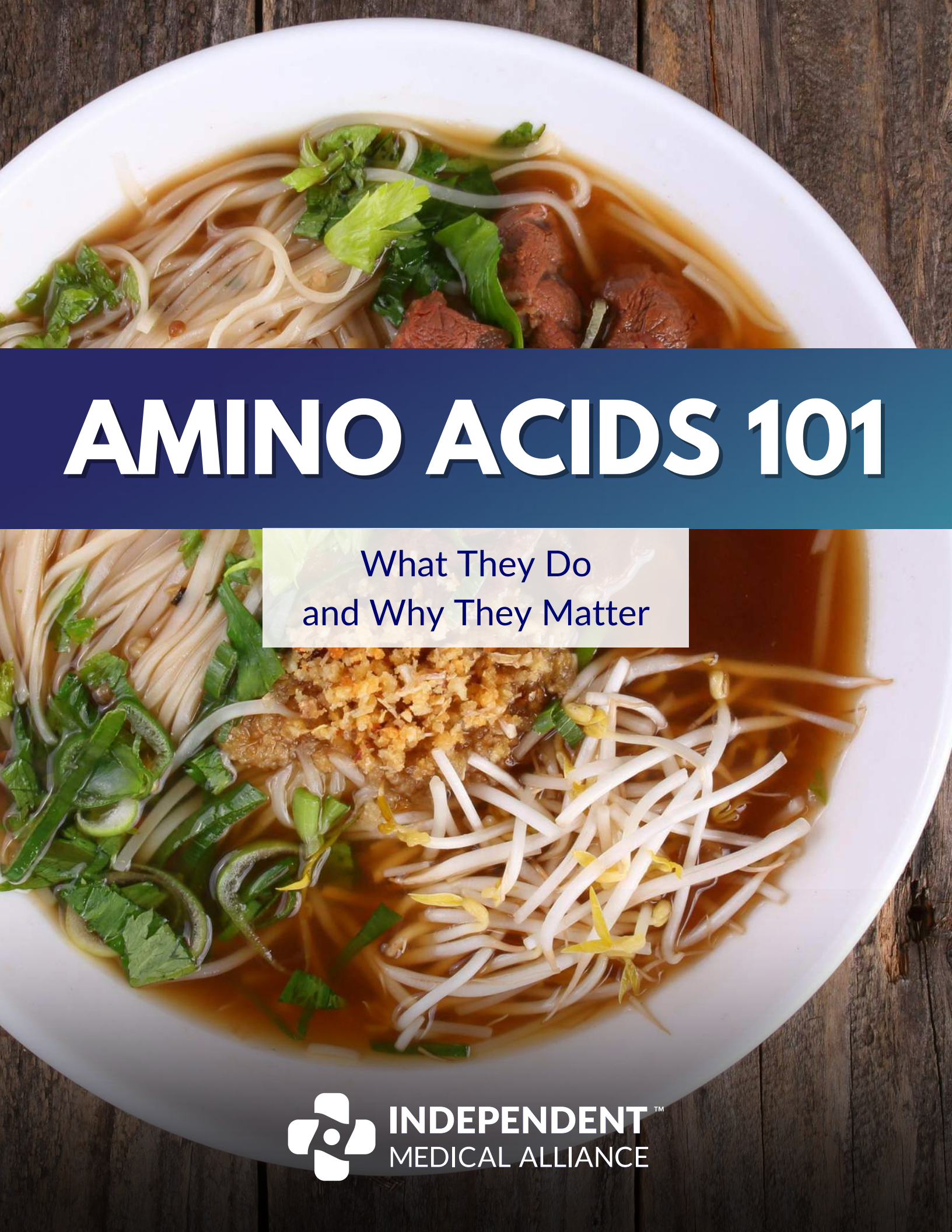


AMINO ACIDS 101

What They Do and Why They Matter

INDEPENDENT™ MEDICAL ALLIANCE

TABLE OF CONTENTS

Glycine
L-Arginine & L-Citrulline
L-Glutamine
L-Lysine
NAC (N-Acetyl Cysteine)
Taurine
L-Carnitine
L-Tyrosine
L-Tryptophan
GABA (gamma-aminobutyric acid)
5-HTP (5-Hydroxytryptophan)
L-Proline
L-Methionine
Inositol
BCAAs (branched chain amino acids)
L-Theanine

GLYCINE

Glycine is the simplest and most abundant amino acid in the human body, yet it is frequently overlooked in nutritional discussions. It is a major component of collagen—making up roughly one third of its structure—and plays essential roles in detoxification, neurotransmission, and metabolic function. Modern diets, which favor muscle meat over connective tissue and organ meats, are significantly depleted in glycine, creating a widespread functional deficiency.

How it helps:

- Essential building block of collagen and connective tissue
- Supports liver detoxification (phase II conjugation)
- Acts as an inhibitory neurotransmitter — promotes calm and sleep
- Supports healthy blood sugar regulation
- Promotes gut lining integrity
- Works synergistically with NAC to produce glutathione
- Supports healthy creatine synthesis
- May reduce inflammation and oxidative stress

Signs of deficiency:

- Poor sleep quality
- Joint and connective tissue problems
- Poor wound healing
- Muscle weakness
- Digestive issues and leaky gut
- Impaired detoxification
- Anxiety and poor stress resilience
- Elevated inflammation

Glycine-rich foods:

- Bone broth
- Collagen peptides
- Pork skin and pork rinds
- Chicken skin
- Beef (especially tougher cuts with connective tissue)
- Gelatin
- Cod and other fish
- Dairy products
- Spinach
- Eggs

Optimal Dosages:

- General health and sleep support: 3–5 g daily (taken before bed is particularly effective)
- Collagen and connective tissue support: 5–10 g daily
- Liver detox and glutathione support: 3–5 g daily alongside NAC
- Glycine is exceptionally safe even at high doses—no established upper limit
- Powder form is practical and cost effective given the doses involved
- Found abundantly in bone broth and collagen peptides—dietary sources are highly encouraged alongside supplementation

L-ARGININE & L-CITRULLINE

L-arginine is a semi-essential amino acid and the primary precursor to nitric oxide (NO), a critical signaling molecule that relaxes and dilates blood vessels, supporting cardiovascular function, circulation, and cellular energy. L-citrulline is increasingly preferred over arginine as a supplement because it converts to arginine more efficiently in the body and has superior bioavailability. Together they form a powerful cardiovascular and performance-supporting duo.

How it helps:

- Primary precursor to nitric oxide — supports healthy circulation
- Supports cardiovascular health and healthy blood pressure
- Enhances athletic performance and exercise recovery
- Supports erectile function and sexual health
- Promotes healthy immune function
- Supports wound healing and tissue repair
- Supports growth hormone secretion
- May support kidney detoxification pathways

Signs of deficiency:

- Poor circulation
- High blood pressure
- Fatigue and poor exercise tolerance
- Slow wound healing
- Weakened immune function
- Erectile dysfunction
- Poor muscle recovery

L-Arginine / L-Citrulline-rich foods:

- Watermelon (exceptionally high in citrulline)
- Pumpkin seeds
- Turkey and chicken
- Pork
- Soybeans
- Peanuts
- Dairy products
- Chickpeas
- Lentils
- Spirulina

Optimal Dosages:

- L-Citrulline (preferred form): 3–6 g daily for general health; 6–8 g pre-workout for performance
- L-Arginine: 3–6 g daily—less preferred due to poorer bioavailability and potential to trigger cold sore outbreaks in herpes-susceptible individuals
- Citrulline malate (2:1 ratio) popular for athletic performance—6–8 g pre-exercise
- Best taken on an empty stomach for cardiovascular use
- Those with herpes simplex virus should use L-citrulline over arginine and balance with L-lysine
- Avoid high-dose arginine if prone to cold sores

L-GLUTAMINE

L-glutamine is the most abundant amino acid in the bloodstream and a critical fuel source for rapidly dividing cells—particularly the cells lining the gut wall and immune cells. It is considered conditionally essential, meaning the body's demand for it increases dramatically under physical stress, illness, surgery, or intense exercise. Its central role in gut barrier integrity makes it foundational for anyone dealing with digestive issues, leaky gut, or immune dysfunction.

How it helps:

- Primary fuel source for intestinal lining cells
- Supports and repairs gut barrier integrity (leaky gut)
- Supports healthy immune function
- Promotes muscle recovery and reduces exercise-induced muscle breakdown
- Supports liver detoxification
- Supports healthy acid-base balance in the kidneys
- May reduce sugar and alcohol cravings
- Supports healthy nitrogen balance

L-Glutamine-Rich Foods:

- Beef
- Chicken
- Fish
- Eggs
- Dairy products (especially cottage cheese)
- Tofu
- Cabbage (raw is best, as cooking degrades glutamine)
- Spinach
- Bone broth
- Spirulina

Signs of deficiency:

- Leaky gut and digestive dysfunction
- Frequent illness and poor immune response
- Slow muscle recovery
- Sugar and alcohol cravings
- Poor wound healing
- Fatigue and poor endurance
- Mood disturbances
- Impaired detoxification

Optimal Dosages:

- Gut health and repair: 5–10 g daily on an empty stomach
- Immune support: 5–10 g daily
- Athletic recovery: 10–15 g daily (split doses around training)
- Serious gut repair protocols: up to 20–40 g daily under practitioner supervision
- Powder form strongly preferred due to the doses required
- Do not mix with hot liquids—heat degrades glutamine
- Those with cancer, seizure disorders, or liver disease should consult a practitioner before supplementing at high doses

L-LYSINE

L-lysine is an essential amino acid, meaning the body cannot synthesize it and it must come entirely from diet. It is a cornerstone of collagen synthesis, calcium absorption, and immune function. Lysine is perhaps best known for its well-documented antiviral properties, particularly against the herpes simplex virus, where it directly competes with and inhibits arginine—the amino acid the virus requires to replicate.

How it helps:

- Essential for collagen and connective tissue synthesis
- Supports calcium absorption and bone health
- Powerful antiviral properties — particularly against herpes simplex (cold sores, HSV-1 and HSV-2)
- Supports healthy immune function
- Promotes carnitine synthesis — supports fat metabolism and energy
- Supports healthy hormone and enzyme production
- May support anxiety reduction
- Supports wound healing and tissue repair

L-Lysine- Rich Foods:

- Meat (beef, chicken, pork, lamb)
- Fish (cod, sardines, tuna)
- Eggs
- Dairy products
- Legumes (especially soybeans)
- Spirulina
- Fenugreek seed
- Quinoa
- Pumpkin seeds
- Parmesan cheese

Signs of deficiency:

- Frequent cold sores or herpes outbreaks
- Poor wound healing
- Fatigue and weakness
- Poor appetite and nausea
- Brittle bones and poor calcium absorption
- Hair loss
- Irritability and poor concentration
- Impaired immune function

Optimal Dosages:

- General health: 1,000–3,000 mg daily
- Cold sore prevention and antiviral support: 1,000–3,000 mg daily (maintenance); 3,000–9,000 mg daily in divided doses during active outbreak
- Bone health support: 1,000–2,000 mg daily alongside calcium and vitamin D
- Best taken on an empty stomach for antiviral use
- Maintain a high lysine to arginine ratio in the diet when managing herpes—reduce arginine-rich foods (nuts, chocolate, seeds) during outbreaks
- Pairs well with vitamin C for collagen synthesis support

NAC (N-ACETYL CYSTEINE)

NAC is a supplemental form of the amino acid cysteine and one of the most clinically researched and versatile supplements available. It is the direct precursor to glutathione—the body's master antioxidant—making it foundational for detoxification and oxidative stress defense. NAC has been used medically for decades as an antidote to acetaminophen (Tylenol) overdose and as a mucolytic agent, but its broader applications in mental health, respiratory function, immune support, and liver protection are equally compelling.

How it helps:

- Direct precursor to glutathione — the master antioxidant
- Supports liver detoxification and protection
- Breaks down and thins mucus — supports respiratory health
- Supports mental health — researched in OCD, addiction, and depression
- Powerful antioxidant and anti-inflammatory
- Supports kidney protection during oxidative stress
- May reduce insulin resistance
- Supports healthy immune function
- Protects against heavy metal toxicity

Signs of deficiency:

- Low glutathione levels
- Poor detoxification capacity
- Frequent respiratory infections or chronic congestion
- Liver stress or impaired liver function
- Oxidative stress and high inflammation
- Poor mental health resilience
- Impaired immune response
- Chemical and environmental sensitivities

NAC-Rich Foods:

- NAC itself is not found in food—it is a modified form of cysteine
- Cysteine-rich foods (precursor): chicken, turkey, eggs, sunflower seeds, legumes, dairy, broccoli, garlic, onions

Optimal Dosages:

- General health and antioxidant support: 600–900 mg daily
- Liver support and detoxification: 1,200–1,800 mg daily in divided doses
- Respiratory health: 600 mg twice daily
- Mental health support (OCD, addiction, mood): 1,200–2,400 mg daily
- Best taken on an empty stomach or with a light meal
- Always pair with glycine to maximize glutathione synthesis (glycine is the rate-limiting cofactor)
- Pair with vitamin C to help recycle and extend glutathione activity
- Those on nitroglycerin or activated charcoal should consult a practitioner

TAURINE

Taurine is a sulfur-containing amino acid—technically an amino sulfonic acid—that is one of the most abundant compounds in the brain, heart, eyes, and muscles. Unlike most amino acids, it is not used to build proteins but rather serves critical roles in cellular regulation, bile acid conjugation, antioxidant defense, and electrolyte balance. Once considered non-essential, emerging research—including landmark longevity studies—suggests taurine levels decline significantly with age and that supplementation may be one of the most impactful interventions for healthy aging.

How it helps:

- Supports heart health and healthy heart rhythm
- Protects and supports eye health (retinal health)
- Supports healthy brain function and may reduce anxiety
- Essential for bile acid conjugation and fat digestion
- Supports healthy electrolyte balance inside cells
- Powerful antioxidant — protects mitochondria
- Supports athletic performance and reduces muscle fatigue
- Emerging longevity research — declining taurine linked to aging
- Supports liver health and detoxification

Signs of deficiency:

- Heart problems and poor cardiovascular function
- Poor eye health and vision decline
- Anxiety and poor stress resilience
- Poor fat digestion and bile issues
- Muscle weakness and poor recovery
- Fatigue and low energy
- Impaired liver function
- Electrolyte imbalances

Taurine-Rich Foods:

- Scallops and clams
- Tuna and salmon
- Octopus
- Turkey and chicken (dark meat)
- Beef
- Lamb
- Eggs (small amounts)
- Dairy products (small amounts)
- Seaweed (small amounts)

Optimal Dosages:

- General health and longevity: 1,000–2,000 mg daily
- Cardiovascular and eye support: 1,500–3,000 mg daily
- Athletic performance: 1,000–2,000 mg pre-exercise
- Anxiety and neurological support: 1,000–3,000 mg daily
- Taurine is exceptionally safe—studies have used up to 6,000 mg daily with no adverse effects
- Can be taken with or without food
- Naturally declines with age—supplementation becomes increasingly important after 40
- Vegans and vegetarians are at higher risk of deficiency, as taurine is found almost exclusively in animal foods

L-CARNITINE

L-Carnitine is a naturally occurring compound synthesized from the amino acids lysine and methionine, and is essential for transporting long-chain fatty acids into the mitochondria where they are burned for energy. It plays a critical role in energy metabolism, cardiovascular function, brain health, and reproductive health. Carnitine levels decline significantly with age, and deficiency is particularly common in vegans, vegetarians, and older adults.

How it helps:

- Transports fatty acids into mitochondria for energy production
- Supports fat metabolism and healthy body composition
- Promotes cardiovascular health and heart muscle function
- Supports brain health and cognitive function
- Supports male fertility and sperm motility
- Reduces exercise-induced muscle damage and supports recovery
- Supports healthy blood sugar regulation
- May slow cognitive decline associated with aging

Signs of deficiency:

- Fatigue and low energy
- Difficulty losing weight despite diet and exercise
- Muscle weakness and poor recovery
- Brain fog and poor concentration
- Heart irregularities
- Poor sperm motility and male infertility
- Cold intolerance
- Mood disturbances

L-Carnitine-Rich Foods:

- Beef (richest source)
- Lamb
- Pork
- Chicken
- Fish
- Dairy products
- Asparagus (small amounts)
- Avocado (small amounts)
- Whole wheat bread (small amounts)

Optimal Dosages:

- General health and energy: 500–1,000 mg daily
- Fat metabolism and body composition: 1,000–2,000 mg daily
- Cardiovascular support: 1,000–3,000 mg daily
- Cognitive and aging support: 1,500–2,000 mg as acetyl-L-carnitine (ALCAR)—the form that crosses the blood-brain barrier
- Male fertility: 1,000–3,000 mg daily
- Best taken before meals or before exercise
- Acetyl-L-carnitine (ALCAR) preferred for brain and neurological benefits; L-carnitine tartrate is preferred for athletic performance
- Vegans and vegetarians should supplement routinely, as carnitine is found almost exclusively in animal foods

L-TYROSINE

L-tyrosine is a non-essential amino acid that serves as the direct precursor to some of the body's most important neurotransmitters and hormones, including dopamine, norepinephrine, epinephrine, and thyroid hormones T3 and T4. It is the foundation of the catecholamine pathway, making it essential for mood, motivation, focus, stress response, and metabolic function. Under conditions of chronic stress, illness, or intense cognitive demand, tyrosine becomes conditionally essential as the body's ability to synthesize sufficient amounts is overwhelmed.

How it helps:

- Precursor to dopamine — supports motivation, pleasure, and focus
- Precursor to norepinephrine and epinephrine — supports stress response
- Essential for thyroid hormone production (T3 and T4)
- Supports mental performance under stress and sleep deprivation
- Promotes healthy mood and emotional resilience
- Supports healthy metabolism via thyroid support
- May support ADHD and attention-related challenges
- Supports melanin production (skin and hair pigment)

Signs of deficiency:

- Depression and low motivation
- Brain fog and poor concentration
- Fatigue and low energy
- Underactive thyroid symptoms
- Poor stress resilience
- Low libido
- Difficulty with focus and attention
- Premature greying of hair

L-Tyrosine- Rich Foods:

- Chicken and turkey
- Beef and pork
- Fish and seafood
- Eggs
- Dairy products (especially parmesan)
- Soy products
- Pumpkin seeds
- Peanuts
- Almonds
- Avocado

Optimal Dosages:

- General health and mood support: 500–1,000 mg daily
- Cognitive performance and stress resilience: 1,000–2,000 mg daily
- Thyroid support: 500–1,500 mg daily alongside iodine and selenium
- Best taken on an empty stomach 30–60 minutes before mentally demanding tasks or stressful situations
- Use N-acetyl-L-tyrosine (NALT) for enhanced bioavailability
- Avoid taking alongside thyroid medications without practitioner guidance
- Those with melanoma, hyperthyroidism, or taking MAOIs should consult a practitioner before supplementing

L-TRYPTOPHAN

L-tryptophan is an essential amino acid and the sole dietary precursor to serotonin, the neurotransmitter most associated with mood, emotional well-being, and social behavior. It is also the precursor to melatonin, making it foundational for both sleep and circadian rhythm regulation. Despite its critical importance, tryptophan competes with other large neutral amino acids for transport across the blood-brain barrier, meaning dietary intake alone does not guarantee adequate brain levels.

How it helps:

- Sole precursor to serotonin — supports mood and emotional wellbeing
- Precursor to melatonin — supports healthy sleep and circadian rhythm
- Supports anxiety reduction and stress resilience
- Promotes healthy appetite regulation
- Supports cognitive function and memory
- May reduce symptoms of depression and seasonal affective disorder
- Supports healthy pain tolerance
- Promotes healthy immune function via NAD+ pathway

Signs of deficiency:

- Depression and low mood
- Anxiety and irritability
- Poor sleep and insomnia
- Increased pain sensitivity
- Carbohydrate cravings
- Poor concentration and memory
- Seasonal mood changes
- Aggressive behavior and poor impulse control

L-Tryptophan-Rich Foods:

- Turkey
- Chicken
- Eggs
- Cheese (especially cheddar and parmesan)
- Pumpkin seeds
- Tofu and soy products
- Salmon and tuna
- Milk and dairy
- Peanuts
- Oats

Optimal Dosages:

- General mood and well-being: 500–1,000 mg daily
- Sleep support: 1,000–2,000 mg taken 30–60 minutes before bed
- Depression and anxiety support: 2,000–4,000 mg daily in divided doses
- Consider 5-HTP (a direct tryptophan metabolite) as an alternative—it more readily converts to serotonin and requires lower doses (100–300 mg)
- Do not combine with SSRIs, SNRIs, or MAOIs without practitioner supervision due to risk of serotonin syndrome
- Take on an empty stomach or with a small carbohydrate snack—carbohydrates enhance tryptophan transport to the brain
- Best taken separately from high-protein meals which compete for absorption

GABA (GAMMA-AMINOBUTYRIC ACID)

GABA is the brain's primary inhibitory neurotransmitter, working by slowing down neuronal activity, promoting calm, reducing anxiety, and facilitating sleep. While technically an amino acid derivative rather than a protein-building amino acid, it is closely related and functionally essential. Low GABA activity is strongly associated with anxiety disorders, insomnia, epilepsy, and chronic stress. Many commonly used medications, including benzodiazepines and alcohol, work by enhancing GABA signaling—making natural GABA support relevant for those seeking to reduce reliance on these substances.

How it helps:

- Primary inhibitory neurotransmitter — promotes calm and relaxation
- Supports healthy sleep onset and sleep quality
- Reduces anxiety and nervous system hyperactivity
- Supports healthy stress response
- May reduce blood pressure
- Supports healthy growth hormone secretion
- May reduce symptoms of PMS and menopause
- Supports healthy pain regulation

Signs of deficiency:

- Anxiety and racing thoughts
- Insomnia and poor sleep quality
- Chronic stress and inability to relax
- Irritability and mood instability
- Muscle tension
- Seizure susceptibility
- Cravings for alcohol, carbohydrates, or sedatives
- Overwhelm and sensory sensitivity

GABA-Rich Foods:

- Fermented foods (kimchi, miso, tempeh, kefir)
- Sprouted grains and legumes
- Tomatoes
- Spinach and leafy greens
- Mushrooms
- Broccoli
- Sweet potato
- Lentils
- Chestnuts
- Green and black tea

Optimal Dosages:

- General calm and stress support: 250–500 mg daily
- Sleep support: 500–750 mg taken 30–60 minutes before bed
- Anxiety support: 500–1,000 mg daily in divided doses
- Pharma GABA (naturally fermented form) is considered more effective than synthetic GABA at crossing the blood-brain barrier
- L-theanine works synergistically with GABA—combining them enhances the calming effect
- Magnesium glycinate also supports GABA signaling and pairs well
- Those tapering from benzodiazepines or alcohol should work with a practitioner

5-HTP (5-HYDROXYTRYPTOPHAN)

5-HTP is a naturally occurring amino acid and the direct metabolic precursor to serotonin, sitting one step closer to serotonin than L-tryptophan in the biosynthetic pathway. It is derived from the seeds of the African plant Griffonia simplicifolia and crosses the blood-brain barrier efficiently, making it one of the most direct and effective natural tools for supporting serotonin levels. Unlike tryptophan, 5-HTP does not compete with other amino acids for brain transport, giving it a more reliable and predictable effect on mood, sleep, and appetite regulation.

How it helps:

- Direct precursor to serotonin — supports mood, emotional wellbeing, and calm
- Supports healthy sleep — serotonin converts to melatonin
- Reduces anxiety and promotes relaxation
- Supports healthy appetite regulation and reduces carbohydrate cravings
- May reduce frequency and severity of migraines and tension headaches
- Supports healthy pain tolerance via serotonin pathways
- May reduce symptoms of fibromyalgia
- Supports healthy weight management via appetite suppression
- Promotes emotional resilience and stress tolerance

Signs of deficiency:

- Depression and persistently low mood
- Anxiety and excessive worry
- Poor sleep and insomnia
- Carbohydrate and sugar cravings
- Increased pain sensitivity
- Emotional volatility and poor stress resilience
- Compulsive or addictive behaviours
- Migraines and tension headaches
- Poor appetite regulation

5-HTP-Rich Foods:

- 5-HTP is not found directly in food
- Foods rich in tryptophan (the precursor to 5-HTP): turkey, chicken, eggs, pumpkin seeds, dairy products, tofu, salmon, oats, bananas

Optimal Dosages:

- General mood and well-being: 50–100 mg daily
- Sleep support: 100–200 mg taken 30–60 minutes before bed
- Depression and anxiety support: 100–300 mg daily in divided doses
- Appetite and weight management: 50–100 mg before meals
- Always start at the lowest dose (50 mg) and increase gradually
- Always take with vitamin B6 (P5P)—an essential cofactor for converting 5-HTP to serotonin
- Never combine with SSRIs, SNRIs, MAOIs, or St John's Wort without practitioner supervision—serious risk of serotonin syndrome
- Avoid taking with protein-rich meals—amino acids compete for brain transport
- Do not use continuously long term without breaks—consider cycling with L-tryptophan
- Those with carcinoid syndrome or eosinophilia-myalgia syndrome should avoid

L-PROLINE

L-proline is a non-essential amino acid and one of the most critical building blocks of collagen—the most abundant protein in the human body. Together with glycine, proline constitutes the majority of collagen's amino acid structure, making it indispensable for the integrity of skin, joints, tendons, ligaments, blood vessels, and the gut lining. While the body can synthesize proline, production often falls short of optimal—particularly under conditions of aging, chronic stress, or high physical demand.

How it helps:

- Essential building block of collagen alongside glycine
- Supports skin elasticity and healthy aging
- Promotes joint, tendon, and ligament health
- Supports gut lining integrity and repair
- Supports cardiovascular health — maintains arterial wall integrity
- Promotes wound healing and tissue repair
- Supports healthy immune function
- May support healthy blood pressure via arterial health

L-Proline-Rich Foods:

- Bone broth
- Collagen peptides
- Beef and pork (especially tough cuts)
- Chicken skin
- Gelatin
- Egg whites
- Dairy products
- Asparagus
- Mushrooms
- Cabbage

Signs of deficiency:

- Poor skin elasticity and premature aging
- Joint pain and poor connective tissue integrity
- Slow wound healing
- Digestive issues and leaky gut
- Cardiovascular weakness
- Muscle and tendon injuries
- Poor recovery from exercise or injury

Optimal Dosages:

- General health and skin support: 500–1,000 mg daily
- Collagen and connective tissue support: 1,000–2,000 mg daily
- Best taken alongside vitamin C—essential for converting proline to hydroxyproline, the stabilized form used in collagen
- Found abundantly in collagen peptides and bone broth—dietary sources are an excellent and practical way to supplement
- Pairs powerfully with glycine—take together for maximum collagen synthesis support
- Works best as part of a broader collagen support protocol including vitamin C, silica, and zinc

L-METHIONINE

L-methionine is an essential sulfur-containing amino acid that serves as the starting point for numerous critical biochemical pathways. It is the precursor to S-adenosylmethionine (SAMe)—the body's universal methyl donor—making it foundational for methylation, which affects gene expression, neurotransmitter production, detoxification, and inflammation regulation. Methionine is also the precursor to cysteine, taurine, and ultimately glutathione, placing it at the head of the entire sulfur amino acid pathway.

How it helps:

- Precursor to SAMe — supports methylation throughout the body
- Supports liver health and detoxification
- Essential for glutathione production via the transsulfuration pathway
- Promotes healthy mood — SAMe is well researched for depression
- Supports joint health — SAMe supports cartilage synthesis
- Supports healthy DNA methylation and gene expression
- Promotes healthy skin, hair, and nail growth
- Supports cardiovascular health via homocysteine regulation

Signs of deficiency:

- Fatty liver and impaired liver detoxification
- Depression and poor mood
- Brittle hair and nails
- Muscle weakness and fatigue
- Poor wound healing
- Elevated homocysteine (cardiovascular risk)
- Impaired detoxification
- Joint degeneration

L-Methionine-Rich Foods:

- Beef and lamb
- Chicken and turkey
- Pork
- Fish (tuna, salmon, sardines)
- Eggs
- Dairy products
- Brazil nuts
- Sesame seeds
- Spirulina
- Tofu

Optimal Dosages:

- General health: 500–1,000 mg daily from dietary sources is usually sufficient
- Liver and detox support: 1,000–2,000 mg daily
- Mood support: Consider SAMe directly at 400–1,600 mg daily as a more targeted approach
- Important: High methionine intake raises homocysteine—always ensure adequate B6, B12, and folate when supplementing to support healthy homocysteine metabolism
- Those with homocystinuria or bipolar disorder should consult a practitioner before supplementing
- Balance methionine with glycine—a high methionine-to-glycine ratio is associated with increased inflammatory and aging markers

INOSITOL

Inositol is a naturally occurring sugar alcohol that functions as a critical component of cell membrane phospholipids and serves as a secondary messenger in numerous hormonal and neurotransmitter signaling pathways. Once classified as vitamin B8, it is now understood that the body can synthesize it, though often not in sufficient amounts under conditions of metabolic stress, hormonal imbalance, or mental health challenges. Inositol has emerged as one of the most exciting and clinically validated natural compounds for PCOS, anxiety, OCD, and metabolic health—with a particularly impressive body of research in female hormonal health.

How it helps:

- Supports healthy insulin signaling and glucose metabolism
- Clinically validated for PCOS — reduces testosterone, restores ovulation, and improves insulin sensitivity
- Supports healthy mood — particularly anxiety, OCD, and panic disorder
- Supports healthy serotonin and dopamine signaling
- Promotes healthy egg quality and fertility in women
- Supports healthy thyroid function
- Supports healthy liver fat metabolism — reduces non-alcoholic fatty liver disease
- Supports healthy hair growth in PCOS-related hair loss
- Supports healthy fetal neural tube development
- Promotes healthy sleep quality

Signs of deficiency:

- Anxiety, panic attacks, and OCD tendencies
- PCOS symptoms — irregular cycles, elevated androgens, cystic ovaries
- Poor insulin sensitivity and blood sugar dysregulation
- Difficulty conceiving
- Poor egg quality
- Fatty liver
- Depression and poor mood
- Hair thinning and loss (androgen-driven)
- Poor sleep quality

Inositol-Rich Foods:

- Citrus fruits (especially oranges and grapefruit)
- Cantaloupe
- Beans and legumes
- Brown rice and whole grains
- Corn
- Sesame seeds
- Wheat germ
- Nuts (especially almonds and peanuts)
- Fresh vegetables broadly
- Note: Therapeutic doses required for clinical benefit are difficult to achieve through food alone—supplementation is necessary

Optimal Dosages:

- General mood and anxiety support: 2–4 g daily of myo-inositol
- OCD and panic disorder: 12–18 g daily—the most researched therapeutic dose for these conditions
- PCOS and hormonal support: 4 g myo-inositol combined with 100 mg D-chiro-inositol daily—the 40:1 ratio is the most clinically validated combination
- Fertility and egg quality support: 4g myo-inositol daily—begin at least 3 months before conception attempts
- Metabolic and blood sugar support: 2–4 g daily with meals
- Inositol is exceptionally safe even at high doses—occasional mild nausea and digestive upset at doses above 12 g
- Powder form is most practical and cost effective at therapeutic doses
- Effects on PCOS and hormonal health are cumulative—allow 3–6 months for full benefit
- Pairs powerfully with folate, NAC, and omega-3 for comprehensive PCOS support

BRANCHED CHAIN AMINO ACIDS (BCAAS)

BCAAs—leucine, isoleucine, and valine—are a group of three essential amino acids named for their branched molecular structure. Unlike most amino acids, which are metabolized in the liver, BCAAs are metabolized directly in muscle tissue, making them uniquely important for muscle protein synthesis, energy during exercise, and recovery. Leucine in particular is the primary trigger for muscle protein synthesis, acting as a direct signal to the mTOR pathway. BCAAs are among the most researched sports nutrition supplements, but their benefits extend well beyond athletics into liver health, immune function, and metabolic support

How it helps:

- Stimulates muscle protein synthesis — particularly leucine via mTOR pathway
- Reduces exercise-induced muscle breakdown
- Supports faster recovery from intense exercise
- Provides direct energy source for muscle tissue during exercise
- Supports liver health — used therapeutically in liver cirrhosis
- May reduce mental fatigue during prolonged exercise
- Supports healthy immune function
- Supports healthy blood sugar regulation — isoleucine enhances glucose uptake

Signs of deficiency:

- Muscle loss and poor recovery
- Fatigue during exercise
- Poor athletic performance
- Muscle soreness and slow recovery
- Impaired liver function
- Poor wound healing
- Immune dysfunction
- Blood sugar instability

BCAAs-Rich Foods:

- Whey protein
- Beef and lamb
- Chicken and turkey
- Eggs
- Fish and seafood
- Dairy products (especially Greek yogurt)
- Soy protein
- Pumpkin seeds
- Quinoa
- Lentils

Optimal Dosages:

- General health and muscle maintenance: 5–10 g daily
- Athletic performance and recovery: 10–20 g daily—split around training
- The optimal leucine to isoleucine to valine ratio is 2:1:1
- Best taken before or during exercise for performance; after exercise for recovery
- Whole food protein sources containing BCAAs (whey, meat, eggs) are often superior to isolated BCAA supplements if total protein intake is adequate
- Whey protein is naturally rich in BCAAs and may be more cost effective than isolated BCAA supplements
- Older adults benefit significantly from higher BCAA intake to counteract age-related muscle loss (sarcopenia)

L-THEANINE

L-theanine is a naturally occurring amino acid found almost exclusively in tea leaves, particularly green tea, where it is responsible for the calm yet alert mental state associated with tea drinking. It works by increasing alpha brain wave activity—the same relaxed-focus state associated with meditation—and by modulating key neurotransmitters, including GABA, serotonin, and dopamine. Unlike sedatives or anxiolytics, L-theanine promotes relaxation without drowsiness, making it uniquely valuable for daytime calm and focused cognitive performance.

How it helps:

- Promotes calm relaxation without sedation or drowsiness
- Increases alpha brain wave activity — supports focused, meditative mental state
- Supports healthy GABA, serotonin, and dopamine levels
- Reduces anxiety and stress response
- Enhances cognitive performance and focus — especially combined with caffeine
- Supports healthy sleep quality and sleep onset
- May reduce blood pressure during stress
- Supports immune function via gut microbiome modulation
- Protects neurons from overstimulation and oxidative stress

Signs of deficiency:

- L-theanine is not an essential nutrient, so there is no classical deficiency state —however, low intake is associated with:
- Anxiety and chronic stress
- Poor sleep quality and racing thoughts at bedtime
- Difficulty focusing without stimulants
- Heightened stress response and irritability
- Caffeine sensitivity and jitteriness
- Poor stress resilience

L-Theanine-Rich Foods:

- Green tea (highest concentration)
- Black tea
- White tea
- Oolong tea
- Matcha (concentrated green tea powder—richest dietary source)
- Some mushroom varieties (small amounts)
- Bay bolete mushrooms
- Guayusa tea
- Gyokuro green tea (shade-grown is particularly high)

Optimal Dosages:

- General calm and focus: 100–200 mg daily
- Anxiety and stress support: 200–400 mg daily
- Sleep support: 200 mg taken 30–60 minutes before bed
- Cognitive performance—the caffeine + L-theanine stack (typically 100 mg caffeine : 200 mg theanine) is one of the most well-researched combinations for sustained focus without jitteriness
- Suntheanine is the most clinically studied patented form
- Exceptionally safe—no known toxicity or upper limit established
- Can be taken with or without food at any time of day

A NOTE ON CONTRAINDICATIONS

The information contained in this guide is intended for educational purposes only and should never replace the personalized guidance of a qualified healthcare practitioner. While every nutrient and compound featured in these pages has a well-established safety profile at the doses outlined, there are important considerations to be aware of before beginning any new supplement protocol.

Medications and supplement interactions to be aware of:

Antidepressants and psychiatric medication: 5-HTP, L-tryptophan, St. John's Wort, and SAMe should never be combined with SSRIs, SNRIs, or MAOIs without practitioner supervision due to risk of serotonin syndrome.

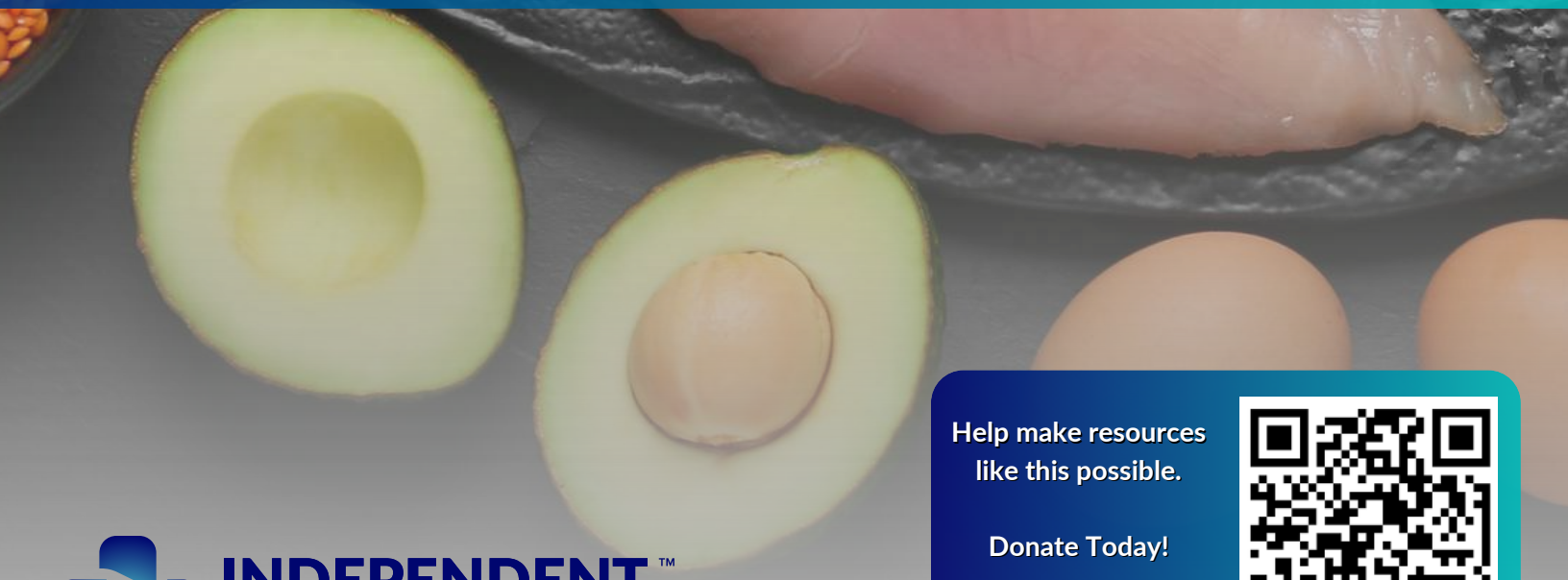
Special populations requiring extra caution:

Children and adolescents: Doses throughout this guide are intended for adults. Always seek professional guidance for supplementing children.

Thanks to you, this ‘Amino Acids 101’ guide is free!

We’re 100% donor-supported. Your gift enables us to do this critical research and create these life-saving, FREE resources.

IMA is a 501(c)(3) organization. Your gift is tax-deductible.



INDEPENDENT™ MEDICAL ALLIANCE

Help make resources like this possible.

Donate Today!

IMAhealth.org/donate