

Liposomal Glutathione



0.5 ml = 1 pump

Reduces free radicals formed in the body and maintains healthy immune system function

OVERVIEW

- > New innovative proprietary Liposomal Technology for optimal absorption and delivery
- > Orange peppermint flavour for easy compliance
- > Supports liver health
- > Reduces free radicals formed in the body
- > Maintains healthy immune system function

Active Ingredients per 3 ml (6 pumps) serve	
Glutathione (reduced)	250 mg

Pack Size	50 ml
Serving Per Pack	16 serves

Excipients
Sunflower lecithin (equiv. phospholipids 74.7 mg/g)
Tocofersolan
Purified water
Orange oil
Glycerol
Peppermint oil
Ethanol
Potassium carbonate

Directions for Use
Take 3 ml (6 pumps) in mouth once daily or as directed by your healthcare professional. Hold in mouth for 30 seconds before swallowing.

Allergen Information
Does not contain: soy, gluten, dairy, lactose or nuts.

Warnings:
<ul style="list-style-type: none"> • Contraindicated for use during pregnancy and lactation.¹ • Contains 5% ethanol. • Adults only.

Storage Instructions
Store at 2–8°C. Refrigerate do not freeze.

Designed and packed in Australia from imported ingredients.



No Added Soy



No Added Gluten



No Added Dairy



No Added Nuts



No Artificial Flavours or Colours



Vegan Friendly



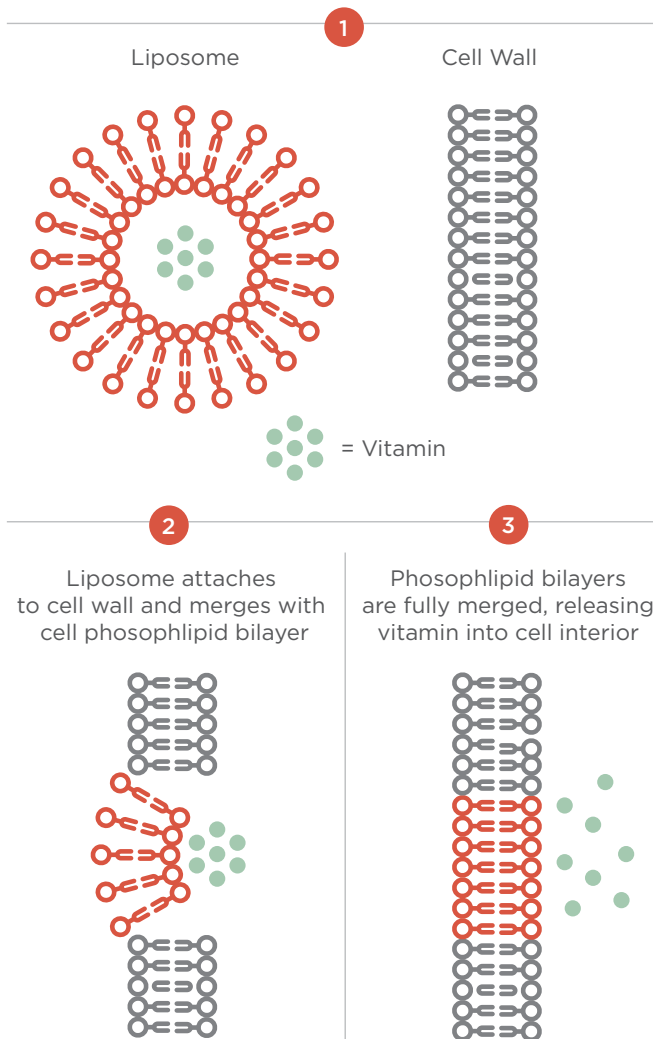


EDUCATION

Liposome structure and function

A liposome is a vesicle made up of at least one phospholipid bilayer, which can be used to deliver hydro- or lipophilic drugs into the cell. The liposome vesicle's phospholipid bilayer merges with the phospholipid bilayer of the cell wall, releasing the nutrient into the cell interior (see fig.1).

Figure 1: Liposomal Vitamin merging onto cell wall.



Liposomes can range in size, with smaller vesicles giving greater absorption and cellular uptake, being cleared at a slower rate giving greater opportunity for absorption, and being able to be absorbed from the buccal cells meaning they get to the cell more quickly than waiting for absorption into the bloodstream from the stomach. The liposomes in Designs for Health products are 50-100nm in size.¹⁰

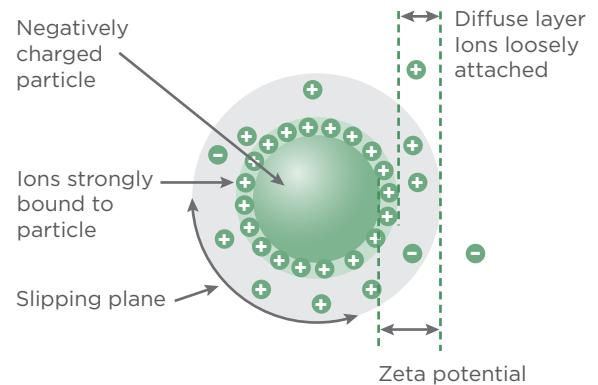
Liposomal Quality - particle size is not the whole story

Zeta potential

One of the key physicochemical properties that determine liposomal quality is the integrity and structure of each liposomal sphere. If the sphere fails, the medicine within the liposome can leak, rendering the liposome ineffective.⁸

One way to monitor the integrity of the spheres to ensure medicine retention is to measure the net charge or "zeta potential".⁸

Zeta potential is defined as the electrical charge between the outer edge of the sphere (the slipping plane) and the free water molecules/ions surrounding the outer edge of the sphere. If the ions on the edge and the free ions both have a similar electrical charge (for instance, both positive), a repulsive force is created (like that created when two batteries are placed side by side with their positive ends facing one another). This force keeps the sphere formation intact.⁹



Zeta potential measurement⁹

Low Zeta potential is an indication that the integrity of the sphere is compromised and that the liposomal medicine has become an emulsion. The higher the zeta potential, the greater the stability and integrity of the liposome. See Figures 2 and 3.

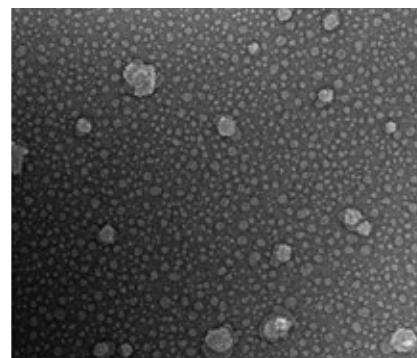


Figure 2: Liposomal Medicine with spheres intact. Zeta potential = negative 34eV (Designs for Health Liposomal D3).

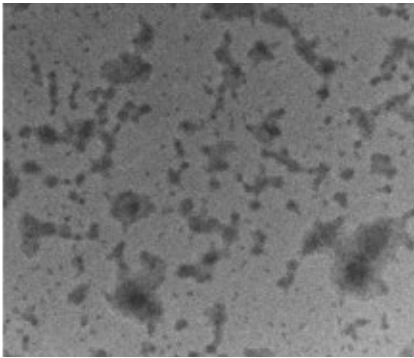


Figure 3: Liposomal medicine with spheres compromised. Zeta potential = negative 14 eV.

From the above, it also becomes obvious that the presence of water is critical to creating a stable liposomal formulation.

Each batch of Designs for Health Liposomal products is tested for zeta potential upon release and then throughout the shelf-life of the product to ensure the superior quality of our Liposomals.

Benefits of liposomal delivery¹¹

- Facilitates absorption in the buccal cells
- Facilitates gastrointestinal uptake
- Prevents breakdown by stomach acid
- Able to incorporate both hydro- and lipophilic agents
- Reduces risk of side effects
- Increased circulation time with smaller nanoparticles (inverse relationship between particle size and clearance time)
- Increased absorption with smaller particle size (9-fold increase from 236nm to 97nm and 34-fold higher at 64nm)
- Increased patient compliance for those who cannot or prefer not to swallow tablets
- Increased ability for flexible dosing

Glutathione bioavailability

Supporting optimal glutathione levels in the body requires overcoming issues associated with oral glutathione intake, including extensive gastrointestinal hydrolysis and suboptimal bioavailability.^{1,4} Combining the biologically active reduced form of oral glutathione (GSH) with liposomal technology provides an effective delivery system specifically designed to overcome these issues by acting as efficient transport carrier for peptides and proteins.^{3,4} Liposomes can enhance the gastrointestinal stability, bioavailability and absorption of glutathione due to their bilayer structure, with a lipophilic phospholipid layer surrounding a hydrophilic core encapsulating glutathione.⁴ The structural similarity of liposomes to endogenous cell membranes is a key factor in their capacity to improve glutathione bioavailability and absorption, thereby supporting the full spectrum of glutathione's therapeutic benefits in the body.⁴ Glutathione is an endogenous antioxidant comprising of glutamate, cysteine and glycine that continually converts between 4 different forms depending on the body's physiological requirements.¹ Present in relatively high concentrations in many tissues,

optimal levels of glutathione are essential for many functions in the body including reducing oxidative stress, maintaining redox balance, enhancing metabolic detoxification processes, as well as enhancing hepatic conversion and immune system functionality.²⁻⁴ Many factors influence the body's need for glutathione including weight gain, stress, aging, increased exposure to medications, environmental toxin exposure (e.g. heavy metals, solvents, pesticides, alcohol), smoking, poor nutrition and ultraviolet radiation.^{1,2,5} While glutathione is naturally present in some foods, the level of intake that can be attained via the diet alone is minimal due to significant hydrolysis in the gastrointestinal tract, low bioavailability and the complexity of maintaining glutathione levels in the body.^{1,5}

Antioxidant

The significance of glutathione's potent antioxidant activity is highlighted by its synthesis in the cytoplasm of every cell in the body.¹ It is considered to be the most important endogenous hydrophilic, intracellular antioxidant due to its ability to neutralize lipid peroxides, hydrogen peroxides and reactive oxygen species, regenerate other antioxidants (vitamins C and E) as well as conjugate and inhibit the oxidative effects of exogenous toxins.^{1,5} The importance of optimal levels of the active form of glutathione in the body is also observed in the fluctuating ratio between its reduced (GSH) and oxidized (GSSH) forms, with high GSSH levels correlated with elevated oxidative stress levels, the effects of which being counteracted by higher GSH concentrations in the body.^{1,3}

Immune

Glutathione is also important for healthy immune system function via several mechanisms.^{1,5} These include protection of immune cell integrity and activity via both antioxidant processes and by inhibiting the cell damaging effects of complement system proteins. Glutathione also supports the synthesis, proliferation and activity of natural killer cells, T-cells, lymphocytes and dendritic cells.^{1,3,5} The importance of glutathione for immune system health is also observed by low levels of glutathione in the body associated with suboptimal immune strength and function.⁵

Liver

Almost 25% of the body's total glutathione is concentrated in the liver, emphasising the importance of optimal glutathione levels for healthy liver function.^{1,6} Glutathione supports liver function by acting as a key substrate of the hepatic phase 2 glutathione-S-transferase enzymatic pathway that conjugates exogenous toxins and xenobiotics (e.g. medications, pesticides, alcohol), and as part of glutathione peroxidase that neutralises hydrogen peroxide free radicals and lipid oxidative damage.^{1,7}

References supplied on request.



Designs for Health Quality Guarantee

Designs for Health medicines that are listed on the Australian Register of Therapeutic Goods will display an AUSTL number on the label. Listed medicines in Australia need to be manufactured according to legislated standards set out in Therapeutic Goods Order 101. TGO101 legislation sets out minimum quality standards for medicines supplied in Australia that display an AUSTL number. It mandates testing for:

- Impurities such as heavy metals (including lead, mercury, cadmium and arsenic), pesticides and residual solvents
- Dissolution (to ensure the capsule will dissolve once taken)
- Uniformity (to ensure that every capsule is the same)

Final assay testing is also performed to ensure that what we have on the label is in each capsule, and microbiological testing is performed to ensure that no microbial contamination has occurred during the encapsulation and packing process.