

WEIGHT CONTROL • HEALTHY RECIPES • SPIRITUAL WELLNESS • LIVING HEALTHY

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**Improve
Your Health
with
Amino Acids**

**What You Need
to Know about
Blood Sugar
and Alcohol**

**When Is the Best
Time to Take
Berberine?**

**What to Eat
for Strong Muscles**

Home Cures That Work

Achieving strong muscles and overall health relies on a well-rounded diet. Protein, essential for muscle repair and growth, is more efficiently absorbed from animal sources, but plant-based proteins can also meet your needs when combined correctly. Carbohydrates, particularly complex carbs like oats and sweet potatoes, provide the energy needed for workouts and muscle maintenance. Calcium and vitamin D, vital for muscle function, are found in dairy and certain fish, with supplements beneficial for those lacking dietary intake. Other essential nutrients include creatine, essential amino acids, iron, magnesium, potassium, and probiotics, all contributing to muscle health and overall well-being.

Managing high blood sugar levels requires caution with alcohol, which can cause fluctuations in glucose levels and increase insulin sensitivity. Moderation and careful monitoring are essential. Berberine, derived from plants like goldenseal, offers benefits in weight management, cholesterol regulation, and insulin sensitivity. Taken in divided doses with meals, it can aid digestion and overall health. Understanding the digestion and absorption of amino acids, influenced by diet, health conditions, and digestive efficiency, helps in making informed dietary choices that support muscle health and well-being.

The process of protein digestion begins in the stomach, where acid and enzymes break down proteins into peptides and amino acids. Factors such as meal composition, gastrointestinal pH, and digestive tract health can impact this process. Insulin resistance and other conditions may also impair amino acid absorption, highlighting the need for a balanced diet and, in some cases, supplementation.

For more in-depth information on these topics and practical health tips, we invite you to read more in this month's issue of Home Cures That Work. Your journey to better health and vitality starts here.

For your health,

Cheryl Ravey,
Editor, Home Cures That Work

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HOW UNDERSTANDING AMINO ACID DIGESTION CAN IMPROVE YOUR HEALTH

by Dr. Scott Saunders, M.D.



“YOU ARE WHAT you eat!” The huge words from a colorful poster in the cafeteria of my elementary school keep coming to mind. Fifty years ago, as a child, and being very literal, I thought I would turn into a cow, a fish, or a sprig of broccoli, as pictured on the poster, if I ate those things. Those who are less literal might still think they have chicken, fish, egg, or milk proteins in their bodies – This is NOT the case! The digestive system takes every single protein you eat, completely digests it into individual amino acids, and then allows you to use them to make your own proteins.

Proteins are long chains of amino acids. It is not protein that we need, it's amino acids. We make our own proteins out of the amino acids we absorb. Therefore, when we eat protein, it is essential that we digest it completely, and absorb the amino acids.

DIGESTION OF PROTEINS

Have you ever wondered why eggs get hard when you cook them?[i]

Albumen is the white part of the egg. It is made of a bunch of individual balls of protein suspended in water. Heat causes the little balls of protein to unravel, and then the strings of protein wind around each other like a hairball, and start sticking to each other, called crosslinking. When they are all stuck together, they can no longer move separately, so they become a solid, instead of a liquid.

This same process goes on in your stomach.[ii] The acid in your stomach acts on protein like heat, causing the little protein molecules that you just broke up by chewing to unravel and open up, but then, instead of allowing them to stick together,

the stomach has ENZYMES that cut them into pieces as they unwind, so they don't harden. Then, they go down into the small intestine where pancreatic enzymes break down the short protein chains, called peptides, into individual amino acids. These amino acids are absorbed through the intestine, going into the blood so every cell in the body can use them to make proteins and other things. Thus, EVERY ONE of the proteins in your body is made by you. They are each unique to you from your hair to your toenails. You have no proteins that belong to, or came from, anyone, or anything else. This is important because your immune system uses the uniqueness of your proteins to identify you as you.

To properly digest proteins, the stomach must produce acid – a lot of acid. The pH inside your stomach is enough to burn you severely if it spilled on you.[iii] It must denature proteins, and your skin is made of protein. This acid along with enzymes are required to digest the proteins you eat.

We make acid and digestive enzymes according to what we eat. Eating protein causes the production of a hormone called “gastrin” which tells the stomach to make more acid so the proteins can be digested. Eating sugar, on the other hand, causes the production of a hormone called GIP (Gastric Inhibitory Polypeptide) which stops the stomach from making acid and enzymes. So, if we eat only protein in a meal, we will digest it easily, but if we eat sugar with the protein, it may prevent the full digestion of proteins. There are many proteins in a modern diet that are mixed with sugar. For example:

- Flavored yogurt
- Peanut butter with honey
- Ketchup on hamburgers
- Chocolate milk

- BBQ sauce on meat
- Bread and cheese
- Cinnamon rolls

These all contain a mixture of protein and sugar which may impair the digestion of the protein. “What about cinnamon rolls?” you ask. There is gluten in the cinnamon roll that requires a high level of acid to digest. Many people have celiac disease because of eating sugar with wheat protein. Individuals will respond differently, it is just something to keep in mind, especially if you lack amino acids.

ABSORPTION OF AMINO ACIDS[iv]

Amino acids must be actively absorbed in the intestines. There are multiple mechanisms for absorption, and therefore multiple things that can go wrong, preventing absorption and causing deficiencies.

Lack of Digestive Enzymes: digestive enzymes are essential for breaking proteins down into amino acids.

The wrong Gastrointestinal pH: Different enzymes require specific pH levels to function optimally. For instance, pepsin in the stomach needs a highly acidic environment (pH 1.5-3.5), whereas enzymes in the small intestine, such as trypsin and chymotrypsin, require a slightly alkaline pH (around 7-8).

Poor Gastrointestinal Health: Conditions such as celiac disease, “leaky gut,” Crohn's disease, or other inflammatory bowel diseases can damage the intestinal lining, leading to malabsorption of amino acids.

Presence of Antinutrients: Phytates

(found in grains and legumes), lectins (from seeds and vegetables), and tannins (found in some teas and fruits) can bind amino acids and make them less available for absorption.

Diet Composition: dietary components can hinder amino acid absorption. For example, sugar can compete with amino acid absorption, as can antacids and calcium supplements.

Transport Mechanisms: Some amino acids share the same transport channels across the intestinal membrane. For example, leucine, isoleucine, valine, methionine, and threonine all share transporter systems, so a high concentration of one can limit the absorption of the others.

Meal Timing: eating late at night can prevent digestion and absorption of amino acids.

Medications: acid reducers for acid reflux can decrease both the stomach acid and enzymes that digest proteins.

The absorption of amino acids is complex, requiring multiple mechanisms working together to make sure you have enough of each. Your cells can make some of them, but some amino acids are essential.

ESSENTIAL AMINO ACIDS[v]

Nine amino acids are called “essential” because you cannot make them in your body. This means that the only way to get these is from your diet. All are needed to make most proteins, but each has a special function:

- 1. Histidine: growth and repair of tissues, production of blood cells, and helps

protect nerve cells

- 2. Isoleucine: muscle metabolism, immune function, hemoglobin production, and energy regulation
- 3. Leucine: protein synthesis, muscle repair, and regulation of blood sugar levels; stimulates growth hormone production
- 4. Lysine: growth, tissue repair, hormone production, enzymes, and antibodies
- 5. Methionine: energy metabolism and detoxification; tissue growth and the absorption of zinc and selenium
- 6. Phenylalanine: Brain function, makes tyrosine, dopamine, epinephrine, nor-epinephrine and thyroid; also required for enzymes
- 7. Threonine: collagen and elastin, and nervous system function
- 8. Tryptophan: maintain proper nitrogen balance and serotonin
- 9. Valine: muscle growth and regeneration, energy production

If you are missing any of the essential amino acids, you can get deficiency diseases of all kinds, as you can see from their function. You want to be sure you get a good balance of these from your food.

AMINO ACIDS IN DIFFERENT FOODS

In the Old Testament, the prophet Daniel and his companions were offered a place in the king’s court but were required to eat the king’s meat. They proposed a scientific test to see if they could fare well on

“pulse” a mixture of grains and legumes (a vegan diet). They did fine.

All food has protein because life requires protein to function. Plants make lots of protein. However, the types and amounts of plant proteins are different so they have a different amino acid profile. They are also digested differently.

Animal proteins, including meat, are considered complete proteins because they contain all the essential amino acids in proportions suitable for human needs.[vi] The structure of meat protein is typically more accessible for digestive enzymes to break down compared to many plant proteins. This is partly due to the fibrous nature of plant cell walls and the complex structures in some plant proteins, which can make them less accessible to digestive enzymes. Also, plants often contain antinutritional factors such as phytates, tannins, lectins, and protease inhibitors, which can interfere with protein digestion and absorption.

Moreover, plant proteins often lack one or more essential amino acids or have them in lower quantities, especially if the food is processed. White flour, white rice, and other processing of plant foods remove much of the protein. It is possible to obtain sufficient and high-quality protein from a well-planned plant-based diet by choosing a wide variety of less processed, whole foods. For example, effectively combining different plant protein sources, like beans and brown rice, can provide a complete amino acid profile.[vii]

INSULIN RESISTANCE AND AMINO ACIDS:[viii]

We have already talked about how the

digestion of proteins can be inhibited by sugar. But there is more. Insulin resistance also has a large effect on amino acids. Insulin stimulates the uptake of amino acids and the production of proteins. Insulin is a growth hormone. So, when people have insulin resistance these mechanisms stop working. Not only is glucose blocked from getting into cells, it also prevents amino acid transport. The amino acids most affected are those that are most important for energy and growth:

- Leucine
- Isoleucine
- Valine
- Phenylalanine
- Tryptophan
- Tyrosine
- Methionine
- Serine
- Proline
- Glutamine

Deficiencies in these amino acids will slow healing, cause depression and anxiety, can lead to Parkinson's Disease, Alzheimer's Disease, and immune dysfunction. Some of the deficiencies also lead to low thyroid, fatigue, weakness, and lack of energy production. [People with insulin resistance](#) are often found to be deficient in one or more of these amino acids and are told to take supplements.

AMINO ACID SUPPLEMENTATION

It is common today for physicians to prescribe amino acids for all sorts of health issues, such as:

- Lysine to prevent herpes.[ix]
- Tryptophan for depression and anxiety.[x]
- Cysteine (NAC) for liver detox.[xi]
- Arginine for hypertension.[xii]
- BCAA (branched-chain amino acids: Leucine, Isoleucine, Valine) to build muscle.[xiii]
- Tyrosine for low thyroid.[xiv]
- Glutamine for intestinal problems.[xv]

The problem with this, however, is that these amino acids compete for absorption with other amino acids. We need all the amino acids, not just some of them. Taking large amounts of one may change the balance of amino acids in the body. For example, taking extra lysine lowers arginine, which blocks the herpes virus from replicating. However, less arginine lowers nitric oxide which is needed to relax blood vessels, causing high blood pressure.

Amino acid supplementation is sometimes needed for a specific purpose, but it is best to have a balance in all amino acids. This balance almost always is a matter of digesting and absorbing the protein you eat. For this reason, before taking supplements, it is better to make sure your digestion, absorption, and metabolism of proteins is working properly.

Those who may have genetic or other metabolic dysfunction, should test amino acids in both urine and blood. The urine shows what you are excreting from your kidneys, and the blood shows the level of amino acids you have available to make

proteins. These tests will determine if you need to supplement one or more amino acids.

MORE IS NOT BETTER

We have a persistent concept in modern society that if some is good, then more is better. If I need all the amino acids, why don't I just take protein supplements all the time? This can be counter-productive, especially to those who have insulin resistance. Remember that insulin resistance prevents amino acids from getting into the body, into the brain, and into cells. That creates an imbalance. Some get in, but some don't. This creates a bottleneck of amino acids that prevent proteins from being made. Moreover, there are excessive amino acids in the blood that cannot get into cells, making them toxic. This is like having excess glucose in diabetes.

For example, high levels of amino acids block an enzyme called the mammalian Target Of Rapamycin (mTOR) pathway, which is crucial for cell growth and protein synthesis, causing muscle wasting, fatigue, and weakness. The body becomes resistant to this enzyme as it is resistant to insulin. So, amino acid supplements are not for everyone.

WHO NEEDS AMINO ACID SUPPLEMENTS?

- Low glutathione – There are many who have genetic defects in the sulfation (sulfur) pathways, requiring supplements of methionine (SAME) and/or cysteine (NAC).
- Connective tissue disorders like

Ehlers-Danlos Syndrome (EDS) often need collagen peptides. This can also be done with bone broth.

- Abnormal neurotransmitters – those who have deficiencies in enzymes to make dopamine, epinephrine, and norepinephrine or thyroid hormone, may need a tyrosine supplement.
- Low Digestive enzymes – those who are deficient in enzymes, may take an enzyme supplement, or sometimes a comprehensive essential amino acid supplement.
- Achlorhydria – low stomach acid production can be helped with Betaine HCL and Pepsin with meals to get proper digestion of proteins.

is no lack of protein or amino acids in a diet that has a variety of foods. The problem is usually from digestion and absorption of these nutrients. This is the way to improve your digestion of proteins:

- Do not mix sugar and protein in the same meal.
- Prevent insulin resistance; avoid sugar and artificial sweeteners.
- Eat a variety of foods.
- Avoid snacks. Leave at least 5 hours between meals to reset the stomach and pancreas.
- Proper food preparation such as soaking, sprouting, fermenting, or cooking can reduce the levels of antinutrients.
- Supplements of certain vitamins and minerals (like magnesium, vitamin C and vitamin B6) can aid in the metabolism and absorption of amino acids.
- Avoid foods to which you are sensitive.
- Don't take "acid blockers." Instead, stop eating before 6pm.

After you have done all you can, and you still have issues with lack of one or more amino acids, it would be a good idea to take a supplement. These should be taken without food, so they do not inhibit your ability to absorb other amino acids.

The key to amino acids is balance. Balance is best achieved by digesting your proteins and absorbing all the amino acids. Your metabolism is made to use all the amino acids, so don't get over-focused on one, or just a few. Though you may not turn into an egg, or a cucumber, your diet will determine which amino acids you have, and thus which proteins you are able to make. A good balance brings health and vitality to your body and brain!

PROGRAM TO IMPROVE DIGESTION AND ABSORPTION OF AMINO ACIDS:

It is possible, even preferable, to get all your amino acids from your food. There

Sources:

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High Blood Sugar and Alcohol: What You Need to Know



DRINKING ALCOHOL CAN be especially dangerous for people with high blood sugar. Here's why.

Managing high blood sugar is complex, and adding alcohol into the mix makes it even more so. Alcohol can cause both spikes and drops in blood sugar levels, necessitating careful planning and caution.

The Immediate Effect of Alcohol in People With High Blood Sugar

The most critical fact to know is that

alcohol consumption can significantly lower blood sugar (hypoglycemia). This risk is particularly high for anyone with type 1 diabetes or type 2 diabetes using insulin or sulfonylureas, which can cause low blood sugar.

Alcohol disrupts the liver's ability to release stored glucose into the bloodstream, as it prioritizes processing the alcohol instead. This interruption can lead to lower blood sugar levels. Additionally, alcohol may increase insulin sensitivity, further complicating blood sugar management.

The hypoglycemic effect of alcohol can be delayed, occurring after you've stopped drinking, falling asleep, or even the next

day. Complicating matters, the symptoms of drunkenness and hypoglycemia overlap significantly, making it difficult to recognize and respond to low blood sugar.

Heavy drinking, particularly binge drinking, can be extremely dangerous, especially for young adults like college students who may engage in risky drinking behaviors. Many already struggle with glucose control, which heavy alcohol consumption exacerbates. Going to sleep drunk is particularly risky because hypoglycemia symptoms, which would normally wake you up, may go unnoticed.

The Morning After

The blood sugar-lowering effects of alcohol can peak hours after consumption. A study involving men with high blood sugar showed that symptomatic hypoglycemia often occurred 12 hours after drinking. This delayed effect means you're at risk for blood sugar issues the morning after drinking. Handling a hangover may require extra care and preparation.

Alcohol and Carbohydrate Content

Alcohol itself contains few or no carbohydrates. Spirits like vodka and tequila have minimal carbs, while a glass of wine or light beer contains only a few grams. However, sweet wines, beers, and sugary cocktails can be high in carbs, causing a rapid blood sugar spike and necessitating insulin use. Combining this with alcohol's delayed blood sugar-lowering effect can be dangerous, making it safer to avoid sugary alcoholic beverages.

Mitigating the Risks of Drinking Alcohol for People With High Blood Sugar

Many people with high blood sugar don't receive adequate education about alcohol. For those using glucose-lowering drugs, it's crucial to monitor blood glucose levels closely while drinking and for up to 24 hours afterward. Here are

some tips to drink more safely:

- Practice moderation.
- Check your blood sugar frequently, both while drinking and the day after.
- Consider having a snack to prevent hypoglycemia.
- Be mindful of the carbohydrate content in your drinks.
- Avoid exercising during or after drinking, as it can lower blood sugar.
- Have a sober friend who understands your condition and can help in an emergency.
- Wear a medical alert bracelet.
- Remember that drinking can cause delayed hypoglycemia.
- Discuss with your doctor how to adjust your medication when drinking.

High Blood Sugar, Alcohol, and Ozempic

Some drugs used to manage high blood sugar, like semaglutide (Ozempic) and tirzepatide (Mounjaro), might reduce alcohol cravings and consumption. However, these drugs can also provoke vomiting, similar to excessive drinking, so caution is still advised.

The Long-Term Effect of Moderate Drinking With High Blood Sugar

Moderate drinking has been linked to increased insulin sensitivity and a reduced risk of type 2 diabetes, though more recent research disputes these benefits. In 2023, the World Health Organization stated that no amount of alcohol consumption is safe for health.

The Long-Term Effect of Heavy Drinking With High Blood Sugar

Heavy drinking is harmful to everyone, but it poses specific risks [for people with high blood sugar](#), including accelerating complications like neuropathy and retinopathy. It also significantly increases the risk of dementia and Alzheimer's disease. Binge drinking can be toxic to pancreatic beta cells, raising the risk of type 2 diabetes.

The Takeaway

Drinking alcohol carries significant immediate risks, particularly hypoglycemia, for people with high blood sugar. Those taking insulin or sulfonylureas should be especially cautious. Frequent heavy drinking has many harmful effects and should be avoided. If you're concerned about your drinking habits, please seek professional help.



WHEN IS THE BEST TIME TO TAKE BERBERINE?



BERBERINE, AN ALKALOID compound derived from plants such as goldenseal, barberry, and Oregon grape, has been used for centuries in Traditional Chinese Medicine (TCM), Ayurvedic medicine, and Native American medicine to treat gastrointestinal issues, infections, and inflammation. Discovered and isolated by German chemists in the 19th century, berberine has since been recognized for its extensive pharmacological properties. Modern research has expanded its potential health benefits, indicating that [berberine can aid in weight](#)

[management, regulate cholesterol levels, and improve insulin sensitivity.](#)

When integrating berberine into your supplement routine, questions like “Can I take berberine on an empty stomach?” and “How long does berberine take to work?” are important to maximize its benefits.

When Is the Best Time of Day to Take Berberine?

Due to its half-life of about five hours, berberine is best taken in divided doses throughout the day—such as after breakfast and dinner. This approach helps maintain a stable concentration of berberine in your system, potentially enhancing its effectiveness.

Can You Take Berberine on an Empty Stomach?

It's generally recommended to take berberine with a glass of water about 30 minutes before a meal. While berberine typically does not cause severe side effects, starting a new supplement routine can lead to digestive discomfort, including nausea, bloating, diarrhea, or constipation. If you experience these symptoms, consult your healthcare provider to adjust your regimen accordingly.

Can You Take Berberine After a Meal?

Yes, berberine can be taken after meals and may actually reduce the risk of digestive discomfort compared to taking it on an empty stomach.

Can You Take Berberine Before Bed?

Taking berberine before bed is safe and may offer additional benefits. Some studies suggest that including berberine in a nighttime supplement routine can improve sleep quality, aid in weight management, and enhance memory.

How Long Does Berberine Take to Work?

The onset of berberine's effects can vary based on factors such as health status, dosage, and the specific health condition being targeted. Some people may notice [improvements in blood sugar regulation](#) or digestive issues relatively quickly, while others may need several weeks or even months to see benefits for conditions like high cholesterol or cardiovascular health.

Things to Consider When Taking Berberine

Consistency is key when taking berberine for optimal results. Whether you take it before or after meals, adhering to a regular schedule is crucial. As with any supplement, the effectiveness of berberine can vary from person to person. It's always best to consult with a healthcare professional for personalized advice on using berberine or any other supplements.





WHAT TO EAT FOR STRONG MUSCLES

TO BUILD AND maintain strong muscles, you need more than just protein. These essential nutrients support your muscles now and for the long haul.

Listen up: Your muscles are hungry! They work for you day and night and need proper nutrition to perform their essential functions. With the right diet, you can progress in your workouts, avoid muscle atrophy as you age, and more.

Everyone should care about feeding their muscles. Muscles help with movement,

posture, joint stability, and even heat production, which are important for everyone.

Most discussions about muscles and diet focus on protein because it stimulates growth. But building muscle mass is only part of the picture. Healthy, functional muscles require a well-rounded nutritional regimen that includes macronutrients, micronutrients, amino acids, probiotics, and prebiotics, among others.

Here are some key nutrients your muscles need for performance, recovery, and growth.

Protein

Every cell in the body contains protein. This macronutrient, composed of amino acids, plays many roles, from providing tissue structure to supporting metabolism. In your muscles, protein primarily repairs cells and creates new ones, which are vital for maintaining and building muscle tissue.

Muscle proteins are in constant flux. Activities like resistance training damage muscle cells, which then use protein for

repair. Ensuring a steady supply of protein is crucial for muscle protein synthesis, the process of creating new muscle proteins.

Determining the right amount of protein can be tricky. Many experts believe the current recommended daily allowance (RDA) of 0.36 grams per pound of body weight is too low, especially for active people and older adults.

As we get older, we need more protein than people think and more than we may have needed when we were younger. This is because age-related changes make muscles more resistant to growth, requiring extra protein to spur muscle protein synthesis.

The International Society of Sports Nutrition and the National Academy of Sports Medicine recommend 0.6 to 0.9 grams of protein per pound of body weight per day — 96 to 144 grams daily for a 160-pound person — to support muscle growth at any age. For older adults, sufficient protein intake may also prevent sarcopenia, the loss of muscle associated with aging.

Animal proteins, like poultry, beef, dairy, eggs, and fish and seafood, offer more bang for your buck than plant-based sources: You don't have to eat as much to get the protein you need.

Carbohydrates

Carbohydrates are crucial for muscle health. They are stored in your muscles and liver as glycogen, which is used as energy for muscle contractions.

Think of protein as a macronutrient for building and repair, and carbohydrates as a macronutrient for energy.

Getting enough carbs is critical, especially

if you're active. Adequate glycogen stores provide the energy needed for workouts, helping you push harder and see better results in muscle maintenance and building.

Insufficient glycogen can force your body to use protein for energy, leaving less for muscle maintenance and repair. This can lead to muscle shrinkage and weakness over time.

Carb needs vary depending on factors like sex, age, body weight, and activity level. Gaudreau suggests getting at least 40 percent of your daily calories from carbohydrates and gradually increasing that amount if needed. Endurance athletes may need up to 60 percent.

Steel-cut oats, sweet potatoes, pumpkin, spaghetti squash, brown rice, black beans, quinoa, and lentils are great sources of complex carbohydrates that offer plenty of fiber.

Calcium & Vitamin D

These nutrients are vital not just for bone strength but also for muscle function. Calcium is essential for muscle contractions, while vitamin D helps regulate these contractions and supports muscle recovery.

Dairy products, including milk, yogurt, and cheese, are some of the best natural sources of calcium. Canned sardines, salmon, kale, broccoli, and bok choy are good nondairy sources of calcium. Calcium supplements can be helpful for people who have trouble getting enough from their diet, including those who are postmenopausal and those who don't eat dairy. It's recommended that adults get 1,000 to 1,200 mg of calcium daily.

Vitamin D, is known as the sunshine

vitamin because sun exposure can trigger its production, increases antioxidant capacity, support mitochondrial health, and boost muscle regeneration. Fatty fish such as trout, salmon, tuna, and mackerel are ideal food sources of vitamin D. Beef liver, egg yolks, and cheese contain small amounts of vitamin D. Vitamin D supplements can compensate for shortages in your diet and sun exposure. "The majority of the people I work with need vitamin D supplementation because it's challenging to get enough through food alone," says Koszyk.

Creatine

Creatine, an amino acid produced by the body and stored in muscles as phosphocreatine, is used as energy during intense exercise. While the body naturally makes about 1 gram of creatine per day, this may not be enough. Supplementing with creatine monohydrate can support athletic performance, muscle recovery, and growth, and counteract age-related declines in muscle mass and bone density.

Creatine is found in protein-rich foods, particularly animal sources, but supplementation can be beneficial, especially for those actively trying to build muscle, vegans, vegetarians, and postmenopausal individuals.

Essential Amino Acids

Amino acids are the building blocks of proteins. Of the 20 amino acids crucial for building protein, nine are considered essential (EAAs) because the body cannot produce them. These EAAs must be obtained through food and are critical for muscle synthesis, growth, and repair.

Animal sources are considered complete proteins because they contain all EAAs. Meat, poultry, fish, eggs, and dairy are complete proteins. Quinoa, buckwheat, soy, and hempseed are also complete proteins, though they may not offer as much protein as animal foods. Many plant-based protein sources, including nuts, seeds, legumes, and vegetables, are incomplete proteins, meaning they contain some but not all of the EAAs. While this doesn't mean you should avoid them, be sure to eat a combination of them over 24 to 36 hours to get your complete fill of amino acids.

Branched-chain amino acids (BCAAs), a subgroup of EAAs, are popular for their muscle-building properties. Leucine stimulates muscle protein synthesis, isoleucine boosts energy, and valine promotes muscle growth and tissue repair.

Iron

Iron is essential for red blood cells, which carry oxygen throughout the body, and myoglobin, a protein that supplies oxygen to muscles. Iron helps muscles make and use energy for everyday functions and exercise.

Lean meat and seafood are rich sources of iron. Nuts, beans, and vegetables are great plant-based sources. Your body doesn't absorb iron from plant foods as well as it does from animal sources, so you'll want to pay attention to your intake if you're vegan or vegetarian.

The RDA for iron is 8 mg for adult men and postmenopausal women and 18 mg for adult premenopausal women. Individual needs may vary, and those pregnant or with heavy menstrual flow should consult a healthcare provider about supplements.

Magnesium

Magnesium is an electrolyte that helps transport calcium and potassium into muscle cells to support contractions. It is also a critical component of energy production and muscle protein synthesis.

[The RDA for magnesium](#) is 400 to 420 mg daily for adult men and 310 to 320 mg for adult women, increasing to 350 to 360 mg during pregnancy.

Legumes, nuts, seeds, whole grains, and green leafy vegetables are great sources of magnesium. In general, most fiber-rich foods contain this mineral. Refined grains and other processed foods lose magnesium during the manufacturing process. Dairy products, like milk, yogurt, and cheese, are also good sources.

Potassium

Potassium, another electrolyte, helps with muscle contractions, fluid balance, and nerve signal transmission. Most of your body's potassium resides in your muscles.

The RDA is 3,400 mg for adult men and 2,600 mg for adult women, with increased needs during pregnancy and breastfeeding. Most U.S. adults don't get enough potassium, and the USDA and HHS recommend increasing intake through whole foods rather than supplements.

Many vegetables and fruits are excellent sources of potassium, including bananas, spinach, tomatoes, broccoli, acorn squash, and potatoes (white, gold, red, and purple).

Probiotics & Prebiotics

Probiotics are live microorganisms found in fermented foods like yogurt, kefir, kimchi, sauerkraut, tempeh, and aged cheeses, and they support a diverse gut microbiome. Prebiotics, found in foods like bananas, onions, garlic, soybeans, and Jerusalem artichokes, feed probiotic microorganisms.

[A balanced gut microbiome supports muscle maintenance and overall health.](#)

A lack of diversity can disrupt the maintenance of lean muscle mass. Digestive issues can indicate an imbalance, and supplementation may be necessary.

Proper nutrition is essential for muscle health. Ensure your diet includes a variety of these nutrients to support muscle performance, recovery, and growth





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