

## Guillermou

As Dr. Mercola establishes in this relevant article, the methionine/glycine ratio is essential. Inflammation is a common factor in cancer, cardiovascular disease, and diabetes, as well as arthritis and other inflammatory diseases. Studies establish an inverse association of plasma glycine levels between patients with insulin resistance and diabetes, cardiovascular disease, and cancer. This suggests that low blood glycine levels can lead to a hyperinflammatory state, predisposing the body to a spectrum of chronic diseases including cancer. Plasma glycine levels in human populations, while may be adequate for the biochemical functions of glycine, including protein synthesis, may not be sufficient for the cellular physiological role of glycine in membrane voltage stabilization, cell activation in macrophages and other cells.

Glycine comprises one-third of the mole fraction of collagen, and it is postulated that such chronic diseases have been on the rise because the consumption of glycine-rich bone and connective tissues has declined in recent decades. Amino acid metabolism suggests a more complex relationship between glycine and methionine, the latter of which is abundant in muscle meats. Specifically, glycine is the only substrate for glycine-N-methyltransferase, which comprises the only major pathway of methionine clearance. Triggered by the absorption of a methionine-rich meal, elimination of excess methionine requires two to three molar equivalents of glycine per mole of methionine.

Therefore, it could be hypothesized that high consumption of methionine-rich, glycine-poor muscle meats without the connective tissues as staple foods causes a net reduction in plasma glycine levels. This hypothesis among the participants of the EPIC study in the United Kingdom. Carnivores consuming high methionine and low glycine intake had the lowest plasma glycine levels than other diets.

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Observational studies, a clinical trial in Mexico City a decade ago reported the reversal of type 2 diabetes with the consumption of 15 g/day of supplemental glycine for 90 days. Glycine decreases proinflammatory cytokines and increases interferon- in patients with type 2 diabetes. Observationally, the inverse association of type 2 diabetes and prediabetes with plasma glycine has been abundantly documented, as evidenced by the recent SRMA of 46 studies. [www.ncbi.nlm.nih.gov/.../PMC4839172](http://www.ncbi.nlm.nih.gov/.../PMC4839172) (2016)----- [www.ncbi.nlm.nih.gov/.../PMC4859380](http://www.ncbi.nlm.nih.gov/.../PMC4859380) (2016).----- [analyticalsciencejournals.onlinelibrary.wiley.com/doi/abs/10.1002/bmc...](http://analyticalsciencejournals.onlinelibrary.wiley.com/doi/abs/10.1002/bmc...) (2017).----- [www.jbc.org/.../S0021-9258](http://www.jbc.org/.../S0021-9258) (17)30753-6/fulltext (2009).--- [www.nature.com/.../ejcn2015144](http://www.nature.com/.../ejcn2015144) (2015).--- [link.springer.com/.../BF03346417](http://link.springer.com/.../BF03346417) (2008).---- [www.bmj.com/.../rr-1](http://www.bmj.com/.../rr-1) (2018).--- Glycine administration modulates dietary amino acid levels especially methionine, which may increase healthy lifespan in mice and provide a basis for further investigation of the effects of diet on aging and old-age diseases.

[onlinelibrary.wiley.com/.../acel.12953](http://onlinelibrary.wiley.com/.../acel.12953) (2019).- GLYNAC (GLYCINE AND N-ACETYLCYSTEINE) SUPPLEMENTATION IMPROVES IMPAIRED MITOCHONDRIAL FUEL OXIDATION AND LOWERS INSULIN RESISTANCE IN PATIENTS WITH TYPE 2 DIABETES. [www.mdpi.com/.../154](http://www.mdpi.com/.../154) (2022) Glycine supplementation improves various components of the metabolic syndrome, such as diabetes, obesity, hyperlipidemia, and hypertension. In the future, the use of glycine may have a significant clinical impact in the treatment of patients with metabolic syndrome. [link.springer.com/.../s40618-021-01720-3](http://link.springer.com/.../s40618-021-01720-3) (2022)

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Glycine and N-acetylcysteine (GlyNAC) supplementation in older adults improves glutathione deficiency, oxidative stress, mitochondrial dysfunction, inflammation, insulin resistance, endothelial dysfunction, genotoxicity, muscle strength, and cognition [onlinelibrary.wiley.com/.../ctm2.372](https://onlinelibrary.wiley.com/doi/10.1111/ctm2.372) (2021)  
INDUCTION OF GLUTATHIONE BIOSYNTHESIS BY GLYCINE-BASED TREATMENT MITIGATES ATHEROSCLEROSIS [www.sciencedirect.com/.../S2213231722000854](https://www.sciencedirect.com/science/article/S2213231722000854) (2022)  
EXTRACELLULAR SERINE AND GLYCINE ARE REQUIRED FOR MOUSE AND HUMAN SKELETAL MUSCLE STEM AND PROGENITOR CELL FUNCTION [www.sciencedirect.com/.../S2212877820301800](https://www.sciencedirect.com/science/article/S2212877820301800) (2021)  
Higher levels of glycine, glutamine, betaine, indolepropionate, and (phosphatidylcholines) were associated with a lower risk of type 2 diabetes.

[diabetesjournals.org/care/article/45/4/1013/144892/Metabolomics-and-Ty](https://diabetesjournals.org/care/article/45/4/1013/144892/Metabolomics-and-Ty). (2022) Glycine is synthesized from serine, threonine, choline, and hydroxyproline through interorgan metabolism primarily involving the liver and kidneys. The main pathway is glycine synthesis is a serine cleavage reaction that yields two different products: a glycine molecule plus a C1 unit carried by tetrahydrofolate for other metabolic processes.

Metabolism requires much more glycine than C1 units. The amount of glycine available from synthesis, around 3 g/day, together with that from the diet, may be below the amount needed for all metabolic uses, including collagen synthesis by 10 g per day. day for a person of 70 kg. This result supports that glycine is a semi-essential amino acid. [www.ncbi.nlm.nih.gov/.../20093739](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC20093739/) .---  
[www.ncbi.nlm.nih.gov/.../19179765](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC19179765/) .--- [www.ncbi.nlm.nih.gov/.../23615880](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC23615880/).---

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Glycine also plays a role in the transmission of nerve signals and the removal of toxins from the body. Glycine stimulates the production of serotonin, the "feel good" hormone that helps elevate mood, improve sleep, and improve memory. Glycine is anti-inflammatory and antioxidant, both of which are properties that reduce the risk of heart disease. Therefore, some researchers have looked at the connection between glycine and heart disease. TOP 9 BENEFITS AND USES OF GLYCINE [www.healthline.com/.../glycine](http://www.healthline.com/.../glycine) .----- Glyphosate in particular is working synergistically with most other factors to increase toxic effects.

Glyphosate causes insidious damage through its action as an amino acid analogue of glycine, and that this interferes with natural protective mechanisms against other exposures. [www.ncbi.nlm.nih.gov/.../PMC6695815](http://www.ncbi.nlm.nih.gov/.../PMC6695815) (2019) Glycine also plays an important role in fighting inflammation, as explained by Dr. Mercola in the article "Glycine Suppresses Oxidative Damage by Inhibiting Superoxide NOX Production and Raising NADPH Levels," and is used in the detoxification process. As a result of glyphosate toxicity, many people do not have sufficient glycine levels for efficient detoxification.

NADPH is used as a reducing reservoir of electrons that serves to recharge antioxidants once they are oxidized. NADPH is also needed to produce steroid hormones and fats. To prevent many chronic diseases, we need to find a way to inhibit or modulate NOX. Such strategies include avoiding fructose, practicing nutritional ketosis, and taking spirulina, niacin, glycine, and collagen supplements. Glycine might be beneficial in preventing or treating metabolic syndrome, diabetic complications, and cardiac hypertrophy, as well as fatty liver disorders. [articulos.mercola.com/sitios/articulos/archivo/2022/04/01/que-son-la-n..](http://articulos.mercola.com/sitios/articulos/archivo/2022/04/01/que-son-la-n..) (2022)

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## juststeve

Guyi, another powerhouse supporting a broad spectrum of many of our bodies health workhorses. Being as we are hit with glyphosate from so many sources, there has been discussion glycine may absorb or neutralize it. (In the gut as the glyphosate moves through us?) Perhaps a gut healer too? I can hear the old timers from back in the day saying, there is always room for Jell-O. Maybe this is one more reason they lived well into their late 80's, 90's?

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Indeed. Just, in principle glycine protects against the intestinal toxicity of glyphosate. Importantly, glycine is depleted in the detoxification process, so many of us don't have enough glycine for efficient detoxification. To flush out glyphosate, you need to saturate your body with glycine. Klinghardt recommends taking 1 teaspoon (4 grams) of glycine powder twice a day for a few weeks, then reducing the dose to one teaspoon (1 gram) twice a day. This forces the glyphosate out of your system, allowing it to be eliminated through your urine. This paper presents an exhaustive review of the toxic effects of the herbicide, glyphosate, the active ingredient in Roundup, in humans, and demonstrates how glyphosate's adverse effects on the gut microbiota, in conjunction with its established ability to inhibit the activity of cytochrome P450 enzymes, and its likely impairment of sulfate transport, can remarkably explain a great number of the diseases and conditions that are prevalent in the modern industrialized world.

Its effects are insidious, because the long-term effects are often not immediately apparent. . The pathologies to which glyphosate could plausibly contribute, through its known biosemiotic effects, include inflammatory bowel disease, obesity, depression, ADHD, autism, Alzheimer's disease, Parkinson's disease, ALS, multiple sclerosis, cancer, cachexia, infertility, and developmental malformations. Glyphosate works synergistically with other factors, such as insufficient sun exposure, dietary deficiencies in critical nutrients such as sulfur and zinc, and synergistic exposure to other xenobiotics whose detoxification is impaired by glyphosate.

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Given the known toxic effects of glyphosate reviewed here and the plausibility that they are negatively impacting health worldwide, it is imperative for more independent research to take place to validate the ideas presented here, and to take immediate action, if they are verified, to drastically curtail the use of glyphosate in agriculture. Glyphosate is likely to be pervasive in our food supply, and, contrary to being essentially nontoxic, it may in fact be the most biologically disruptive chemical in our environment. [www.mdpi.com/.../4/1416](http://www.mdpi.com/.../4/1416) .---- GLYPHOSATE'S EFFECT ON OUR GUT HEALTH - DR. STEPHANIE SENEFF [www.youtube.com/watch](http://www.youtube.com/watch) Glycine provides protection against intestinal ischemia/reperfusion injury by a method consistent with glycine absorption.

The intestine has several types of membrane transport systems that use glycine as a substrate to increase cellular absorption. The GLYT1 receptor is present in the basolateral membrane of enterocytes and its main function is to import glycine into cells, in the cytoprotective effect of glycine to combat oxidative stress. If glycine is administered before the oxidative challenge, it protects intracellular glutathione levels without altering the rate of glycine absorption. The protection of intracellular glutathione levels depends on the unique activity of the GLYT1 receptor.

The GLYT1 receptor provides the necessary requirements for the accumulation of intracellular glycine. Irritation and epithelial damage caused by trinitrobenzene sulfonic acid or dextran sodium sulfate were cured with glycine. Direct effects of glycine on intestinal epithelial cells might show a particular influence on the overall inflammatory state of the intestine through a significant change in redox state that is completely different from the anti-inflammatory effects of glycine on various molecular targets of other mucosal cell populations. .

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2 days of oral glycine supplementation after sulfonic acid administration was identified to be highly effective in reducing inflammation, demonstrating the therapeutic and prophylactic benefits of glycine. Glycine's ability to switch multiple cell types further highlights the difficulty of dissecting glycine's various modes of function to reduce injury and inflammation. MULTIFARIOUS BENEFICIAL EFFECT OF NONESSENTIAL AMINO ACID, GLYCINE: A REVIEW [www.hindawi.com/.../1716701](http://www.hindawi.com/.../1716701) (2017).---- THE GLYCINE TRANSPORTER GLYT1 IN HUMAN INTESTINE: EXPRESSION AND FUNCTION [www.jstage.jst.go.jp/article/bpb/34/6/34\\_6\\_784/\\_article/-char/ja/](http://www.jstage.jst.go.jp/article/bpb/34/6/34_6_784/_article/-char/ja/) (2011).---- Intestinal lipopolysaccharide-induced injury increased apoptosis of jejunal and colonic epithelial cells and the abundance of cleaved caspase3 proteins in the jejunum, which were markedly abrogated by Glycine (Gly).

LPS also elevated levels of Toll-like receptor 4 (TLR4) mRNA, myeloid differentiation factor, proinflammatory cytokines, and chemokines in the jejunum and colon. These alterations were significantly suppressed by Gly. In addition, Gly supplementation attenuated the infiltration of CD4+, CD8+ T cells, CD11b+ and F4/80+ macrophages into the colon. Furthermore, Gly increased the relative abundance of Mucispirillum, Lachnospiraceae-NK4A136-group, Anaerotruncus, Faecalibaculum, Ruminococcaceae-UCG-014 and decreased the abundance of Bacteroides at the genus level. Gly supplementation could be a nutritional strategy to ameliorate LPS-induced intestinal injury. [link.springer.com/.../s00726-021-03011-w](http://link.springer.com/.../s00726-021-03011-w) (2021).----

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This article establishes a framework for further studies to quantify essential amino acid (AA) metabolism in intestinal bacteria, determine the effects of functional AA on cell-mediated and humoral immunities, and establish a much-needed database of the composition of AA in foodstuffs. Unexpectedly, COVID-19- In particular, glutathione, arginine, and glutamine have now been exploited to effectively alleviate severe respiratory symptoms of COVID-19 in affected patients. Functional AA (eg, arginine, cysteine, glutamate, glutamine, glycine, taurine, and tryptophan) and glutathione are crucial for optimal immunity and health in humans and animals.

[www.cambridge.org/core/journals/british-journal-of-nutrition/article/i..](http://www.cambridge.org/core/journals/british-journal-of-nutrition/article/i..) (2021).--- Glycine protects against shock caused by hemorrhage, endotoxins, and sepsis, prevents ischemia/reperfusion, and cold storage/reperfusion injury in a variety of tissues and organs, including liver, kidney, heart, intestine, and liver.

skeletal muscle, and decreases liver and kidney damage caused by the liver. and toxic and renal drugs. Glycine also protects against arthritis induced by peptidoglycan polysaccharides and inhibits gastric secretion and protects the gastric mucosa against stress and chemically induced ulcers. Glycine appears to exert several protective effects, including direct anti-inflammatory, immunomodulatory, and cytoprotective actions. Glycine has immunomodulatory and anti-inflammatory effects. [pubmed.ncbi.nlm.nih.gov/12589194](https://pubmed.ncbi.nlm.nih.gov/12589194)

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## juststeve

Gui, it is discouraging despite our best efforts we have from the youngest to the oldest at this point been saturated with all kinds of offenders. From fallout of nuclear test once held above ground, to PCB's, to the Glyphosate &PUFA's so prevalent today. While we do our best and it is not to say we shouldn't pursue healthy measures, we should, it still means we can get blindsided with serious outcomes as not all can catch up from the multiple cascading offenses to have been Imposed upon us. The process over time to create Monopolies, to progress into Global Monopolies, to today's cozy Fascism for us, and a protected no matter what Socialism for a minority One Tenth of One Percent few.

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## well4life

Is there any difference in the quality of different products? I'm in Australia so we'd have different brands here but wondered if there's anything I need to be aware of when choosing one? Thanks to everyone here and Gui who is like a library of info right out the gate!! Hopefully I get a response before this article is replaced. Aaagghh... just got an email from one place I buy from saying... As some of you may or may not know, the TGA (Therapeutic Goods Administration) is stopping the selling of food grade sports supplements This will come into effect from November this year and will impact a very high number of the products we sell! I'm guessing this is just the beginning of all health supplements eventually getting the boot. Along with meat and actual food.

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## Erena5

While Glycine, especially combined with NAC sounds very promising, per Dr. Mercola and as Gui mentioned for Inflammation is a common factor in cancer, cardiovascular disease, and diabetes, as well as arthritis and other inflammatory diseases, collagen production to support muscles and connective tissues. I have one concern Supplement Facts Active ingredient(s): Glycine Alternate name(s): Aminoacetic acid, Glycocol Legal status: Available over the counter (OTC) Suggested dose: 2-5 grams Safety considerations: May interact with some medications. I'd like to stress this out Suggested dose: 2-5 grams, every source available suggested this dosage. Dr.Mercola, however, suggested 10 to 20 grams..... how safe is up to 20 grams dally intake ? Any thoughts, please.

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## badboy2

I have found that Glycine helps relieve sugar cravings. Glycine requires Folic acid/Folate and B6 for better absorbability. Glycine is an essential intermediate in the metabolism of protein, peptides, and bile salts. Glycine removes heavy metal such as lead from the body, also effective in alcohol withdrawal as it decreases the cravings. In many cases replacing sugar on foods such as cereal with Glycine, has been shown to calm aggression in both, children and adults. Glycine increases the urinary excretion of uric acid, so it possibly a useful adjunct to gout. In Ronald Kotulak's book, Inside the Brain, he states that Glycine helps trigger brain cells to fire electric charges and speeds learning. It helps spasticity and seizures, and is involved in behaviors related to convulsions and retinal functions.

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## Guillermou

Interesting references, Badboy. Also: Some of the many health benefits of glycine include: 1) helping build lean muscle mass 2) preventing sarcopenia (muscle loss, muscle wasting or deterioration) 3) playing a role in the production of human growth hormone 4) boosting mental performance and memory 5) helping prevent ischemic strokes and seizures 6) protecting skin from signs of aging or cellular mutations 7) protecting collagen in joints and reducing joint pain 8) improving flexibility and range of motion 9) stabilizing blood sugar and lowering risk for type 2 diabetes 10) improving sleep quality 11) lowering inflammation and free radical damage by increasing glutathione production 12) reducing risk for certain types of cancer 13) building the lining of the gastrointestinal tract 14) producing bile salts and digestive enzymes 15) helping reduce allergic and autoimmune reactions 16) boosting energy levels and fighting fatigue, stress and anxiety 17) helping produce red blood cells 18) helping control symptoms of seizures, schizophrenia and mental disorders [draxe.com/.../glycine](https://www.draxe.com/.../glycine)

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## badboy2

Good stuff Gui. I mention many of the same things in my other comment about Taurine, such as growth hormones and such. The aminos seem to intertwine and support each other along with other nutrients. As I mention many times, we need 90 nutrients everyday of our lives, especially as we age where absorption keeps decreasing which contributes to age. It is a human impossibility to get all the nutrients from the food we eat, and I doubt that most people get half of the 90 that is due to poor soil, synthetic fertilizers, pesticide, herbicides and poor food choices.

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## Guillermou

**7 SUPPLEMENTS TO CUT SUGAR CRAVINGS** In addition to glycine, chromium, omega 3, Q10, glutamine, vitamin B, Lipase and neurotransmitter support. Neurotransmitter brain support supplements is excellent especially for emotional eaters. If your sugar cravings are triggered by excess stress, neurotransmitter support supplements can help rebalance your brain chemistry so your stress is reduced by treating your sugar cravings at the source of the cause. Supplements that help calm the brain include L-glutamine, gamma-aminobutyric acid (also known as GABA) glycine, and D-phenylalanine.

Glycine serves several functions as a transmitter in the central nervous system (CNS). As an inhibitory neurotransmitter, it is involved in the processing of motor and sensory information that enables movement, vision, and hearing. This action of glycine is mediated by the strychnine-sensitive glycine receptor, whose activation produces inhibitory postsynaptic potentials. In some areas of the CNS, glycine appears to be co-released with GABA, the major inhibitory amino acid neurotransmitter. Furthermore, glycine modulates excitatory neurotransmission by potentiating the action of glutamate at N-methyl-D-aspartate (NMDA) receptors.

The role of glycine during development and shows evidence indicating that it regulates morphogenetic events through its transporters and receptors, emphasizing the role of glycinergic activity in balancing excitatory and inhibitory signals during development.

[www.yogafit.com/news/tips-and-advice/7-supplements-to-cut-sugar-craavin..](http://www.yogafit.com/news/tips-and-advice/7-supplements-to-cut-sugar-craavin..) .----

[pubmed.ncbi.nlm.nih.gov/11396606](http://pubmed.ncbi.nlm.nih.gov/11396606) (2001) .----- [www.ncbi.nlm.nih.gov/.../PMC9525178](http://www.ncbi.nlm.nih.gov/.../PMC9525178) (2022)

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**rco94872**

From a study on carbs related to gout it showed a significant increase in uric acid as the carb intake increased. The study also showed as the uric acid levels increased so did the blood pressure. This study may have been from something I have read here.

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**Guillermou**

Yes, RCO, although the normal level of uric acid in the blood may act as an antioxidant, in excess uric acid may have a role in driving hypertension, there is also increasing evidence that uric acid may have a causal role in obesity, insulin resistance and chronic kidney disease. Indeed, serum uric acid has been found to be a strong independent predictor of the development of obesity, diabetes, nonalcoholic fatty liver disease, and chronic kidney disease, and experimental studies have identified mechanisms by which uric acid may drive these conditions. In these studies, one of the most common mechanisms involves the intracellular generation of uric acid in response to the added sugars fructose. [www.ncbi.nlm.nih.gov/.../PMC7556347](http://www.ncbi.nlm.nih.gov/.../PMC7556347) (2020)

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Uric acid impairs endothelial function by reducing endothelial nitric oxide synthase phosphorylation under hypoxic conditions. In addition, several groups have recently found that soluble uric acid increases the expression of aldose reductase in the endothelium and other tissues. Interestingly, elevated aldose reductase expression results in activation of the polyol pathway, which has two main consequences: blockade of nitric oxide production and endogenous fructose production. Both mechanisms appear to play an important detrimental role in the pathogenesis of arterial hypertension in the endothelium, since blockade of aldose reductase or fructokinase, the enzyme involved in fructose metabolism, markedly improves endothelial cell function.

The molecular mechanism by which uric acid upregulates aldose reductase and causes endothelial cell dysfunction appears to be mediated by its prooxidant properties. More specifically, uric acid has been shown to induce mitochondrial dysfunction and superoxide generation through activation of nicotinamide adenine dinucleotide phosphate (NADPH) oxidases, thereby depleting energy capacity (adenosine triphosphate (ATP)). Of interest, mitochondrial ATP production is important for proper endothelial signaling and function. In summary, these studies highlight new evidence for the direct deleterious effects of uric acid on the endothelium, which may be important underlying factors in the pathogenesis of hypertension (Fig. 1). [www.nature.com/.../s41440-020-0481-6](https://www.nature.com/.../s41440-020-0481-6) (2020)

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## mjt11860

fantastic info. thanks!

Posted On 04/20/2023

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## toraware

Hey Dr Mercola! Thanks so much for all the work you do! You're a treasure!

Posted On 04/20/2023

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## Huckleberry1

I have been buying a powder glycine from.....[purebulk.com/search](https://purebulk.com/search) . It is Third Party Laboratory Tested and has no other ingredients. Just thought this might be helpful in looking for a powder form of glycine.

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## markuzick

Even if glycine didn't have more powerful benefits than any other supplement, it would be well worth taking just for eliminating glyphosate from the body, as the body cannot distinguish between the two. The extra glycine displaces the glyphosate to be eliminated with the unneeded glycine - diluting the bad stuff with the good stuff to be flushed away and competing with the glyphosate for uptake by the tissues.

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## badboy2

The article states that " We further show that glycine, but not taurine, acts through mGlyR to regulate neuronal excitability in cortical neurons." To me it makes it sound that Taurine has no nerve functions. There are many studies that shows that Taurine is necessary for brain development and function. Very helpful, especially at the growing ages. I just want to clear that up some. Taurine also protects the eye lens from drying out and strengthens the cells of the retina. Taurine will also prevent and cure Tourette Syndrome, (twitches and tics) in the facial muscles and such which can eventually lead to death.

I wish they would teach that in medical school. I knew a young married man, not too far from me who died of Tourette Syndrome after many years. He had it since he was a boy. Taurine can stimulate production of growth hormones. Cats especially need taurine to prevent blindness. I also find it interesting that most of the taurine in the body ends up around the heart muscle. Maybe because taurine has been found to help muscle recovery after exercising.

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Yes, models of neurodegenerative disorders show reduced concentrations of taurine in the brain. Models of diabetes, insulin resistance, and diet-induced obesity show taurine accumulation in the hippocampus. Given the possible cytoprotective actions of taurine, such cerebral accumulation of taurine could constitute a compensatory mechanism that attempts to prevent neurodegeneration. This article provides an overview of taurine homeostasis in the brain and reviews the mechanisms by which taurine may provide neuroprotection in people with obesity and diabetes. We conclude that further research is needed to understand taurine homeostasis in metabolic disorders with an impact on brain function.

**TAURINE SUPPLEMENTATION AS A NEUROPROTECTIVE STRATEGY UPON BRAIN DYSFUNCTION IN METABOLIC SYNDROME AND DIABETES** [www.mdpi.com/.../1292](http://www.mdpi.com/.../1292) (2022) Several studies using different experimental models have shown the importance of taurine during development; its scarcity during various phases of development has been linked to various pathological problems such as retardation, cardiomyopathy, and retinal degeneration. Taurine is involved in a number of metabolic processes, including osmoregulation, membrane stabilization, and detoxification. Taurine transporter-deficient mice are characterized by impairment of several physiological functions, suggesting a crucial role for taurine in cellular homeostasis.

Additionally, taurine has been used to treat cystic fibrosis, Alzheimer's disease, cardiovascular disease, epilepsy, muscle breakdown, and liver disorders. In this article, we review the sources and synthesis of taurine and examine the evidence from in vitro and in vivo studies on the ability of taurine to protect against dyslipidemia, obesity, hypertension, and diabetes mellitus, as shown in Figure 2.

**BENEFICIAL EFFECTS OF TAURINE ON METABOLIC PARAMETERS IN ANIMALS AND HUMANS** [www.ncbi.nlm.nih.gov/.../PMC9284575](http://www.ncbi.nlm.nih.gov/.../PMC9284575) (2022)

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Taurine is the most abundant amino acid in the retina. In the 1970s, it was thought to be involved in retinal diseases with photoreceptor degeneration. Retinal vascular perfusion disturbances in these retinal diseases may therefore affect retinal taurine uptake, resulting in local depletion. The low plasma taurine concentrations observed in diabetic patients may further increase such local decreases in taurine concentration. In this study we review the evidence for the role of taurine in the survival of retinal ganglion cells and the studies that suggest that this compound may be involved in the pathophysiology of glaucoma or diabetic retinopathy. Therefore, along with other antioxidant molecules, taurine should be seriously reconsidered as a potential treatment for such retinal diseases.

[www.sciencedirect.com/science/article/abs/pii/S1350946214000147](http://www.sciencedirect.com/science/article/abs/pii/S1350946214000147) (2014) The mechanism by which taurine supplementation acts is mainly related to the reduction of oxidative stress. In particular, it has been shown to enhance retinal reduced glutathione, malondialdehyde, superoxide dismutase, and catalase activities. Antiapoptotic effects are also involved; however, the protective mechanisms exerted by taurine against retinal damage still need to be further investigated.

[onlinelibrary.wiley.com/.../cns.13610](http://onlinelibrary.wiley.com/.../cns.13610) SYSTEMIC TAURINE TREATMENT AFFORDS FUNCTIONAL AND MORPHOLOGICAL NEUROPROTECTION OF PHOTORECEPTORS AND RESTORES RETINAL PIGMENT EPITHELIUM FUNCTION [www.sciencedirect.com/.../S2213231722002786](http://www.sciencedirect.com/.../S2213231722002786) (2022)

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## rrealrose

badboy2, thanks for your associations. Was taking taurine in 2 or 3 month stretches for several years before covid came to town, as it supported my clogged liver. (Don't worry, recently added milk thistle and more) As the eyes and liver are closely related in Asian (TCM) medicine, my guess is both organs benefit. Sporadically taking taurine now, notice eyestrain reduces...my take is it is never just one thing and varying combinations need close scrutiny.

Posted On 04/20/2023

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## **sunflowerjanis**

i had read that taurine does help with heart issues. i use it everyday; also give some to my cat along with lysine, some MSM and an ancient carbon powder for detoxing. My feline is 14 years old; but appears to be young and is still very mobile and healthy. i give him the best food i can find; along with the clean water that i use for myself. He's very pampered!

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## **Jhaden**

Taurine deficiency can kill a cat.

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## **badboy2**

Yes rrealrose, I have also found that taurine has made a great improvement in my eyesight. At 82, I am almost back to 20/20 vision. I do not need glasses for driving and only use reading glasses for very small print. Jhaden, at least cause them to go blind.

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## **badboy2**

sunflowerjanis; your cat is very lucky to have you with all your care. Studies done in 1935 has shown that cat and dogs can live healthy lives for 19 to 35 years, so you boy is well on his way. Just an FYI. Lysine also releases protein from plaque buildup and prevents further deposits. Great to take for any kind of infections and insect bites. Including both Hepatitis 1 and 2.

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## **badboy2**

Glycine is an amino acid that is vital for the body to create protein. It plays a significant role in the health of muscles, promoting healthy sleep, and contributing to a healthy mood and overall sense of well-being. Glycine is also an antioxidant, supporting heart health and circulation, fortifying the liver, and strengthening the joints. Additionally, it can benefit overall health and wellness by helping to tone the skin. A lot better for you than monkey fruit, along with all the man-made sweetener's out there that is hard on your pancreas, and arteries.

Posted On 04/20/2023

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## **markuzick**

I buy glycine in bulk powder form. (5 or 10 kg at a time.) I typically take 3 heaping teaspoons in lemon tea daily.

Posted On 04/20/2023

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## **kev8395**

markuzick, can it be taken on an empty stomach or also with food? Does it matter which? Thanks.

Posted On 04/20/2023

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## markuzick

Kev: While I take it on an empty stomach (other than the 25 oz. of tea) and have no problems, I've heard that some people experience gastric distress from as little as 2 grams. I'm not sure if food helps, but, in any case, try taking increasingly higher doses until you reach the desired amount. If you don't make it there without distress, then at least you'll know how much you can tolerate. Divide that into your target dose, and then you'll know how many divided doses you'll need to take over the course of the day.

Posted On 04/20/2023

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## HealthiestChoices

I also have the granular NOW brand of Glycine for a few yrs. Problem for me is I take several other supplements that suggest 'preferably' best on an empty stomach - Nascent Iodine, Dr. Mercola's Collagen Powder, the Glycine, etc. and I have NOT got time to take one away from the others every 20 min. to 1/2 hr., so I rarely take the Glycine now. And I was also taking it (as per other suggestions) along with Dr. Mercola's NAC capsule, which reads " best with a meal." ??? I've been studying, researching, and following a healthy lifestyle for 50+ yrs. but these days it's become more complicated than I like (or have time for) due to all that's going on with our foods, supplements, and criminal organizations who want to control everything!

Posted On 04/20/2023

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## kurlikew

I'm wondering if there are other good food sources of glycine in addition to meats? I always prefer to get whatever nutrients I need from food rather than taking a supplement.

Posted On 04/20/2023

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## Guillermou

FOODS BY GLYCINE CONTENT [www.nutritionvalue.org/foods\\_by\\_Glycine\\_content.html](http://www.nutritionvalue.org/foods_by_Glycine_content.html) .----  
[wholefoodcatalog.info/.../foods](http://wholefoodcatalog.info/.../foods) .---- [www.verywellhealth.com/glycine-overview-4583816](http://www.verywellhealth.com/glycine-overview-4583816) .--

Posted On 04/20/2023

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## markuzick

Most meats increase your requirement for glycine by far more than what they contain. They are not a good source. You would have to eat connective tissues, like skin or gristle. Food may be adequate for survival, but if you're looking for ways to get therapeutic doses, there are only a limited number of nutrients that can be obtained that way; and, even then, you'd need a huge appetite.

Posted On 04/20/2023

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## ono4884

Gelatin powder has about 30% glycine

Posted On 04/20/2023

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## badboy2

Food sources include seaweed (kelp) and spirulina, crustaceans, meats such as ostrich, pork, lamb, buffalo, beef, gelatins, veal, soy, fish, turkey, watercress, wheat germ, sunflower seeds, spinach, egg whites, chicken, and turnips. It seems that supplementation is the only way to get the quantities that is needed as mention in this article.

Posted On 04/20/2023

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## **toraware**

sugar-free jello!

Posted On 04/20/2023

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## **grulla**

[duckduckgo.com/?q=great+lakes+collagen+gelatin+organic&t=newext&am..](https://duckduckgo.com/?q=great+lakes+collagen+gelatin+organic&t=newext&am..)

Posted On 04/20/2023

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## **TruthST8up**

I've been taking glycine for a few years now, nothing near 12 g. a day. I did notice every now and then that I rarely get an ocular migraine (painless, but annoying as it is like trying to see underwater in a pool without a face mask, and a psychedelic inchworm moves around in field of vision; lasts 15 or 20 min.), which is only about once or twice a year, and possibly around when I took a g. of glycine. It may be completely unrelated, but just thought I would mention it so people can be on the lookout... I had my first ocular migraine years before I started taking the glycine, again I get maybe 1 or 2 a year.

Posted On 04/20/2023

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## **20thCenturyFox**

Holy cow, I had no idea! I've been taking 3 tsp glcine on empty stomach at bedtime for sleep for several years. It helps me sleep,, and I also think it gives me entertaining dreams. I also read that it was good for Phase II liver detox and bone quality. But I had no idea about the rest. Is this why people suppose I am 60 when I am 74 (besides that I still ski, ice skate, hike, etc)? I guess now that the cat is out of the bag, the price of glycine will go up. But I'm happy if it means better health for all.

Posted On 04/20/2023

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## Dar6416

Glycine will also mitigate the glyphosate in dog's kibble. (Although I use a very expensive brand, I'm sure it still has glyphosate.) I try not to use much kibble substituting beans instead but there are times when I use a small amount mixed in with their meat and vegetables. I also drink it in my coffee and smoothie. Now if I can just find a replacement coffee creamer instead of dairy. Nothing I've tried seems to work.

Posted On 04/20/2023

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## seastars

Adding some Collagelatin to my BP Coffee or Dandy tea makes it delightfully creamy.

Posted On 04/21/2023

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## ColdTurkey

Already took a teaspoon of this this morning before reading the article, after reading sometime ago that Dr. Mercola takes two teaspoons a day.

Posted On 04/20/2023

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## zumbacjg

Great information & comments. I take enough supplements to choke a horse, and since I live near a farm that sells grass fed beef, I have few excuses not to make bone broth. I have made it in the past. It just takes a while to first bake the bones in the oven. Thanks GUI & Badboy2 for additional information about taurine. I have retinal damage (not enough to affect eye sight), and getting more taurine can't hurt. GUI, reading your comment about glycine's ability to help cytokine storming, it seems to me that glycine should have been in one's arsenal to fight COVID-19, at least with the early stains of Delta & omicron, and especially if the patient were diabetic.

Posted On 04/20/2023

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## **fir1272**

Just found out that hyaluronic acid, which is in collagen, helps to prevent breast cancer. This comes from a biochemist researcher of hyaluronic acid at University of California at San Francisco. I also found a good inexpensive source for glycine at swanson vitamins dot com. It's the Swanson house brand, I've used swanson for over 10 yrs ALOT and love them, never had a problem and their products are top notch especially the house brand, which is always much cheaper than any place else. I also ordered their NeoCell super collagen - both were good prices a total of \$25.00 for both for 3 week supply.

Posted On 04/20/2023

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## **dri2693**

Another great article Dr Mercola. I have been using NAC for a couple of months now.

Posted On 04/20/2023

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## **katndognco**

GUI I have a question please. How do they produce glycine? Is it from pigs, beef or both? I ask bc if they are indiscriminate on animal use would we not be exposing ourselves to mRNA vaccines the pigs are receiving per Mercola's article a couple days ago? I've stopped eating pork till I can find clean sources. Thank you so much!

Posted On 04/20/2023

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## Guillermou

ORGANIC COLLAGEN . Dr. Mercola -Organic Collagen tablets and powder provide nutrients for healthy skin, bones, cartilage and digestion with collagen from Organic Beef Bone Broth, sourced from U.S. grass-fed cattle raised without the addition of antibiotics or hormones. -Our formula is unhydrolyzed and minimally processed, so you receive a wider range and balanced ratio of complementary amino acids rather than just isolated peptides as with hydrolyzed products

[products.mercolamarket.com/collagen-supplement](https://products.mercolamarket.com/collagen-supplement) Collagen is the most abundant structural protein in the body, constituting more than 25% of the total protein in the body.

It constitutes approximately 80% of the tendons, 74% of the skin, 64% of the cornea, 50% of the cartilage, 23% of the cortical bone, 12-24% of the arteries, 10% of the lung, and 4% of the liver. The collagen molecule has one third glycine and 13% is proline. Of the derived amino acids, it presents 9% 4-hydroxyproline and 0.6% 5-hydroxylysine. It also contains glutamate, arginine, alanine and other amino acids of less structural relevance. The main process affected by glycine deficiency is collagen synthesis, since more than 90% of the available glycine is spent on it.

A deficient supply of glycine means that not enough collagen is synthesized and this can cause weakness in the body's mechanical system (weakness in the joints, osteoarthritis, broken bones, sprains, etc.) but it can also be the cause of the appearance of anemia, muscular dystrophies, excess cholesterol, and many other pathologies, which could be resolved by increasing the daily intake of glycine. [www.researchgate.net/profile/Kolja-Gelse/publication/9004464\\_Collagens..](https://www.researchgate.net/profile/Kolja-Gelse/publication/9004464_Collagens..) (2001)

Posted On 04/20/2023

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## katndognco

Thank you GUI I'm looking for a bulk glycine supplement, they're less expensive. Knowing it's a beef product helps a lot. Yay!

Posted On 04/20/2023

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## Guillermou

Glycine is a non-essential amino acid naturally found in a variety of protein-rich foods such as fish, legumes, dairy, meat, etc. It is colorless in appearance and sweet in taste. Commercially, glycine is manufactured by the reaction of chloroacetic acid with ammonia or the Strecker amino acid synthesis route. The latter manufacturing process is prominently used in the US & Japan. Glycine has wide adoption in the pharmaceutical industry. It is effectively used for treating diseases like schizophrenia, sleep disorder, stroke, metabolic syndrome along with rare inherited metabolic disorders. Also, it is also used for memory enhancement and treat leg ulcers and heal wounds.

It also helps reduce anxiety. Anxiety disorder is rapidly increasing across various sections of society especially amongst the youths. The number of people taking medication for anxiety has significantly gone up. As per the Anxiety & Depression Association of America, anxiety has affected around 40 million adults aged 18 or old in the US alone. Only 36.9% of those suffering from anxiety receive treatment. The rising awareness for proper treatment is expected to increase this number. As a result, the demand for inexpensive glycine is also expected to increase. <https://www.fortunebusinessinsights.com/glycine-market-102347>

Posted On 04/20/2023

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## Krofter

kat - Lipid nanotech , which the good Doc has touched on before, is the most problematic aspect of modern jabs. It's been used in livestock vaccines for many years before covidcon. It's also being emitted in the geoengineering of our skies (chem trails). So it's now in all livestock and humans. Having said that, it is wise to do everything we can to avoid getting more, and to eat foods that can chelate the metals used in nanotech so we can pass them out.

Posted On 04/20/2023

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## **katndognco**

Thank you Krofter, appreciate you. My current dive is into amino acids/nootropics. Due to early childhood poisoning I've had tremors since. I'm learning ppl are healing themselves through amino acids. It's stunning how much information is available and equally stunning that doctors aren't taught to heal us but to treat the condition. Their education is twisted against us, not for our benefit. Nothing new right we discuss it here daily ad naseum but bc I don't use doctors I felt exempt. It wasn't even on my radar that I had the option to heal the tremors, I've been focused on autoimmune issues since mid 90's. I'm feeling elated and hopeful again. Best to you!

Posted On 04/20/2023

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## **Guillermou**

Yes, Krofter, from Dr. Mercola's reports: Some of the metals that are particularly detrimental to mitochondrial function are aluminum, arsenic, cesium, tin, and thallium. Other toxic metals that many people have in their bodies are cadmium, mercury, and lead. When you have heavy metal toxicity, your body tends to attract electromagnetic fields (EMFs). These in turn affect your metabolism and ability to effectively eliminate toxins and heavy metals. Some strategies that are great for detoxifying you are a low-EMF, full-spectrum infrared sauna along with R-lipoic acid. Minerals like magnesium, zinc, selenium, potassium, and iodine are also important for detoxification. Myers also has an online program called "Myers Detox Protocol Course" which focuses on replenishing minerals lost during the detoxification process like Magnesium and Zinc.

Zinc helps flush out cadmium, a metal that causes more cancers than all other metals combined. Selenium also prevents viral replication and helps remove arsenic, beryllium, cadmium, mercury, and silver. Potassium helps expel thallium. Iodine to displace fluorine. Also consider getting a high-quality, low-EMF infrared sauna. Use regularly in combination with binders and any minerals you may need. Remember that we live in a highly toxic world. Even if you think you're doing pretty much everything right, you've probably built up heavy metals in your body, which can prevent you from experiencing peak health.

Posted On 04/20/2023

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## Guillermou

DR. KLINGHARDT: 2016 CONFERENCE NOTES. -Some studies have shown that melatonin can help to detoxify the brain as well as to help with parasites, viruses, etc. in the brain. Dr. Klinghardt finds that only liposomal melatonin gets into the brain. -Cannabis has been shown to increase levels of melatonin in the body. -All along people have focused on detoxifying with glutathione, but melatonin is even better. -EMFs keep metals from being properly detoxified in the body.

[www.betterhealthguy.com/klinghardt-2016](http://www.betterhealthguy.com/klinghardt-2016) .---- DR. MED. DIETRICH KLINGHARDT M.D., PH.D., ON EFFECTIVE HOLISTIC HEAVY METAL DETOXIFICATION (CHELATION)

[docshare04.docshare.tips/.../175192800.pdf](http://docshare04.docshare.tips/.../175192800.pdf).---- HOW TO DETOX HEAVY METALS

[thewholejourney.com/.../](http://thewholejourney.com/.../).--- BENEFITS OF USING A SAUNA [artofsauna.ca/.../](http://artofsauna.ca/.../).---

Posted On 04/20/2023

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## kev8395

I have a jar of pure glycine powder but haven't used it in a while. How many grams of glycine are in a heaped teaspoon please? Thanks

Posted On 04/20/2023

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## AaronF

Since the density of glycine is 1.16 g/mL (according to Wikipedia and also PubChem), and since there are 4.93 mL per teaspoon (tsp), two tsp of glycine would be approximately your heaping teaspoon, and therefore, be equivalent to a little over 11 grams of glycine. A tablespoon would be 3 teaspoons, and be equivalent to about 17 grams of glycine. These estimates are based on the assumption your glycine is in its pure crystalline form (not pulverized or powdered) and not mixed with other substances.

Posted On 04/20/2023

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## mdso379

I live in Australia, I went into our local Health Food shop today enquiring about buying some Glycine. The lady serving told me that I cannot buy Glycine without a script from a Doctor. She then went on to say the Therapeutic Goods Act in Australia, are in the process of looking at banning quite a lot of "sporting supplements." This will become the rule as of November 2023. The TGA in Australia, who pushed the vaccines telling everyone how safe and effective they were. Australians need to become aware of the changes which are going to take place in Austrtalia and may affect them. It is obvious that the TGA in Australia have plans and those plans will not look after people's good health.

Posted On 04/21/2023

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## well4life

mdso379, I am going down to my Healthshop soon to buy some. (Qld) I did phone yesterday and I can buy it and she never said I need a script. Also you can buy it online. Yes, this is just the beginning of the TGA eventually stopping all our good supplements. Meat is soon to be poisoned, already is to a degree. Do you listen to Maria Zee at all? Wow, she has all the docs on what's planned by you know WHO and to be in place by 2024. It's not going to be pretty... Just have to do what we can while we can. Back from shops and I did get it. This is the brand and you can also get it direct online from here or other places. There's also other brands online but this seems a good one.

[healthwiseproducts.com.au/.../9-healthwise-glycine.html](https://healthwiseproducts.com.au/.../9-healthwise-glycine.html)

Posted On 04/21/2023

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## ghereinaus

For some people, like me, glycine excites neurons. When I take glycine, initially it is calming, but around 3 hours later it is exciting my brain neurons and putting me closer to having a seizure. Maybe because it activates NMDA receptors? [www.sciencedirect.com/science/article/abs/pii/S0014488697964633?](https://www.sciencedirect.com/science/article/abs/pii/S0014488697964633?via%3D..)  
[via%3D..](https://www.sciencedirect.com/science/article/abs/pii/S0014488697964633?via%3D..)

Posted On 04/21/2023

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## TruthST8up

According to the internet, Supplementing with glycine is safe in appropriate amounts. Studies have used up to 90 grams of glycine per day over several weeks without serious side effects ( 45 ). For comparison, the standard dose used in studies is about 35 grams per day. It does have an LD-50 (Lethal Dose in 50% of the population)... for rats at least Oral, rat: LD50 = 7930 mg/kg; . Glycine is a non-essential amino acid for human development. It is the only amino acid with no asymmetric carbon. [Nonessential is a misleading term, it does not mean that it is nonessential to the body, but that it is not essential for you to consume each day since the body makes some of it daily—

However, that the body does not need to consume nonessential aminos is a broad statement, possibly untrue; the difference may be enough to keep you alive, not healthy and thriving (as with all USDA recommendations).] A 150 lb. person is 68 kg. (kilos / kilograms) 7,930 is roughly 8 grams; thus, a 150 lb. person would need to take 544 g. at one time, or more than 1 lb. The container that it comes in, from Swanson, is a half pound. Thus it is not something to be left around for children, especially since it is sweet, since for even a 50 lb child, all that would be needed is 181g., which is less than 1 Swanson vitamins container of 8 ounces / 227 grams. Eating a full 1/2-lb would indeed be quite a bit, but then again, children sometimes do things adults would not... so a half-ounce of prevention is worth a half-pound of cure.

Posted On 04/20/2023

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