cysteine, L-methionine has been shown to counteract many of the symptoms of copper toxicity (17).

**L-ornithine**

L-ornithine, a metabolically important amino acid, is neither incorporated into protein, nor has any role in endogenous protein synthesis (21). L-ornithine is about twice as effective as L-arginine in stimulating the secretion of growth hormone (27). Growth hormone increases the body’s metabolism of adipose (fat) tissue. It also enhances the transport of amino acids into intra-cellular spaces where they become available for increased synthesis of protein (8). Like L-arginine, L-ornithine plays an important role in wound healing as a result of its effect on growth hormone release and stimulation of the immune system. These two amino acids are interconverted in the urea cycle where they effect the detoxification of
ammonia (21). L-ornithine is valuable in the production of polyamines that stabilize membrane structure and DNA integrity as well as promote cell growth (21).

**L-phenylalanine**

L-phenylalanine is an essential amino acid widely distributed in the proteins of the human body and is, as well, a vital component in the production of the powerful adrenal catecholamines. Catecholamines are neurotransmitter substances with a wide scope of activities and include the compounds epinephrine (adrenaline), dopamine and neopinephrine (nor adrenaline) (29). Vitamins B6 and C are necessary for the conversion of L-phenylalanine into these neurotransmitters (8) (30). Systemic functions affected by the catecholamines include heart rate, cardiac output, blood pressure, oxygen consumption, blood glucose levels, lipid energy metabolism and central nervous system action (29).

L-Phenylalanine, by virtue of its role in dopamine and nor epinephrine production, is useful in the management of some forms of depression (3). (Patients who are taking MAO inhibitors–a class of prescriptive antidepressants should not use it).

In addition, this amino acid, as a result of its activity on norepinephrine metabolism, may suppress the appetite. Because L-phenylalanine increases norephendihrine stores rather than diminishes them, as do prescriptive and over the counter appetite suppressants, it has been suggested that there is no diminution in effectiveness with neither time nor wild cycling of appetite levels (22).

L-Phenylalanine also stimulates brain production of the hormone cholecystokinin, that appears to act as a signal indicating a sense of ‘fullness’ and has been shown to cause experimental animals to stop eating sooner (12, 24). L-phenylalanine may increase blood pressure and should, therefore, be used with caution by hypertensives. It should also be restricted in case of certain tumours, notably melanoma that needs L-phenylalanine to produce its pigment, melanin.

**D-phenylalanine**

As mentioned previously, D-amino acids are not incorporated into proteins. D-phenylalanine is the mirror image of L-phenylalanine being composed of the same chemical units in a slightly different conformation (in the same way, your right hand is a mirror image of your left and both are composed of a palm, four fingers and a thumb). Also, D-phenylalanine cannot be transformed into nor adrenaline, dopamine and the other neurotransmitters.

D-phenylalanine may be effective in the management of certain types of severe pain due to its ability to inhibit the enzymes that normally break down enkephalins, the body’s natural morphinelike painkillers. The resulting heightened levels of these substances results in an increased ability to withstand pain (27).

It has been suggested that chronically obese individuals may have an actual addiction to food. This may be related to the release of enkephalins in response to eating. By preventing their breakdown and therefore maintaining high levels, it has been suggested that D-Phenylalanine may reduce the craving for food in these individuals (27).

**Taurine**

Taurine is a naturally occurring amino acid that, like L-ornithine, is not incorporated into proteins. Structurally, taurine is distinct from the other amino acids and is available in only one form. The D and L naming system do not apply to taurine. Although mammals capable of synthesizing some taurine from