

The Multifaceted Benefits of Glycine on Aging and Chronic Inflammation

Analysis by [Dr. Joseph Mercola](#)

October 26, 2024

STORY AT-A-GLANCE

- › Glycine, the smallest amino acid, plays an essential role in multiple physiological processes and has gained attention for its anti-inflammatory properties and ability to slow aging
- › A systematic review of 50 studies, published in the journal *GeroScience*, found that glycine promotes healthy aging by improving cognitive functions and psychiatric symptoms
- › Glycine supplementation was also shown to improve sleep quality, cognitive function and metabolic health in healthy adults, while also benefiting patients with chronic conditions
- › Another recent study published in the *International Journal of Molecular Sciences* demonstrated glycine's ability to reduce inflammation throughout the body, making it useful for managing chronic inflammatory conditions and supporting cellular repair mechanisms
- › Practical ways to boost glycine intake include consuming collagen-rich foods and taking glycine powder; more tips are included below

Glycine is the simplest and smallest amino acid in your body, but don't let its size fool you. This little molecule plays a big role in multiple physiological processes, from building proteins to supporting your immune system. A growing body of research also shows that glycine plays a far more significant role than previously thought.

Recently, glycine has gained attention in the scientific community for its anti-inflammatory properties and ability to slow down the aging process. This dual action makes glycine a compelling subject for those seeking natural ways to promote overall well-being and longevity, and transforms how we approach chronic diseases, aging and overall health maintenance.

Glycine's Impact on Aging and Longevity

As the global population grows older, the need for safe interventions to maintain vitality becomes increasingly important. This prompted researchers to conduct a systematic review of 50 total studies to determine the effect of glycine administration on various physiological systems as we age. Published in *GeroScience*, the researchers noted:¹

"Most studies (42 over 50) were randomized controlled trials (RCT), of which half were parallel-group trials. The majority of studies (41 over 50) reported oral glycine ingestion as the mode of delivery. Eighteen out of 50 studies were in healthy populations, 34 [out of] 50 in diseased populations and 2 [out of] 50 contained both healthy and diseased populations.

The mean or median age ranged from 21.5 to 41.4 years for healthy populations and 29.5 to 67 years for diseased populations. Glycine was administered for a period of one day (single bolus) to 14 days in healthy populations and up to 4 months in diseased populations."

Their findings showed that glycine had the most pronounced effect on the nervous system, particularly in patients with psychiatric conditions. For instance, schizophrenic patients experienced notable improvements in psychiatric symptoms, cognition and sleep after long-term glycine supplementation.

This is largely attributed to glycine's role as a co-agonist at the N-methyl-D-aspartate (NMDA) receptor, which is vital for neural communication and plasticity. The activation of NMDA receptors by glycine has been shown to enhance cognitive and neurological functions.

*"Schizophrenia is hypothesized to result from the hypofunctioning of NMDA receptors. Several reports cited herein have particularly underscored the ... effect of glycine on the NMDA receptor in eliciting positive neurological outcomes."*²

In addition to its effects on the nervous system, glycine demonstrated significant results in other physiological systems. In healthy populations, studies reported improved insulin responses, indicating benefits for metabolic health. For patients with chronic conditions, such as those undergoing hemodialysis, glycine supplementation improved handgrip strength and fat-free mass index, positively impacting muscle function and body composition.³

Glycine Improves Sleep and Cognitive Function in Healthy Adults

The GeroScience review⁴ also observed significant benefits of glycine supplementation on sleep quality and cognitive function in healthy individuals. Sleep disturbances become a common concern as you age, and glycine appears to offer a promising solution.

The researchers observed that those who took glycine before bedtime fell asleep faster and reported better sleep quality. They also experienced better cognitive function the next day. According to the authors:⁵

"Improved sleep quality, alertness and cognition, and decreased fatigue were observed in three populations receiving 3 grams per day oral administration of glycine 30 minutes to one hour before bedtime over two to four days."

The study also highlighted glycine's role in regulating body temperature, which is important for initiating and maintaining sleep. Glycine administration was found to promote hypothermia and vasodilation through its action on NMDA receptors in the suprachiasmatic nucleus (SCN), the master circadian pacemaker.⁶

Although these findings suggest that glycine may help maintain brain function as we age, the results were based on smaller studies, and the researchers acknowledged the

need for larger, long-term trials to confirm these effects. Nevertheless, glycine's ability to improve daytime cognitive function and promote restful sleep highlights it as a simple yet powerful tool for supporting healthy aging.⁷

Glycine – The Natural Solution to Chronic Inflammation

The quest for effective anti-inflammatory compounds has intensified in recent years, stemming from the alarming increase in chronic inflammatory conditions plaguing modern society. Traditional medications often come with unwanted side effects, leading researchers to explore nutritional approaches for managing inflammation. Glycine has emerged as a candidate in this search.

A paper published in the International Journal of Molecular Sciences,⁸ titled “Glycine: The Smallest Anti-Inflammatory Micronutrient,” highlights glycine's ability to reduce inflammation throughout the body. These findings are important because inflammation is at the root of many chronic diseases. According to the authors:⁹

“Glycine could modulate the low-grade inflammatory process through pathways that involve some of its targets that have already been identified in different cells ... For decades, glycine has been proposed as an anti-inflammatory agent and used as a therapeutic nutrient to treat inflammation related to diseases such as arthritis, gastric ulcers, melanoma, alcoholic liver disease and endotoxic shock.”

The study also references various clinical trials that underscore glycine's therapeutic benefits. For instance, in patients with rheumatoid arthritis, glycine supplementation led to reduced joint pain and inflammation, with researchers noting that glycine decreased the production of inflammatory molecules in the body, leading to improved symptoms.¹⁰

Alcoholic liver disease is another condition where glycine shows benefits. In one clinical trial, patients with alcohol-induced liver damage who received glycine supplements saw improvements in liver function tests. Glycine appeared to protect liver cells from the

harmful effects of alcohol, reducing inflammation and supporting the liver's natural detoxification processes.¹¹

Glycine's impact extends to the nervous system, where it plays a neuroprotective role. By suppressing the activation of proinflammatory microglia cells, it helps prevent neuroinflammation.¹² This protective effect on brain cells is beneficial for cognitive health as we age.

Metabolic health also benefits from glycine. In a clinical trial, individuals with metabolic syndrome who supplemented with glycine for three months saw improvements in several key health markers, including reduced inflammation, better insulin sensitivity and improved blood lipid profiles.¹³

Glycine's influence on cellular repair mechanisms is particularly noteworthy. Glycine supports the production of glutathione, one of the body's most powerful antioxidants.¹⁴ This boost in antioxidant capacity helps protect cells from damage caused by everyday stressors, slowing the aging process at a cellular level.

How Glycine Works Its Magic in Your Body

Glycine is efficient at calming down inflammation. According to the study in the International Journal of Molecular Sciences,¹⁵ it does this by putting the brakes on some important signals in your body that usually ramp up inflammation. Studies show it reduces the production of proinflammatory molecules like TNF- α and interleukin-6 while increasing anti-inflammatory factors such as IL-10. It also inhibits NF- κ B from getting activated.

Glycine also binds to specific receptors in your cells called glycine-gated chloride channels.¹⁶ When these channels open, they allow chloride ions to flow into the cell, temporarily changing it to a negative electrical charge. This process, known as hyperpolarization, calms down overactive immune cells and nerve cells, which in turn is helpful for fighting inflammation and protecting your brain.

Glycine also aids your body in the production of an important antioxidant called glutathione, which protects your cells from damage.¹⁷ By helping your body make more glutathione, glycine is basically boosting your cellular defenses. Additionally, glycine influences the beneficial organisms living in your gut, known as your microbiome.¹⁸

A healthy gut microbiome is crucial for your overall health, from your immune system to your mood. So, to sum it up, here's a quick list of how glycine boosts your health:

1. Calms inflammation signals
2. Inhibits overactive immune and nerve cells
3. Boosts the production of protective antioxidants
4. Helps balance your gut microbiome

Boosting Your Glycine Levels – Simple Strategies for Better Health

Here are some practical ways to increase your intake of this powerful amino acid:

- **Eat more collagen- and gelatin-rich food** – Glycine makes up nearly one-third of collagen and gelatin. Some good sources include homemade bone broth made with bones and connective tissue from grass fed, organically raised animals, and chicken broth made from organic chicken feet. The claws are particularly rich in collagen.
- **Consider glycine supplements** – Pure glycine is available in powder form, which has a mildly sweet flavor, offering an affordable, convenient way to boost your intake.
- **Pair glycine with complementary nutrients** – Vitamin C aids collagen synthesis, working synergistically with glycine. Foods rich in vitamin C include citrus fruits, bell peppers and leafy greens.
- **Time your glycine intake strategically** – For sleep benefits, take glycine about an hour before bedtime. If using glycine to support exercise recovery, consume it

shortly after your workout.

- **Support your body's natural glycine production** – Eating a varied diet rich in protein provides the building blocks your body needs to make glycine. Animal-based foods like lean meats and organic, pastured eggs from chickens fed a low-PUFA diet will raise your glycine levels, as they contain taurine, which increases glycine.

Remember, glycine is just one piece of the health puzzle. Combine these strategies with an anti-inflammatory diet, regular exercise and stress management techniques for maximum benefit.

Sources and References

- 1, 2, 3, 4, 5, 6, 7 [GeroScience \(2024\) 46:219–239, doi: 10.1007/s11357-023-00970-8](#)
- 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18 [Int J Mol Sci. 2023 Jul 8;24\(14\):11236. doi: 10.3390/ijms241411236](#)