

Glycine is Required for Energy, Pain, Sleep & Life

by Michael Smith PhD, MDSc



Do you take Fibro-Care™? You may wonder why glycine is in the formulation. The past several years I have been asked many questions over the role of glycine in human nutrition and physiology. Here is an ensemble of the most common questions and my answers on why glycine as a requirement in modifying pain signals, promoting REM sleep, producing energy and for life.

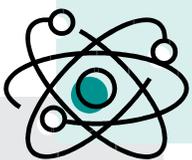
What is glycine?

Glycine is the smallest of 20 common amino acids which make up the majority of proteins and enzymes in mammalian tissues. Because glycine is small, it can be biosynthesized from a few larger amino acids so is not required in the diet. However, due to its special flexibility glycine is a *required component* of almost all enzymes and several special structural proteins such as collagen, elastin and keratin found in connective tissues.

What does glycine do in the body?

Glycine is part of hundreds of proteins, primarily as a link between other amino acids. In addition, glycine is a key amino acid in the major structural proteins, collagen and an important amino acid of hair and silk. On the average glycine represents about 4-5% of all the amino acids in the body and is considered non-toxic in any diet.

Does glycine help with energy production?



Glycine is involved with many steps in the biochemical production of energy. Every enzyme involved with the energy process contains glycine as a *fundamental requirement* for its structure. Without glycine, your body would cease to make energy.

Can glycine modify pain?

Glycine serves as an important neurotransmitter between neurons dedicated to inhibiting pain neurotransmission.¹ There are neurons of the central neuron system which have sites dedicated to binding pain signals and binding glycine. The glycine receptors on the surface of these neurons regulate the excitability of motor and nerve impulses going

to the brain, including pain. Glycine is a signal compound responsible for damping the pain bundles and hence blocking the transmission of some types of pain.² On the other hand, neuronal glycine receptors are involved in processing visual and auditory signals so glycine is not simply dedicated to regulating pain transmission.



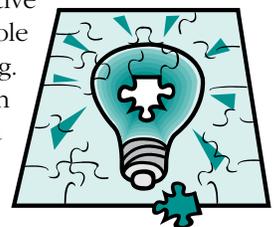
The receptor protein for glycine on the surface of neurons is well studied and understood to a certain extent.³ Using this knowledge it is thought that synthetic compounds that enhance the glycine inhibitory response (called glycine mimics) have therapeutic promise for inducing peripheral analgesia.⁴ So some drug companies now have programs dedicated to the development of compounds which can act on nerves like glycine, that is, dull pain without any of the side effects of most analgesics.

Does glycine support the central nervous system?

Glycine is *required* for the proper function of the central nervous system, not only for modulating pain transmission but also to control visual and auditory sensory transmission. In addition, all neurons require glycine in general for maintaining protein and enzyme integrity.

What about cognitive function?

Glycine directly affects cognitive function because of its central role in perception of vision and hearing. In these systems glycine is also an inhibitor, where it blocks visual and auditory noise. There is evidence that several other pathways of the central nervous system are glycine



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Glycine

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dependent. More research needs to be done but it seems that glycine may also act to control nerve impulses in these systems, much like it does for pain and voluntary muscle signals.

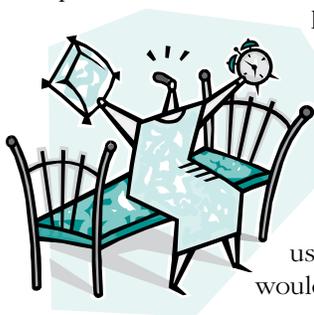
How does glycine influence glutathione?

Glutathione is a necessary antioxidant which is important for maintaining cell integrity against many types of harmful oxidants. Glutathione is biosynthesized by mammals in the body from the amino acids L-cysteine, L-glutamic acid and glycine. If the biosynthesis of glutathione is inhibited by the lack of glycine the consequences are very destructive, often resulting in cell death. As you might guess, the proper level of active glutathione is highly dependent on keeping the vitamin C level high, since vitamin C repairs glutathione back to the protective state.



Can glycine support REM sleep?

Glycine, along with tryptophan, are probably the two most important amino acids which aid sleep. Specifically, glycine has been recently confirmed as the key neurotransmitter responsible and an absolute requirement for REM sleep. Glycine signals the voluntary muscles to be quiet during deep sleep. It also dulls the visual and auditory senses allowing us to ignore outside stimulation which would interrupt our sleep.



What other benefits does glycine offer?

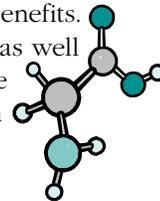
Glycine may be a useful aid for treating gastric ulcers by protecting the mucus of stomach lining and by reducing stomach acid secretions. By doing this, glycine inhibits the deleterious effects of high stomach acid and alcohol damage. Not by itself, but in combination with other therapeutics, glycine can help relieve an upset stomach and begin the repair of ulcerated mucosa.

What is glycinate? How is it used?

Glycinate is the chelate form of glycine. Minerals such as calcium, magnesium, iron, etc are nutritionally required by diet but inorganic in nature. The end product is known as a chelate, for example, magnesium glycinate is the chelate of magnesium and glycine.

Anything else I should know about glycine?

I have only pointed out some of glycine's benefits. Humans do need a constant source of glycine, as well as other amino acids required for life so we should make certain to obtain sufficient protein in our diets every day.



References:

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Editor Note: This article answers why glycine adds benefits beyond mineral delivery. Glycine is a carrier for magnesium in these formulations. Once magnesium is transported inside the cell where it can best be utilized, glycine is then free as a bonus nutrient. By offering organic mineral chelates by Albion, TyH gives you more nutrient-dense, health building products for your money. If your diet is low in protein, consider Fibro-Whey™ as a balanced dietary source of amino acids in an easy to take powder for yet another source of glycine.

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