

Liposomal Glutathione

SUPPORTS ANTIOXIDANT DEFENSES AND DETOXIFICATION IN AN INNOVATIVE LIPOSOMAL FORM*

Glutathione is an important endogenous antioxidant and cofactor in detoxification pathways. Found in virtually every cell of the body, it aids cellular defenses against diverse oxidative and chemical stressors. **Maintenance of adequate levels of glutathione is regarded as an important factor in physical and mental health.**¹



Supports detoxification and liver health¹



Promotes protection from free radicals to support healthy cellular function¹



Liposomal delivery enhances absorption across intestinal cell membranes¹

Glutathione is a tripeptide comprised of three amino acids: cysteine, glutamic acid, and glycine (Figure 1). Its peptide bonds make it susceptible to degradation during digestion. The peptide structure also prevents glutathione from crossing membranes efficiently. While oral glutathione is bioavailable in laboratory animal models, clinical pharmacokinetic research remains limited. Absorption in humans is thought to be poor, owing to degradation by intestinal proteases and limited diffusion across intestinal cell membranes.² Liposomal delivery systems are ideally suited for peptides with these limitations.^{3,4} A liposome protects glutathione from degradation and facilitates passive diffusion across membranes of the intestinal mucosa.

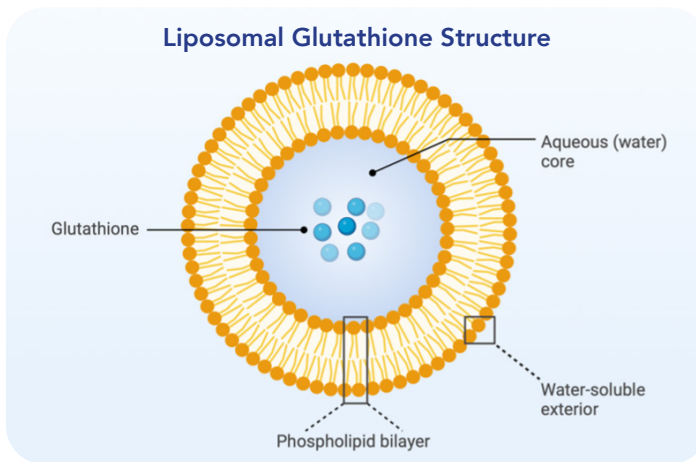


Figure 2. Liposomes are comprised of a phospholipid bilayer, which encloses glutathione in its aqueous interior. The small size, water solubility, and protective structure of liposomes enhance stability and absorption of glutathione across the cell monolayer comprising the intestinal mucosa.

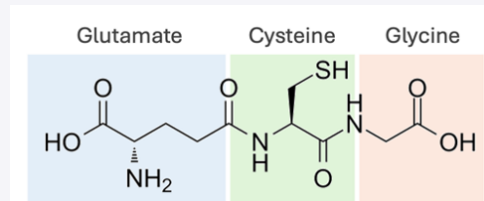


Figure 1. Glutathione is a tripeptide comprised of glutamate, cysteine and glycine. The peptide bonds joining these amino acids are subject to degradation by enzymes in the digestive tract.

WHO IS THIS SUPPLEMENT FOR?

- Patients with increased oxidative stress and/or low plasma glutathione
- Patients seeking support for detoxification

MECHANISMS OF ACTION

Liposomal delivery system. Liposomes are made from purified phosphatidylcholine, whose hydrophobic and hydrophilic properties facilitate the formation of a spherical particle (Figure 2). The liposome enables passive diffusion across intestinal cell membranes, a prerequisite for absorption into the bloodstream.^{3,4} Liposomes also protect peptide bonds from hydrolysis (degradation) that can occur during digestion.

Antioxidant activity. This product provides reduced glutathione, which can directly donate electrons to free radicals, reducing or neutralizing their activity. In the body, glutathione also has indirect antioxidant effects, serving as a co-substrate for glutathione peroxidases, which neutralize hydrogen peroxide.⁵ Hydrogen peroxide is a byproduct of mitochondrial energy metabolism that can diffuse through membranes and damage other cellular structures.

Detoxification support. The highest concentrations of glutathione are found in the liver, the primary site for detoxification of a wide range of environmental and food-borne xenobiotics. As a co-substrate for glutathione sulfotransferases (GSTs), a family of phase II detoxification enzymes, glutathione is essential for conjugation of a variety of endogenous hormones and environmental chemicals. The conjugation process produces less active metabolites.⁶

RELEVANT GENETIC POLYMORPHISMS

Glutathione sulfotransferase Pi 1 (GSTP1) is a glutathione sulfotransferase (GST) enzyme that detoxifies a range of environmental substances via conjugation with glutathione. GSTP1 rs1695 (313 A>G, Ile105Val) is a widely studied polymorphism that alters the catalytic function of this enzyme.

RESEARCH HIGHLIGHTS⁺

In vitro, liposomal glutathione exhibited superior absorption across an intestinal cell (Caco-2) monolayer compared to a matching, non-liposomal powder (Figure 3).⁹

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- Unpublished data

Absorption of liposomal glutathione compared to standard glutathione across intestinal cell monolayer

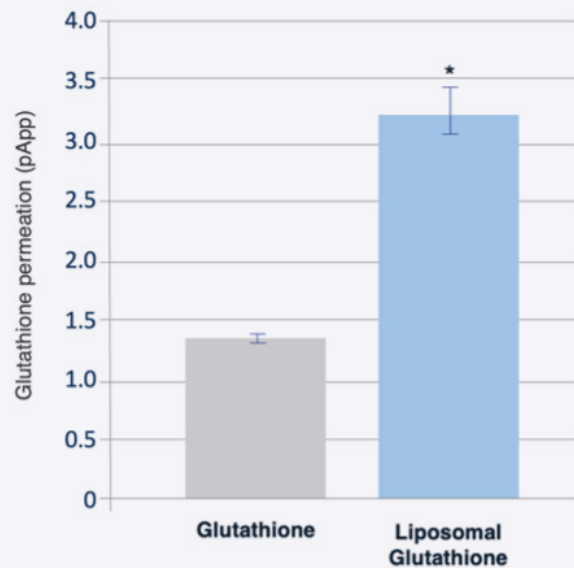


Figure 3. Glutathione absorption across an intestinal cell (Caco-2) monolayer *in vitro* was significantly greater with the liposomal glutathione in this product compared to an equivalent concentration of a non-liposomal product. A higher Papp (apparent permeability coefficient) indicates better penetration across the intestinal barrier.



Supplement Facts

0.906 in

1 softgel capsule, 1-2 times daily, with meals.

Each (size 16) softgel capsule contains:

BioGlute™ proprietary blend of glutathione and essential phospholipids	375 mg
Providing:	
Setria® glutathione	250 mg
Phospholipid complex	125 mg

Other ingredients: gelatin capsule (gelatin, glycerin, water, calcium carbonate), extra virgin olive oil, beeswax

BioGlute™ is a registered trademark of Essential Nutraceuticals, LLC.

Setria® is a registered trademark of KYOWA HAKKO BIO Co., Ltd.

Contains soy

Liver & Detoxification



Liposomal Glutathione	Quantity	Order Code
	60	LSG6
	30	LSG3

*This statement has not been evaluated by the Food & Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.

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