

**From Arginine to
Tyrosine. An
ENCYCLOPAEDIA
of amino acids**

**A Solgar
Reference
Manual**

For professional use only

L-Arginine

A) MUSCULAR ENERGY

Arginine is necessary for production of various compounds needed for muscular energy production, including creating phosphate.

B) IMMUNE SYSTEM PROTECTION

Arginine may protect against shrinkage of the thymus, the primary gland of immunity. It also stimulates the activity of T-lymphocyte white blood cells.

C) MUSCLE GROWTH AND REPAIR

Arginine is involved in the transport and storage of nitrogen in muscle tissue. Studies also suggest it may enhance growth hormone release (the amounts that may be required for this are thought to vary greatly from person to person).

D) LIVER PROTECTION

Ammonia, a major toxin to the liver, is converted into urea by arginine.

E) WOUND HEALING

Research shows that arginine supplementation enhances collagen synthesis and speeds repair time of tissue injury from surgery.

F) MALE FERTILITY

Arginine is known to increase both sperm count and motility.

G) MALE SEXUAL FUNCTION

The supplementation of arginine may raise nitric oxide, a compound involved in facilitating penile erection.

Potential applications of l-arginine:

- weight training and sports nutrition in general
- infection
- cirrhosis
- healing of injuries
- infertility (male)
- impotence

typical intake:

500-5,000 mg per day (taken on an empty stomach)

contraindications:

Should not be supplemented in cases of active herpes infection or schizophrenia.

Branched Chain Amino Acids

(BCAAs) *leucine, isoleucine, valine*

A) MUSCLE REPAIR

BCAAs comprise approximately a third of muscle tissue, suggesting significantly increased need in muscle stress (such as weight training).

B) IMPROVED EXERCISE RECOVERY

BCAAs may be used as an alternative energy source when muscle glycogen is exhausted; therefore supplementation may reduce the loss of BCAAs from muscle.

C) NEUROMUSCULAR PROTECTION

Research suggests benefits of BCAAs in neuromuscular disorders (e.g. ALS), through improving muscle strength and slowing progression of the loss of motor function.

D) PROTECTION AGAINST LIVER DAMAGE

The ability to prevent liver damage (such as seen in cirrhosis) appears to be due to enhancement of protein synthesis in liver tissue.

Potential applications of BCAAs:

- speeding muscle repair and growth
- chronic muscle fatigue and weakness
- enhanced exercise recovery
- neuromuscular degeneration (e.g. ALS, multiple sclerosis)
- alcohol-induced liver damage (e.g. cirrhosis)

typical intake:

isoleucine 150-600 mg

leucine 250-1000 mg

valine 150-600 mg per day (taken on an empty stomach)

contraindications:

none noted

Acetyl L-Carnitine (ALC)

A) BRAIN FUNCTION ENHANCEMENT

ALC appears to improve energy metabolism in the brain's nerve centres (neurons), enhances acetylcholine activity and aids in removal of cellular waste in the brain.

B) HEART TONIC

Carnitine enhances the conversion of fatty acids (the preferred energy source of the heart muscle) into energy.

C) LIPID-LOWERING

Research shows carnitine to reduce cholesterol and triglyceride levels, while improving the ratio between HDL ('good') cholesterol and LDL ('bad') cholesterol.

D) ENERGY ENHANCEMENT

This nutrient is necessary for fatty acids to enter the mitochondria, the metabolic centre of the cells, to be burned for energy.

Potential applications of ALC:

- improved memory and mental alertness (especially in older adults)
- senile dementia and Alzheimer's Disease
- atherosclerosis
- angina
- cardiomyopathy
- heart arrhythmia
- cholesterol and triglyceride reduction
- fatty liver disease
- muscle weakness
- weight control
- enhanced aerobic endurance to exercise

Please note:

In the case of enhancing brain function, ALC is preferred to l-carnitine. When using in improving cardiovascular health, l-carnitine is considered more appropriate.

typical intake:

250-1000 mg per day (taken on an empty stomach)

contraindications:

Certain reports have suggested that ALC should be avoided if pregnant or breastfeeding without the advice of a qualified medical health practitioner.

L-Carnitine

A) HEART TONIC

Carnitine enhances the conversion of fatty acids (the preferred energy source of the heart muscle) into energy.

B) LIPID-LOWERING AGENT

Research shows carnitine to reduce cholesterol and triglyceride levels, while improving the ratio between HDL (good) cholesterol and LDL (bad) cholesterol.

C) ENERGY ENHANCER

This nutrient is necessary for fatty acids to enter the mitochondria, the metabolic centre of the cells, to be burned for energy.

Potential applications of l-carnitine:

- atherosclerosis
- angina
- cardiomyopathy
- heart arrhythmia
- cholesterol and triglyceride reduction
- fatty liver disease
- muscle weakness
- weight control
- enhanced aerobic endurance to exercise

Please note:

In the case of enhancing brain function, ALC is preferred to l-carnitine. When using in improving cardiovascular health, l-carnitine is considered more appropriate.

typical intake:

500-1000 mg per day (taken on an empty stomach)

contraindications:

none noted

L-Cysteine

A) LIVER PROTECTANT

Forms part of glutathione, the potent liver protective tripeptide that neutralises countless compounds known to damage the liver.

B) DETOXIFIER

Through enhancing glutathione, cysteine improves detoxification in the liver and cells through neutralising certain toxins, free radicals and by-products of metabolic and hormonal waste.

C) HEAVY METAL SCAVENGER

Cysteine binds to heavy metals, thus aiding their removal.

D) ANTIOXIDANT

Cysteine, both alone and as part of glutathione is a very effective free radical scavenger. It also forms a part of the potent antioxidant enzyme glutathione peroxidase.

E) CARDIOVASCULAR PROTECTANT

Through its antioxidant effects, cysteine can prevent oxidation of LDL cholesterol, a known risk factor in heart disease. The more potent form of cysteine, NAC, also significantly lowers lipoprotein A, which appears to be an even greater risk factor in heart disease than cholesterol.

F) MUCOLYTIC

Cysteine breaks up bonds that account for the thick consistency of mucous, thus aiding its removal.

Potential applications of l-cysteine:

- Liver protection and liver disorders
- Detoxification
- Heavy metal poisoning
- Free radical-related disorders in general
- Atherosclerosis
- Cystic fibrosis
- Chronic respiratory congestion

typical intake:

500-1500 mg per day (taken on an empty stomach)

contraindications:

None noted. Vitamin C supplementation is often recommended when taking l-cysteine.

N-Acetyl L-Cysteine (NAC)

A) LIVER PROTECTANT

Forms part of glutathione, the potent liver protective tripeptide that neutralises countless compounds known to damage the liver.

B) DETOXIFIER

Through enhancing glutathione, NAC improves detoxification in the liver and cells through neutralising certain toxins, free radicals and by-products of metabolic and hormonal waste.

C) HEAVY METAL SCAVENGER

NAC binds to heavy metals, thus aiding their removal.

D) ANTIOXIDANT

NAC, both alone and as part of glutathione is a very effective free radical scavenger. It also forms a part of the potent antioxidant enzyme glutathione peroxidase.

E) CARDIOVASCULAR PROTECTANT

Through its antioxidant effects, NAC can prevent oxidation of LDL cholesterol, a known risk factor in heart disease. NAC also significantly lowers lipoprotein A, which appears to be an even greater risk factor in heart disease than cholesterol.

F) MUCOLYTIC

NAC breaks up bonds that account for the thick consistency of mucous, thus aiding its removal.

G) ANTI-VIRAL

NAC increases glutathione levels in virally infected cells more efficiently than taking glutathione itself. Raised cellular glutathione inhibits viral spread.

Potential applications of NAC:

- Liver protection and liver disorders
- Detoxification
- Heavy metal poisoning
- Free radical-related disorders in general
- Atherosclerosis
- Cystic fibrosis
- Chronic respiratory congestion
- Viral disorders

typical intake:

500-1200 mg per day (taken on an empty stomach)

contraindications:

None noted. Vitamin C supplementation is often recommended when if taking NAC.

GABA (gamma aminobutyric acid)

A) ANTI-ANXIETY

GABA acts as an inhibitory neurotransmitter, having a calming effect on the central nervous system.

B) SLEEP INDUCING

Effects in insomnia would be due to the brain and nervous system calming properties.

C) ANTI-CONVULSIVE

GABA is often deficient in certain convulsive and motor disorders such as epilepsy or tardive dyskinesia.

D) ANTI-HYPERTENSIVE

GABA may help regulate certain cardiovascular mechanisms involved in hypertension.

E) ANABOLIC AGENT

Studies suggest that GABA supplementation may enhance growth hormone release.

Potential applications of GABA:

- Anxiety and nervous tension
- Panic attacks
- Insomnia
- Epilepsy
- High blood pressure
- Body building

typical intake:

500-1000 mg per day (taken on an empty stomach)

contraindications:

Do not take with benzodiazepine drugs without the consent of a qualified medical health practitioner. In certain people, high levels of GABA may lead to temporary symptoms of increased heart rate or shortness of breath.

L-Glutamine

A) .MENTAL STIMULANT

Passes the blood-brain barrier where it converts into glutamic acid, a major fuel source in the brain.

B) INTESTINAL HEALER

Glutamine is a major component of the connective tissue of the intestinal tract. Supplementation has been shown to prevent and even reverse excessive intestinal permeability ('leaky gut' disorder).

C) MUSCLE REPAIR AND BUILDING

Glutamine is the most abundant amino acid in human skeletal muscle. Muscle stress, such as in intense exercise, increases the requirement for this nutrient.

D) ALCOHOL CRAVINGS

The effect of glutamine supplementation on brain chemistry has been shown to significantly reduce craving for alcohol in clinical research.

E) ANTI-ULCER AGENT

As a major component of the lining of the digestive tract, glutamine is known to speed the rate of healing of digestive ulcers.

Potential applications of l-glutamine:

- Mental alertness
- Memory enhancement
- 'Leaky gut' disorder
- Sports nutrition
- Alcoholism
- stomach and duodenal ulcers
- ulcerative colitis and Crohn's Disease

typical intake:

500-5000 mg per day (taken on an empty stomach)

contraindications:

none noted

L-Glutathione

A) LIVER PROTECTANT

Glutathione neutralises countless compounds known to damage the liver.

B) DETOXIFIER

Improves detoxification in the liver and cells through neutralising certain toxins, free radicals and by-products of metabolic and hormonal waste.

C) HEAVY METAL SCAVENGER

Glutathione is a potent detoxifier of heavy metals, especially lead, mercury and arsenic..

D) ANTIOXIDANT

Glutathione is a powerful free radical scavenger, and combines with selenium to form the potent antioxidant enzyme glutathione peroxidase.

E) CARDIOVASCULAR PROTECTANT

Through its antioxidant effects, glutathione can prevent oxidation of LDL cholesterol, a known risk factor in heart disease.

Potential applications of l-glutathione:

- Liver protection and liver disorders
- Detoxification
- Heavy metal poisoning
- Free radical-related disorders in general
- Atherosclerosis

typical intake:

250-500 mg per day (taken on an empty stomach)

contraindications:

none noted

Glycine

A) CALMING AGENT

Glycine is one of the major inhibitory neurotransmitters in the brain.

B) WOUND HEALING

As a major component of collagen, glycine is known to speed the repair of tissue injury.

C) ANTACID

Glycine has been shown to buffer excessive stomach acidity.

D) ANTI-CONVULSIVE AND ANTI-SPASMODIC

This amino acid appears to act as a protectant of the brain in seizure-related disorders such as epilepsy. It is found to be deficient in spinal cord sites in cases of spastic disorders. Research suggests that correction of deficiency would lead to reduced spasticity.

E) MUSCLE REPAIR AND BUILDING

In addition to the enhancement in the synthesis of collagen (a major component of muscle), research shows that glycine elevates growth hormone release.

Potential applications of glycine:

- Anxiety and nervous tension
- Panic attacks
- Insomnia
- Wound healing
- Ulcers
- Epilepsy
- Spastic disorders
- Sports nutrition

typical intake:

500-2000 mg per day (taken on an empty stomach)

contraindications:

none noted

L-Histidine

A) ANTI-ARTHRITIC

Levels are very often depleted in arthritis, especially rheumatoid arthritis (RA). Studies have shown benefits to histidine supplementation in strength and mobility of RA sufferers, and this amino acid does possess mild anti-inflammatory properties.

B) HEAVY METAL DETOXIFIER

Histidine binds to heavy metals and facilitates their removal from the body.

C) SEXUAL FUNCTION

Histidine is needed to manufacture histamine, an essential compound for achieving sexual climax in both men and women. Although research confirming a therapeutic benefit for this purpose is currently lacking, many experts consider histidine supplementation worth considering in those who can not achieve orgasm.

Potential applications of L-histidine:

- Arthritis (especially rheumatoid)
- Heavy metal poisoning
- impotence or frigidity

typical intake:

500-3000 mg per day (taken on an empty stomach)

contraindications:

none noted

L-Lysine

A) HERPES PREVENTION AND TREATMENT

Studies show lysine supplementation to speed recovery from, and prevent recurrence of, herpes infection. Benefits appear to be primarily due to the ability of lysine to antagonise arginine, which otherwise promotes herpes growth. Although research has primarily focused on herpes simplex, it is likely to be of value in other forms of herpes, such as shingles (herpes zoster).

B) CARDIOVASCULAR PROTECTANT

The formation of lesions in the arteries can lead to atherosclerosis, a precursor to heart disease. Lysine has been reported to strengthen the integrity of the tissue in the artery walls, a process that may inhibit the formation of arterial lesions and/or speed their healing. Lysine is also a precursor of carnitine, a potent cardiovascular tonic.

C) LEAD DETOXIFICATION

Lysine has been shown to bond to the heavy metal lead and effectively aiding its removal and reducing its toxicity.

Potential applications of L-lysine:

- Cold sores
- Shingles
- Genital herpes
- Atherosclerosis
- Lead poisoning

typical intake:

500-4000 mg per day (taken on an empty stomach)

contraindications:

none noted

L-Methionine

A) LIPOTROPIC AGENT

Methionine inhibits the accumulation of fatty deposits in the liver.

B) LIVER PROTECTION

Needed to manufacture cysteine, a component of glutathione, the potent liver protective tripeptide that neutralises countless compounds known to damage the liver. The role of methionine as a lipotropic agent also helps reduce sluggish liver function due to excessive fatty build-up.

C) DETOXIFIER

Through its conversion to cysteine, methionine may aid detoxification due to increased glutathione synthesis. Glutathione facilitates detoxification in the liver and cells through neutralising certain toxins, free radicals and by-products of metabolic and hormonal waste.

D) ANTI-ALLERGIC

Methionine appears to be of great value in reducing the severity of reactions to both food-related and respiratory allergens. This is due to its ability to detoxify histamine, the primary chemical involved in allergic reactions.

E) HYPEROESTROGENISM

Methionine may facilitate the removal of excessive oestrogen in the body. High oestrogen levels are very often associated with sluggish liver due to fat accumulation. Excessive oestrogen is a causal factor in most cases of premenstrual tension (PMT).

F) HISTADELIC (high histamine) DISORDERS

Various psychological disorders (e.g. certain cases of schizophrenia and depression) are often associated with excessive histamine levels. Methionine has been used with success in treating such disorders, when due to high histamine levels.

Potential applications of l-methionine:

- Lipotropic agent
- Sluggish liver function
- Detoxification
- Food allergies
- Environmental allergies (e.g. hayfever)
- PMT
- Depression (when associated with high histamine levels)
- Schizophrenia (when associated with high histamine levels)

typical intake:

500-1500 mg per day (taken on an empty stomach)

contraindications:

It is advised to ensure adequate intake of vitamin B6, B12 and folic acid when taking high levels of l-methionine.

S-Adenosylmethionine (SAM)

A) ANTI-DEPRESSANT

Numerous studies show that SAM is effective in treatment of depression. SAM donates methyl groups in the brain to aid in the re-synthesis of mood elevating brain compounds from their degraded by-products. Supplementation leads to increased activity and receptor binding of mood elevating neurotransmitters in the brain.

B) ANTI-ARTHRITIC

SAM is an important component of joint tissue, and a deficiency leads to a reduced integrity and tolerance of cartilage to wear and tear. Numerous studies involving tens of thousands of patients have shown SAM to be very effective in arthritis treatment. Symptomatic improvements in pain and inflammation were generally as good as, and sometimes better than, NSAID drugs (e.g. aspirin, ibuprofen, indomethacin, etc.). However, unlike NSAID drugs, SAM is not associated with inhibiting cartilage repair.

C) LIPOTROPIC AGENT

SAM is a form of methionine, which inhibits the accumulation of fatty deposits in the liver.

D) LIVER PROTECTION

Methionine enhances the manufacture of cysteine, a component of glutathione, the potent liver protective tripeptide that neutralises countless compounds known to damage the liver. The role of methionine as a lipotropic agent also helps reduce sluggish liver function due to excessive fatty build-up.

E) DETOXIFIER

Through conversion to cysteine, methionine may aid detoxification due to increased glutathione synthesis. Glutathione facilitates detoxification in the liver and cells through neutralising certain toxins, free radicals and by-products of metabolic and hormonal waste.

F) ANTI-ALLERGIC

Methionine appears to be of great value in reducing the severity of reactions to both food-related and respiratory allergens. This is due to its ability to detoxify histamine, the primary chemical involved in allergic reactions.

G) HYPEROESTROGENISM

SAM may facilitate the removal of excessive oestrogen in the body. High oestrogen levels are very often associated with sluggish liver due to fat accumulation. Excessive oestrogen is a causal factor in most cases of premenstrual tension (PMT).

H) HISTADELIC (high histamine) DISORDERS

Various psychological disorders (e.g. certain cases of schizophrenia and depression) are often associated with excessive histamine levels. Methionine has been used with success in treating such disorders, when due to high histamine levels.

Potential applications of SAM:

- Depression (except manic)
- Arthritis (especially osteo)
- Lipotropic agent
- Sluggish liver function
- Detoxification
- Food allergies
- Environmental allergies (e.g. hayfever)
- PMT
- Depression (when associated with high histamine levels)
- Schizophrenia (when associated with high histamine levels)

typical intake:

500-1500 mg per day (taken on an empty stomach)

contraindications:

It has been suggested that SAM should not be used in manic (bipolar) depression unless advised by a qualified medical health practitioner.

L-Ornithine

A) MUSCLE REPAIR AND BUILDING

Ornithine may stimulate growth hormone release, which is associated with an enhanced rate of muscle tissue synthesis. Through its conversion into arginine, ornithine may enhance the transport and storage of nitrogen in muscle tissue, as well as improving muscular energy through influencing the production of creatine phosphate.

B) LIVER PROTECTION

Ammonia, a major toxin to the liver, is converted into urea by ornithine (and arginine).

C) WOUND HEALING

Research shows that arginine, which may be elevated by ornithine supplementation, enhances collagen synthesis and speeds repair time of tissue injury from surgery.

D) IMMUNE SYSTEM STIMULATION

Arginine (such as from ornithine conversion) may protect the thymus (the main gland of immunity) from damage, as well as aiding T-cell activity.

Potential applications of l-ornithine:

- weight training and sports nutrition in general
- infection
- cirrhosis
- healing of injuries

typical intake:

500-2,500 mg per day (taken on an empty stomach)

contraindications:

Should not be supplemented in cases of active herpes infection or schizophrenia.

DL-Phenylalanine (DLPA)

A) ANTI-DEPRESSANT

DLPA is a precursor to the mood elevating compound dopamine. It also enhances other mood enhancing compounds such as PEA and endorphins.

B) PAIN RELIEVER

Studies show DLPA to be effective in chronic pain disorders, due to its elevation of the morphine-like endorphins in the brain.

C) MENTAL ALERTNESS

Aside from dopamine, DLPA converts in to other stimulatory brain chemicals, such as noradrenaline (norepinephrine), which may ultimately enhance mental alertness.

D) APPETITE CONTROL

Phenylalanine has been reported to enhance production of CCK (cholecystokinin), a compound which may reduce appetite.

Potential applications of DLPA:

- Depression
- Chronic pain (e.g. arthritis, back pain, etc.)
- Mental fatigue
- Appetite reduction

typical intake:

500-2000 mg per day (taken on an empty stomach)

contraindications:

Do not take in cases of phenylketonuria (PKU). Not to be used with MAO inhibitor drugs without the consent of a qualified medical health practitioner.

L-Phenylalanine

A) ANTI-DEPRESSANT

Phenylalanine is a precursor to the mood elevating compound dopamine. It also enhances other mood enhancing chemicals such as PEA and endorphins.

B) PAIN RELIEVER

Studies show phenylalanine to be effective in chronic pain disorders, due to its elevation of the morphine-like endorphins in the brain (DLPA is the form most commonly used in chronic pain).

C) MENTAL ALERTNESS

Aside from dopamine, DLPA converts in to other stimulatory brain chemicals, such as noradrenaline (norepinephrine), which may ultimately enhance mental alertness.

D) APPETITE CONTROL

Phenylalanine is reported to enhance production of CCK (cholecystokinin), a compound which may reduce appetite.

Potential applications of l-phenylalanine:

- Depression
- Chronic pain (e.g. arthritis, back pain, etc.)
- Mental fatigue
- Appetite reduction

typical intake:

500-2000 mg per day (taken on an empty stomach)

contraindications:

Do not take in cases of phenylketonuria (PKU). Not to be used with MAO inhibitor drugs without the consent of a qualified medical health practitioner.

Phosphatidylserine (PS)

A) MENTAL ENHANCEMENT

Though not a pure amino acid, a primary component of this important phospholipid is the amino acid, serine. PS has been shown to improve memory and mental acuity in both young, and especially older adults. The effects are due to multiple functions including; enhancing cell membrane fluidity, increasing the number of acetylcholine receptors, keeping fatty substances in the brain in a soluble state and helping to 'untangle' nerve pathways in the brain.

B) ANTI-DEPRESSANT

Mood elevation was also noted in studies on both young and elderly adults

C) MUSCLE REPAIR AND BUILDING

It appears that PS lowers levels of cortisol, a catabolic hormone that can speed the breakdown of muscle tissue.

Potential applications of PS:

- Senile dementia
- Alzheimer's Disease
- Excessive mental stress or mental fatigue
- Depression (especially in the elderly)
- Poor memory
- Bodybuilding

typical intake:

100-400 mg (of elemental PS) per day

contraindications:

Do not use if taking prescribed anti-coagulant drugs such as warfarin without the consent of a qualified medical health practitioner.

L-Proline

A) JOINT REPAIR

Proline is one of the most abundant compounds in the collagen structure of joint membranes.

B) TISSUE HEALING

Proline is necessary for collagen synthesis and repair, an important factor in healing of lesions, ulcers, burns or other forms of tissue injury.

C) CARDIOVASCULAR PROTECTION

The formation of lesions in the arteries can lead to atherosclerosis, a precursor to heart disease. Proline, through its role in collagen replacement, may inhibit breakdown of arterial collagen and speed the healing of existing arterial lesions.

Potential applications of l-proline:

- Arthritis
- Sports injuries (e.g. sprains, strains, etc.)
- Ulcers
- Burns
- Cardiovascular disease (e.g. atherosclerosis)

typical intake:

500-1500 mg per day (taken on an empty stomach)

contraindications:

none noted

Taurine

A) ANTI-HYPERTENSIVE

Taurine plays a major role in regulating the transport of minerals such as potassium, sodium, magnesium and calcium into and out of cardiovascular cells. It also suppresses angiotensin, a blood protein that causes blood pressure elevation.

B) HEART TONIC

By increasing the retention of potassium and magnesium in the heart muscle, this helps normalise heart rate and contractions.

C) CHOLESTEROL LOWERING

Increases production of taurocholate, a compound that causes more cholesterol to be excreted in the bile.

D) LIVER/GALLBLADDER TONIC

Taurine is needed to form bile in the liver and allows for more efficient bile excretion. Bile inhibits the formation of cholesterol-based stones forming in the gallbladder.

E) ANTI-CONVULSIVE

Taurine has a potent anti-convulsant effect due to its ability to stabilise nerve cell membranes.

F) CALMING AGENT

Acts as an inhibitory neurotransmitter in the brain, thus exerting a calming effect.

G) Eye protection

Taurine is the most abundant amino acid in the retina and protects the eye from various toxic influences.

Potential applications of taurine:

- High blood pressure
- Cardiomyopathy
- Heart arrhythmia
- Gallstones
- Poor fat digestion
- Epilepsy
- Anxiety and nervous tension
- Panic attacks
- Insomnia
- Age-related eye degeneration (e.g. cataracts, macular degeneration)
- Retinitis pigmentosa

typical intake:

500-3000 mg per day (taken on an empty stomach)

contraindications:

Do not take with aspirin or use on empty stomach if there is a history of stomach or duodenal ulcers.

Trimethylglycine (TMG)

A) HOMOCYSTEINE LOWERING

Also known as betaine, TMG donates methyl groups to the vascular-damaging compound homocysteine, which converts it back to methionine. High homocysteine levels are linked to various disorders such as heart disease and Alzheimer's Disease.

B) CARDIOVASCULAR TONIC

In addition to its homocysteine-lowering effect, TMG also converts into dimethylglycine (DMG), which has been shown to lower cholesterol and to reduce angina and heart arrhythmias.

C) ANTI-DEPRESSANT

TMG also donates methyl groups in the brain to aid in the re-synthesis of mood elevating brain compounds from their degraded by-products.

D) OXYGENATING EFFECTS

Converts into DMG, a compound that appears to increase oxygen levels in body tissues, a function that is especially pertinent in sports nutrition.

E) IMMUNE STIMULATION

DMG has been shown to enhance antibody response and white blood cell activity in general, and thus might be positively affected by TMG supplementation.

F) ANTI-CONVULSIVE

TMG, due to its conversion to DMG and glycine, may reduce susceptibility to seizures, such as in the case of epilepsy.

Potential applications of TMG:

- Atherosclerosis
- Angina
- Heart arrhythmias
- Depression
- Alzheimer's Disease
- Enhancing endurance and general exercise tolerance
- Fatigue
- Immune boosting
- Epilepsy

typical intake:

500-1000 mg per day (taken on an empty stomach)

contraindications:

none noted

L-5-Hydroxytryptophan (5-HTP)

A) ANTI-DEPRESSANT

Studies shown 5-HTP to be an effective mood elevator, due to its enhancing effect on brain serotonin levels.

B) SLEEP PROMOTING

Converts efficiently in the brain to serotonin, which is a potent tranquillising agent. Serotonin is a precursor to melatonin, a sleep-promoting hormone that is involved in setting the Circadian (sleep-wake) cycle.

C) ANTI-ANXIETY EFFECT

A significant calming effect is achieved through the elevation of brain serotonin, a potent brain and nervous system relaxant.

D) BEHAVIOURAL DISORDERS

Serotonin levels in the brain are often depressed in those with disturbances such as obsessive-compulsive disorder, aggressive behaviour and eating disorders (e.g. bulimia and anorexia). Research suggests that 5-HTP is often helpful in treating such conditions.

Potential applications of 5-HTP:

- Depression
- Insomnia
- Anxiety and nervous tension
- Eating disorders (e.g. anorexia and bulimia)
- Obsessive-compulsive disorder
- Aggressive behaviour

typical intake:

100-300 mg per day or as needed (taken on an empty stomach)

contraindications:

Do not use when taking anti-depressant drugs or prescribed tranquillisers without the consent of a qualified medical health practitioner. If nausea or diarrhoea occurs, it is often suggested to reduce dosage and then gradually build up.

L-Tyrosine

A) ANTI-DEPRESSANT

Tyrosine is a precursor to the mood elevating compound dopamine.

B) MENTAL ALERTNESS

Aside from dopamine, tyrosine converts in to other stimulatory brain chemicals, such as noradrenaline (norepinephrine), which may ultimately enhance mental alertness.

C) ANTI-STRESS EFFECT

Levels of dopamine, and stress-regulating hormones such as adrenaline, are depleted in times of stress. Tyrosine is required to manufacture these compounds, and as such may enhance the body's tolerance to mental and psychological influences of stress.

D) THYROID HORMONE SYNTHESIS

Tyrosine is required to manufacture thyroid hormones, and may be of value as part of a programme in hypothyroidism.

Potential applications of l-tyrosine:

- Depression
- Mental fatigue
- Stress-related anxiety, mental fatigue or exhaustion
- Hypothyroidism

typical intake:

500-2000 mg per day (taken on an empty stomach)

contraindications:

Not to be used with MAO inhibitor drugs without the consent of a qualified medical health practitioner.

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