

Vitamins, Minerals and Amino Acids

Want to know more about what certain [vitamins](#), [minerals](#) and amino acids do in the body and why they might be recommended? Read on.

Additional information about the books identified here as sources will soon be available under [Recommended Reading](#). Check back soon.

AMINO ACIDS

Serotonin is a major antidepressant and regulates sleep, but low serotonin levels are a major predictor of aggression, i.e. violent alcoholics tend to have low brain serotonin levels.

Dopamine coordinates muscle movement and controls attention span.

Some of the **supplements which could assist in reducing fear and stress** include:

Tryptophan - is an essential amino acid, it is one of the few substances capable of passing through the blood-brain barrier (a sort of psychological moat designed to guard the brain.

"The blood-brain barrier is a cellular gateway by which specialized capillaries strictly limit the molecules admitted to the delicate nerve cells` environment."
(Becker/Selden p. 286)

It is essential to the formation of **serotonin**, which helps control moods. To have sufficient tryptophan one needs enough B6, without which tryptophan cannot be formed. It has been shown to be helpful for improvement of obsessive-compulsive behavior, for the treatment of sleep disorders and in controlling tremors.

Tryptophan is the scarcest essential protein in food. It is found in turkey, pumpkin, kelp and seafood and can result in sleep, happiness and a healthy willingness to spend more money - as evidenced by the Thanksgiving Day shopping sprees.
(Jeffery Fortuna Ph.D., Audio tape - Nutrition, Brain Chemistry and Recovery. Audio Awareness 1-800-777-5752)

GABA - an amino acid complex which, when taken with niacinamide and inositol, calms anxiety and stress reactions.

L-tyrosine - Some clinical studies have shown that this amino acid controls medication-resistant depression.

Niacinamide - Assists in tryptophan production and is part of the B complex group.

Magnesium Orotate - This is involved in the absorption and metabolism of other minerals such as calcium, phosphorus, sodium, and potassium. Also assists in the

utilization of the B complex and vitamins C and E. Magnesium is necessary for proper functioning of the nerves, muscles, and neuromuscular contractions, and also acts as a relaxant.

DLPA - a nutritional amino acid, which appears to help the body heal itself, and is also an anti-depressant with no known side effects. Dr. Arnold Fox has written that it has benefits to those who suffer from depression and/or pain.

Glutamine - an amino acid associated with brain metabolism. The amide of glutamic acid, glutamine crosses the blood-brain barrier and is then transformed to glutamic acid and acts as brain fuel. It protects microorganisms from alcohol poisoning and has shown to produce improvements in the ability to learn, retain and recall. Billie Sahley has termed it the `M and C` amino acid, for Memory and Concentration. (1994, pps. 86-91)

Vitamins assist the body in promoting cellular health and wellness at a vibrational or bioenergetic level. The bioelectronic systems control the basic processes of growth, replication and repair.

Albert Szent-Gyorgi discovered vitamin C, which orthomolecular proponents have used for the augmentation of the immune response when used in combination and in a balanced proportion with other vitamins. Linus Pauling found that 25 to 50 milligrams of vitamin B6, along with the vitamin C, would decrease a kidney stone problem that vitamin C in too high a dosage may have caused. (Becker/Selden p. 445)

Magnesium given in pharmacologic doses has the effect of decreasing neuromuscular excitability. Because it is a nutrient, magnesium is considered safer to give to pregnant women than anticonvulsant medication, and intravenous magnesium sulfate is given to pregnant women with toxemia in order to prevent seizures. Magnesium is also being recognized as being useful in preventing abnormal heart rhythms during the acute phase of a heart attack. (Gerber pps. 444)

Spirulina, a type of algae, is said to be the food of the future, as it supplies all eight of the essential amino acids, plus 10 of the 12 non-essential amino acids. Ounce for ounce, it provides more complete protein than meat - about 70%, compared to 22% for beef. It also contains gamma-linolenic acid (GLA), an essential fat associated with heart health, which is an excellent source of important minerals, including potassium, calcium, zinc, magnesium, selenium, iron and phosphorous, and it includes the B complex, B-12, E and beta-carotene. It is also low in calories, fats, sugars and sodium. Using light, warmth, water, and minerals, algae devote almost all of their energy toward producing protein, carbohydrates, vitamins, amino acids, and other nutrients vital to life. (Lets Live Magazine. Sept. `89)

Co-enzyme Q-10 is sometimes called the miracle nutrient and is found in every cell in the body, and in all humans, animals and plants. This ergogenic aid strengthens the heart muscle and energizes the cardiovascular system. It also stimulates insulin, stabilizes blood sugar levels and has antioxidant properties. (Winterdyk/Jensen, p. 191)

The energy portion of a cell is called mitochondria and the enzyme that makes it all work is succinate dehydrogenase-co-Q-10 reductase (Co-Enzyme Q-10 or

Ubiquinone) and, as already mentioned, is found in all humans, animals, and plants. The cells prepare an energy-rich compound called adenosine triphosphate (ATP), which serves as the energy current for all cells. However, there are only three ounces of ATP present in the body at any one time and therefore it is necessary for the body to continuously manufacture it. A deficiency of co-enzyme Q-10 is common in many cardiac patients.

The heart, liver and adrenals contain the largest number of mitochondria per tissue concentration, and therefore have the greatest need for supplementation.

The adrenal gland is a vital organ situated on top of the upper end of each kidney. It is made up of two parts, the inner portion (medulla) and the outer portion (cortex), which perform different functions. The adrenal medulla secretes the hormone epinephrine (adrenaline) as a response to the stimulation of the sympathetic nervous system in times of stress and the medulla also secretes the hormone norepinephrine, which plays a role in maintaining normal blood circulation. The adrenal cortex secretes about 30 steroid hormones including aldosterone, which regulates the body's salt and water balance, and cortisone and hydrocortisone which regulate fat, carbohydrate and protein metabolism.

Studies have been published showing that **GABA (Gamma-Aminobutyric Acid)** has been used with success on anxiety-prone and phobic individuals. The research supports that a person who constantly experiences "what if" type anxiety, or "anticipatory fear" has empty GABA receptors in the brain. The brain is therefore open to bombardment of random firing of excitatory messages, thereby rendering the sufferer to a state of feeling overwhelmed. (Sahley/Birkner p. 57)

GABA with inositol and niacinamide can mimic the tranquilizing effect of valium and librium, but without the heavy sedation effect of these drugs. (ibid. + Sahley 1994 p. 25) B6 (pyridoxine) is GABA's most important partner and literally controls all the amino acid metabolism and transformations in your body. (ibid. 1994, pps. 103 and 110)

GABA not only aids anxiety sufferers, but also lessens muscle tension, and aids Parkinson's symptoms, as well as inhibiting the desire for alcohol and cocaine. (Introductions to Psychopharmacology. Malcolm Lader. 1983, pps. 99-100)

A biochemical marker for life-long anxiety has been found. This genetic, chemical imbalance is called pyroluria and it is responsible for blocking the use of essential nutrients such as B6 and zinc, which results in fearfulness, stress, tension, anger and anxiety.

Dr. Carl Pfeiffer, founder of the Princeton BioCenter and pioneer amino-acid researcher, offers us Pfeiffer's Law: *"We have found that if a drug can be found to do the job of medical healing, a nutrient can be found to do the same job. For example, anti-depressants usually enhance the effect of serotonin or the epinephrines. We now know that if we give the amino acids tryptophan or tyrosine, the body will synthesize these neurotransmitters, thereby achieving the same effect... The challenge of the future is to replace (or sometimes combine) drugs with these natural healers."*

The **biological tasks of amino acids** are to:

- Create body tissues and cells
- Promote growth and repair of all parts of the body
- Create the enzymes required for digestion and production of hormones
- Promote proper functioning of the blood
- Make possible the communication within the brain, and between the brain and the rest of the nervous system
- Create energy as they are converted to glucose, blood sugar and glycogen (sugar stored by the liver for release to meet energy needs)

The following guide to amino acids and what they can do is taken from Dr. Larson's book *Seven Weeks to Sobriety*:

Alanine - Converts quickly to usable glucose and prolongs stabilization of blood sugar (helpful for hypoglycemics). Reduces elevated triglycerides in diabetics; may be helpful in preventing seizures.

Arginine - Induces release of growth hormone from the pituitary; increases sperm count; detoxifies ammonia, which is helpful in cirrhosis of the liver; stimulates the immune response by enhancing production of T cells.

Warning: *Should be used carefully in schizophrenic conditions and may cause replication of herpes simplex virus; keep intake low in affected individuals.*

Aspartic Acid (Asparagine) - Protects the liver; helps detoxify ammonia; promotes uptake of trace minerals in the intestinal tract.

Carnitine - Helps mobilize cellulite and other surface fats; helps combat fatigue and muscular weaknesses; helps provide energy for tissues by promoting oxidation of long-chain fatty acids; useful in clearing triglycerides from the blood.

Citruline - A precursor of the amino acids arginine and ornithine; plays a role in the detoxification of ammonia; stimulates growth hormone.

Cysteine - Helps repair tissues damaged by alcohol abuse, cigarette smoke, and air pollution through detoxification of acetaldehyde; helps maintain skin flexibility and texture; promotes red- and white-blood-cell reproduction and tissue restoration in lung diseases; promotes iron absorption; helps prevent formation of harmful peroxidized fats and free radicals; protects the lungs against damage from cigarette smoke; used in treatment of bronchial disease and asthma.

Threonine - An immunostimulant that promotes thymus gland growth. Useful in treating spastic disorders. Deficiency, if severe, causes neurologic dysfunction.

GABA (Gamma-Aminobutyric Acid) - Useful in inducing calm and tranquillity; may be useful in treatment of schizophrenia, epilepsy, depression, high blood pressure, high-stress disorders, manic behavior, and acute agitation.

Glutamic Acid - Precursor of GABA and glutamine. Taken by mouth, glutamic acid cannot cross the blood-brain barrier. Do not substitute for glutamine.

Glutamine - Anti-stress effect; useful in treatment of alcoholism by reducing cravings for alcohol and sugar. Improves memory and dexterity. (reminder - note that Billie Sahley calls it the M and C amino - being good for both Memory and Concentration)

Glycine - Can be used as a beverage sweetener; decreases uric-acid levels to reverse gout; useful in epilepsy and other conditions characterized by abnormal nerve firings.

Histidine - Creates an anti-anxiety effect in the brain; promotes good hearing by stimulating auditory nerves; a promising answer for rheumatoid arthritis, releases histamines from body stores for sexual arousal.

Warning: *Use carefully in manic-depressive patients with elevated histamine levels. Take with vitamin C.*

Isoleucine and Leucine - Are involved in stress, energy, and muscle metabolism. Leucine stimulates insulin release and inhibits protein breakdown. Both are useful in stress states of surgery, trauma, cirrhosis, fever, and starvation.

Lysine - Controls viral infections; inhibits growth and recurrence of herpes complex; stimulates secretion of gastric juices; controls muscle contractions, spastic disorders.

Methionine - Removes excess brain histamine that can cause depression and compulsive/obsessiveness; prevents deposits and cohesion of fats in the liver; acts as memory builder by synthesizing choline.

Warning: *Must be taken with vitamin B6. Avoid if you are manic-depressive or if you have low histamine levels.*

Ornithine - May reduce fat and increase muscle mass by promoting fat metabolism and stimulating production of growth hormone; helps detoxify ammonia.

D-Phenylalanine - Controls pain; elevates moods by increasing endorphins.

Warning: *Should not be taken by those with high blood pressure or anyone taking MAO inhibitors for depression.*

L-Phenylalanine - Helps manage certain types of depression by increasing levels of the neurotransmitter norepinephrine, a precursor of epinephrine (adrenaline); increases blood pressure in individuals with low blood pressure.

Warning: *Should not be used by anyone taking MAO inhibitors for depression. Do not take if you have high blood pressure.*

Proline - Can help lower blood pressure; promotes wound healing.

Serine - A derivative of glycine; can cause psychotic reactions and elevated blood pressure. No role has yet been developed for this amino acid.

Taurine - Can help inhibit epileptic seizures; helps repair muscle and tendon damage; helps promote skin flexibility, stops alcohol-withdrawal tremors.

Tryptophan - Helps alleviate depression by increasing levels of the neurotransmitter serotonin; induces sleep, has an anti-anxiety effect; appears to aid in blood clotting. Deficiency causes insomnia, depression.

Should be taken with vitamin B6 and fruit juice to maximize uptake by the brain.

Tyrosine - Useful in combatting depression because it is a precursor of the neurotransmitters norepinephrine and adrenaline; is a precursor of thyroid hormone.

Warning: *Should not be used by anyone taking a MAO inhibitor for depression or by those with malignant melanoma.*

Valine - Promotes muscle coordination and proper functioning of the nervous system; promotes mental vigor. Low serum valine is consistently found in patients with anorexia nervosa.

MINERALS

Vitamins cannot function without the assistance of the minerals, which work together as a group and in conjunction with hormones, enzymes, proteins, amino acids, carbohydrates and fats, as well as vitamins. They assist in the body's overall mental and physical functioning as well as helping to maintain its structure. (pps. 170-174)

The importance of Potassium and Sodium balance is well documented regarding electrolyte replacement, and some minerals such as sulfur, chlorine and fluorine are essential, but of less importance than the following;

Calcium - The most abundant mineral to be found in the body. While 99% of the calcium is found in bones and teeth, the other one per cent is in the soft tissues and blood; this one per cent has great effect on the nerves. A double-blind study with anxiety-prone patients and normal patients showed strong similarities between the symptoms of an anxiety attack and the mental effects of calcium deficiency, thus giving further evidence of the importance of calcium in mental health.

Iron - This is an important mineral since over half of the body's iron is found in the red blood cells as part of the hemoglobin, and hemoglobin is the protein that carries oxygen to the body tissues. The amino acids in protein, vitamin C, and copper, all enhance the absorption of iron.

Magnesium - It is a natural tranquilizer for the nervous system. Magnesium is required for protein and for carbohydrate metabolism. Signs of magnesium deficiency are similar to common hangover symptoms: sensitivity to noise, tremors, twitching, dizziness, rapid heartbeat, aching muscles, fatigue, depression, and irritability.

Magnesium has been used in treating anxiety, depression and insomnia. Magnesium is the only electrolyte which has a higher level in the brain fluid than in the blood plasma.

Manganese - This is especially found in the liver, skin, bones and muscles and is necessary for the proper digestion and utilization of food; manganese is important for normal central nervous system function. It helps eliminate fatigue and reduces nervous irritability.

Phosphorus - It is necessary for normal bone and teeth structure and for the transmission of nerve impulses. Phosphorus aids in body repairs, and is helpful in the metabolization of fats and starches.

Zinc - Involved in many enzyme systems with a wide scope of actions, zinc and vitamin A work as a pair- vitamin A is mobilized from the liver by zinc. After the ingestion of alcohol or large amounts of drugs, zinc is excreted in the urine in large amounts; many alcoholics are zinc deficient. This deficiency actually increases the alcoholic's tolerance to liquor, for there is a strong reaction to alcohol when the body contains adequate quantities of zinc. Other signs of zinc deficiency include oily skin, hair loss, lack of appetite, loss of taste, apathy and lethargy. (Sahley 1994, pps. 60-61)

VITAMINS

Vital amines or vitamins fall into two categories: fat-soluble, such as A, D, E and K, and water-soluble, such as B and C for the physically active. Supplementation with water-soluble vitamins may be needed due to sweating and urination.

Some of the vitamin functions include assisting essential chemical reactions, regulation of metabolism, converting fats and carbohydrates to energy, forming bones and tissues, preventing deficiency diseases, and providing antioxidant protection against free-radical damage and environmental toxins.

The **roles of some vitamins:**

A - Strengthens the immune system and protects mucosal tissues. Together with beta-carotene (a vitamin A precursor) prevents stress-induced thymus atrophy and can actually promote thymus growth and maintain soft, smooth skin.

B1 (Thiamine) - Important in maintaining mental wellbeing and is essential in carbohydrate metabolism and in the synthesis of acetylcholine, which is the nerve hormone that makes muscle move. Thiamine can be destroyed by alcohol, caffeine, chlorinated water, and sulphites. A deficiency of thiamine is especially common with alcoholics.

Folic Acid - Needed for healthy red blood cells and for the brain and nervous system function. There is often a major deficiency of folic acid in alcoholics and both this and thiamine should be a part of nutritional recovery for those in addictions treatment centers.

B2 (Riboflavin) - Crucial for energy production and is involved in the regeneration of glutathione - one of the main cellular protectors against damage.

B3 (Niacin or Niacinamide) - Plays an important role in energy production and helps to metabolize fat, cholesterol and carbohydrates, as well as manufacturing

body compounds such as adrenal hormones. Plays a role in the glycogen energy cycle.

B5 (Pantothenic Acid) - Supports the adrenal glands. It is necessary for converting fats and carbohydrates into energy, and for the manufacture of steroid hormones and brain neurotransmitters.

B6 (Pyridoxine) - Crucial for maintenance of hormonal balance and a strong immune system. It is active in blood production, central nervous system metabolism and amino acid metabolism. Necessary as controls all the amino acid metabolisms and transformations in the body.

B12 (Cobalamin) - Helps in the formation and regeneration of red blood cells, helps to prevent pernicious anemia, helps with depression, decreased energy and tiredness.

C - An anti-oxidant whose effect is improved when combined with vitamin E. Manufactures collagen, an important protein for connective tissue, cartilage and tendons. Provides protection against free-radical damage caused by pollution. Is antiviral and antibacterial, and boosts the immune system.

E - An important anti-oxidant, needed for healthy heart and blood vessels, important to circulation, and needed for production of hormones. (Winterdyk/Jensen pps. 183-188)

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