Amino Acids for Better Health

The major functions and therapeutic uses of amino acids

Amino acids are the body's building blocks for proteins. This means that adequate sources of different amino acids are required for optimal health. Supplementing with specific amino acids can be used as an effective form of nutritional therapy.

There are twenty-two amino acid building blocks. We'll go over each one, covering major therapeutic uses, foods that are important sources for that amino acid, and some of the major functions each performs in the body..

Essential Amino Acids

The following amino acids are known as essential amino acids because your body cannot directly synthesize them and they *must* be supplied by the foods that you eat.

Arginine

Therapeutic Uses: Improving circulation, lowering blood pressure, easing angina, and lowering cholesterol

May help with erectile dysfunction by improving blood flow and aiding in wound healing

Found In: Peanuts, peanut butter, cashews, pecans, almonds, and chocolate

Major Functions: Helps form nitric oxide, a major component of seminal fluid, aids immunity, and helps tissue regeneration

Histadine

Therapeutic Uses: May help desensitize the body to pollen

Found In: Meat and dairy products

Major Functions: Aids in the production of stomach acid

Helps form the neurotransmitter histamine

Aids the detoxification of heavy metals and protects against radiation

Low levels are associated with overstimulation in people, high levels with depression, and may be out of balance in schizophrenia

An essential amino acid in childhood, but it may be non-essential in adults.

Leucine and Isoleucine

Therapeutic Uses: Primarily used for muscle and skeletal health, used in muscle building and tissue repair, and may also help reduce feelings of stress

Found In: Beef, chicken, fish, soybeans, eggs, liver, cottage cheese, baked beans, milk

Major Functions: Two of the three branched-chain amino acids

Low levels of isoleucine, leucine, and methionine have been found in children with psychosis

Lysine

Therapeutic Uses: Used internally or topically for chronic viral infections such as herpes simplex infections (500-1,500 mg plus one gram of vitamin C with bioflavonoids, plus a low arginine diet); may help with concentration, fatigue, dizziness, anemia, and athletic performance

Found In: Fish, chicken, beef, lamb, milk, cottage cheese, beans, bean sprouts, wheat germ

Major Functions: Helps transport calcium across the gut wall and throughout the body, aids the immune system in combating viral infections, assists in the formation of collagen, a deficiency results in reduced ability to concentrate, and precursor to the production of carnitine

Methionine

Therapeutic Uses: Heavy metal detoxification

Protecting the liver from damage caused by acetaminophen poisoning

May help with allergies and asthma

May also be helpful in some cases of schizophrenia or Parkinson's disease

Found In: Beef, chicken, pork, soybeans, eggs, cottage cheese, liver, sardines, and yogurt

Major Functions: Sulfur-based amino acid, aids liver detoxification, helps detoxification of heavy metals, protects against radiation damage, detoxifies histamine when levels are too high

Used to create the amino acids cysteine and cystine, breaks down into homocysteine without adequate levels of B vitamins

Phenylalanine

Therapeutic Uses: Helps reduce hunger

Has been used orally and topically for vitiligo in conjunction with exposure to UV light

DL-phenylalanine has been shown to be helpful in pain relief

Found In: Soybeans, cottage cheese, fish, meat, poultry, almonds, brazil nuts, and pecans

Major Functions: Used to synthesize tyrosine, which is used to create the neurotransmitters: dopamine, norepinephrine, and epinephrine (excessive levels can increase anxiety and stress)

L-form is found in animal foods, D-form is found in plants

Induces satiety and helps regulate appetite

One of the amino acids in aspartame

Threonine

Therapeutic Uses: Deficiency may be involved in personality disorders

May help with depression

May relax muscle spasms in the spine

Found In: Dairy, beef, poultry, eggs, beans, nuts, and seeds

Major Functions: Helps digestive and intestinal function, including metabolism of fat in the liver, and boosts immune response

Tryptophan

Therapeutic Uses: May improve sleep and reduce sleep apnea

Helpful for mood disorders such as depression or anxiety

May be helpful for excessively aggressive behavior, irritability associated with PMS, ADHD, and Tourette's syndrome

May ease myofascial pain and reduce bruxism (grinding teeth during sleep)

Found In: Turkey, chicken, beef, brown rice, nuts, fish, milk, eggs, cheese, fruit, and vegetables

Major Functions: Used in the synthesis of serotonin and melatonin

Also used to create pincolinic acid, which helps with the absorption and transportation of zinc

Deficiencies may contribute to carbohydrate cravings

Valine

Therapeutic Uses: Valine, isoleucine, and tryptophan may be helpful for anorexia

May be useful for insomnia and nervousness, but excessively high doses can cause hallucinations and skin crawling

Used in muscle building and tissue repair

May also help reduce feelings of stress

Found In: Raw brown rice, cottage cheese, fish, beef, lamb, chicken, almonds, brazil nuts, lima beans, mushrooms

Major Functions: The third branched-chain amino acid, it is used in muscle development

Non-Essential Amino Acids

The following amino acids are considered non-essential because they can be synthesized from other amino acids and in addition to being sourced from eating different foods.

Alanine

Therapeutic Uses: May be helpful in hypoglycemia: taking 20-40 grams of l-alpha-analine produces a sustained rise in blood glucose levels in insulin-induced hypoglycemia

May help reduce cholesterol

Found In: Meat, poultry, fish, eggs, and dairy products

Major Functions: L-alanine is used in the metabolism of tryptophan and pyridoxine. B-alanine is metabolized to acetic acid. It assists in the synthesis of pantothenic acid

Asparagine

Therapeutic Uses: May aid metabolism and improve athletic performance

Found In: Asparagus, dairy products, potatoes, beef, poultry, meat, and eggs

Major Functions: Used in the synthesis of glycoproteins and the detoxification of ammonia

Amino acid donor in the transformation of other amino acids in the liver

One of the amino acids in aspartame

Carnatine

Therapeutic Uses: FDA approved for use with people undergoing hemodialysis and for l-carnitine deficiencies due to metabolic issues

Heart health: Angina and congestive heart failure, seems to reduce complications and mortality after a heart attack

Hypothyroidism and low energy levels in people who are chronically ill

Male infertility caused by a lack of sperm motility

Neuromuscular disorders

Found In: Red meat and dairy products

Major Functions: A dipeptide—a combination of the essential amino acids methionine and lysine, unique because it is not used in the construction of proteins

Helps oxidize long-chain fatty acids in the mitochondria, important for cellular energy production, heart health, and sperm motility

Citrulline

Therapeutic Uses: May work with arginine to help improve blood flow

May be helpful in weight loss

Found In: Watermelons, cantaloupe, and cucumbers

Major Functions: Formed in the urea cycle by the addition of ornithine to carbon dioxide and ammonia. In combination with aspartic acid, it forms arginosuccinic acid, which, on further metabolization, becomes arginine. It is also a precursor to ornithine.

Cysteine and N-Acetylcysteine (NAC)

Therapeutic Uses: Generally taken in the form of N-Acetylcysteine (NAC)

Helping improve liver detoxification in the removal of heavy metals and other chemicals

Counteracting chemotherapy side effects

Recovery from alcohol poisoning

Acetaminophen toxicity

May be helpful for cystic fibrosis

May be helpful for bronchitis and chronic obstructive pulmonary disease (COPD) because it acts as a natural expectorant for chronic cough

May ease angina when used with nitroglycerine

Helps reduce levels of homocysteine, a pro-inflammatory compound associated with heart disease

May reduce the incidence of stroke and heart attack associated with kidney failure

Reduces the urge to pull hair and the amount of hair pulling

Found In: Poultry, yogurt, egg yolks, red peppers, garlic, onions, broccoli

Major Functions: Major sulfur-containing amino acid, synthesized from methionine, helps to eliminate excess copper, which has been linked to behavioral problems, aids skin texture and flexibility, used in the formation of glutathione, helps cleanse heavy metals like mercury, part of the glucose tolerance factor and used in insulin production, needed for utilization of vitamin B6

Gama Aminobutyric Acid (GABA)

Therapeutic Uses: Helpful for relieving anxiety and manic disorders, ADHD, and excessive mental chatter, inhibiting sleep

Elevates mood and helps stabilize blood pressure

Promotes lean muscle growth and fat burning

Found In: Almonds, tree nuts, bananas, beef, liver, broccoli, brown rice, and halibut

Major Functions: Formed from glutamic acid (glutamine), GABA is used as an inhibitory neurotransmitter and plays an important role in the regulation of muscle tone

It also stimulates the pituitary hormone prolactin

Glutamine

Therapeutic Uses: May help repair the intestinal wall in leaky gut syndrome

Reduces wasting associated with HIV/AIDS

Reduces inflammation of the GI tract as a side effect of chemotherapy

Intravenous administration helps recovery after bone marrow transplant and abdominal surgery

Appears to protect against the harmful effects of alcohol and reduce alcohol cravings

Found In: Most high-protein foods, beef, chicken, fish, beans, and dairy products

A prominent amino acid in wheat

Major Functions: Glutamine is involved in the metabolism of sugars and fats

It readily passes the blood-brain barrier and is the dominant amino acid in cerebrospinal fluid

It is used as a neurotransmitter

It is important for the health of the intestinal membranes

Readily converted to glutamic acid, a stimulating neurotransmitter that aids memory and learning, and gives rise to GABA, a calming neurotransmitter

Glycine

Therapeutic Uses: Aids wound healing, especially when combined with arginine

May help calm the brain to reduce mania, reduce epileptic seizures, and help with schizophrenia

Helps to clear the body of uric acid in gout

May help benign prostatic hyperplasia (BPH) in combination with alanine and glutamic acid

Found In: Fish, meat, beans, dairy products, and collagen supplements

Major Functions: Major amino acid in collagen, used in glucogenesis, the formation of glucose from amino acids and other non-carbohydrate sources, acts as a major inhibitory neurotransmitter to calm brain function, part of the glutathione molecule, and a component of the glucose tolerance factor

Ornithine

Therapeutic Uses: May be helpful in detoxification and reducing fatigue

Found In: Meat, fish, eggs, and dairy products

Major Functions: Important constituent of the urea cycle and is the precursor of other amino acids such as citrulline and glutamic acid, as well as proline, helps with the release of the growth hormone

Proline

Therapeutic Uses: Aids wound healing, especially when combined with arginine

Helps with connective tissues when combined with adequate levels of vitamin C

Found In: Dairy products

Major Functions: Essential for collagen formation and maintenance, which is necessary for bone and connective tissue health, one fourth of the body's collagen is made of proline

Serine

Therapeutic Uses: Used externally in cosmetics as a moisturizing agent

A component of phosphatidylserine, a memory-enhancing nutrient

Found In: Egg whites, sesame seeds, seaweed, and red meat

Major Functions: A very reactive amino acid that is a precursor to several other amino acids, including glycine and cysteine

Taurine

Therapeutic Uses: Calms the brain and may be helpful in controlling tics and epileptic seizures

Supports eye health and benefits the cardiovascular system

May reduce hypertension, can help to calm arrhythmia in combination with taurine and magnesium

Stimulates the heart in congestive heart failure, may be helpful in mitral valve prolapse

Can help reduce cholesterol and ease angina

Found In: Eggs, fish, meat, and dairy products

Major Functions: One of the most abundant amino acids in the body, taurine is especially common in the excitatory neuron tissues of the central nervous system

Conjugates with bile salts to maintain the solubility of fats and cholesterol

Taurine deficiency in childhood is associated with the development of epilepsy

Tyrosine

Therapeutic Uses: Helpful for stabilizing mood in O Blood types on a vegetarian diet

May be helpful for ADHD and depression

Can improve dopamine levels, which can assist with recovering from burnout, addiction, and substance abuse

Small doses are more effective at increasing neurotransmitters than large doses

Found In: Pork, wild game, almonds, avocados, bananas, dairy products, lima beans, pumpkin seeds, and sesame seeds

Major Functions: Produced in the body from phenylalanine, tyrosine is used to make thyroid hormones and the neurotransmitters: dopamine, epinephrine, and norepinephrine

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