designs for health® Australia

LIPOCELLE™ TECHNOLOGY

Liposomal Vitamin D3

Supports bone integrity, maternal health and foetal development and maintains healthy immune system function

285 microlitres = 1 spray

OVERVIEW

- New innovative Lipocelle™ technology for optimal absorption and delivery
- Provides support for healthy bones
- Aids foetal development and maternal health
- Maintains healthy immune system function

Active Ingredients per 285 microlitre (1 spray) serve

Liposomal Vitamin D3 (as Colecalciferol)
Colecalciferol 25 micrograms equiv. Vitamin D3 1000 IU

Pack Size	50 ml
Servings Per Pack	175

Excipients

Purified water
Lecithin (sunflower)
Equiv phospholipids 40.7 mg/g
Orange oil (flavour)
Tocofersolan
Glycerol
Ethanol

Directions for Use

Adults: Take 285 microlitres (1 spray) daily by mouth, or as directed by your healthcare professional. Spray directly onto the inner cheek or under the tongue and hold in mouth for 30 seconds before swallowing.

Allergen Information

No added: Soy, gluten, dairy, lactose or nuts

Prescribing Considerations

Warnings: Contains 12% Ethanol

Storage Instructions

Store below 8°C (refrigerate) and keep away from direct sunlight.

Designed and packed in Australia from imported ingredients.

No Added Soy

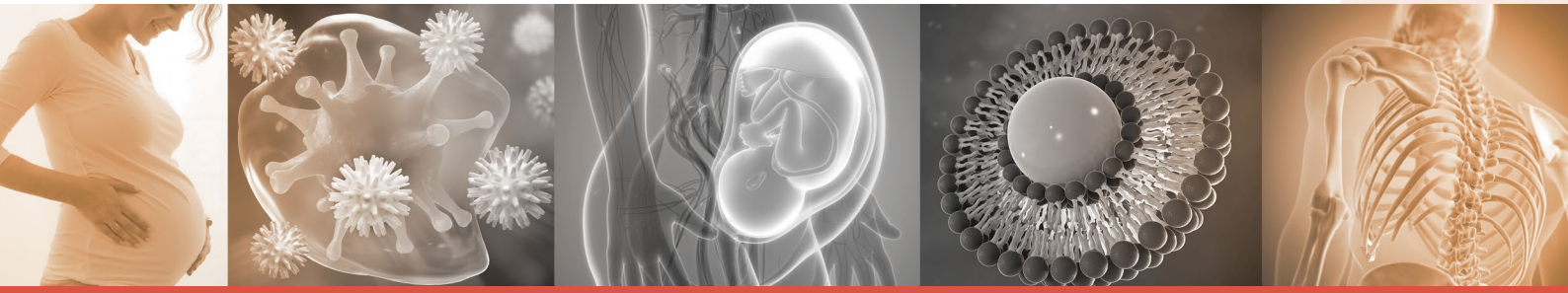
No Added Gluten

No Added Dairy

No Added Nuts

No Artificial Flavours or Colours

No Added Preservatives



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Liposomal Vitamin D3

EDUCATION

Vitamin D is a fat-soluble secosteroid hormone that can be found in three main forms – vitamin D (calcitriol), vitamin D2 (ergocalciferol), and vitamin D3 (colecalciferol). Calcitriol is endogenously produced in the body via ultraviolet B exposure to the epidermis.[1] Ergocalciferol is the synthetic form of vitamin D and is most commonly added to food. Colecalciferol is synthesised in the skin from 7-dehydrocholesterol and is also found in a limited range of food sources such as shiitake mushrooms and oily fish. Vitamin D is required for a vast number of biological processes.[1]

Due to a number of disease states having low vitamin D status in common, serum vitamin D as 25-hydroxyvitamin D (25(OH) D) is often routinely tested. Vitamin D supplementation is suggested in those with a clinical vitamin D deficiency. Variations in vitamin D status are heavily dependent upon a number of factors, including sex, season, location, age, health conditions, and lifestyle.[2]

Liposomal technology

Liposomes are vesicles with phospholipid bilayers surrounding an aqueous or lipid solution. The phospholipid make-up of the bilayer allows for the liposomes to permeate the cell membrane and promote cell to cell fusion, resulting in delivery of the nutrients enclosed within the liposomes into the cells.[5]

Liposomal technology enhances bioavailability and absorption.[3] Efficient intracellular delivery is achieved via superior absorption of the smaller sized liposome particles. Liposomal delivery also allows for greater stability in the bloodstream and can be retained in the blood without degradation or oxidation.[4]

Bone health

Vitamin D plays a primary role in maintaining bone health and integrity. Both bone mass and mineralisation require adequate vitamin D levels. Two of the main nutrients involved in strengthening the bone matrix, calcium and phosphorous, require adequate vitamin D in order to maintain homeostasis. Evidence suggests that as we age, vitamin D levels can decrease, leading to an imbalance in calcium and phoshorous.[6] Hormonal factors also influence bone resorption and formation – therefore, vitamin D is both directly and indirectly responsible for processes involved in the mineralisation of the extracellular matrix in bone tissue.[7]

Immune system

The immune system requires optimal vitamin D levels to function. A number of important immune cells have vitamin D receptors and vitamin D metabolising enzymes, including monocytes, B cells, T cells, and antigen-presenting cells.[8]

Results from *in vivo* human and animal studies show numerous beneficial outcomes for immune function with vitamin D supplementation.[8] Calcitriol has specifically been shown to enhance macrophage and monocyte antimicrobial activity, as well as enhancing innate immune cell chemotaxis and phagocytosis.[8] Calcitriol is also involved in adaptive immunity where it directly influences B cell homeostasis, memory and plasma cell inhibition, and promotion of apoptosis of immunoglobulins responsible for producing B cells.[8]

Maternal health and foetal development

Vitamin D has a vital role in foetal development due to its requirement in maintaining calcium homeostasis and supporting healthy bone growth. Young children and pregnant women are at a particular risk of vitamin D deficiency, with numerous studies linking low serum 25(OH)D to poor health outcomes that can extend beyond bone health.[9] Maternal 25(OH)D is believed to cross the human placenta to the foetus, as has been demonstrated in rat studies. The placenta possesses vitamin D receptors, as well as producing the enzyme CYP27B1 which is responsible for the conversion of 25(OH)D to the active form of vitamin D.

There is also a demonstrated connection between vitamin D, immune function, and maternal health. Adequate vitamin D levels support immune function, which may provide support for the appropriate maternal immune response to the placenta.[10]

References supplied on request.