



# Liquid D3

## CLINICAL APPLICATIONS

- Maintains Bone and Dental Health
- Increases Calcium Absorption and Balance
- Boosts Immune Activity
- Supports Cardiometabolic Health, Blood Sugar Balance Already Within Normal Levels, and Weight Loss
- Helps Increase Musculoskeletal Strength and Comfort



## What is Vitamin D?

Vitamin D is a steroid vitamin, a group of fat soluble pro-hormones that are best known for the role they play in supporting bone health and aiding in the absorption of calcium and phosphate from the GI tract. However, a growing body of research highlights its important role in supporting other body systems, including cardiovascular and blood sugar balance as well as increasing musculoskeletal strength, neurological and immune function enabled by its ability to target over 200 different genes throughout the body. At the same time, deficiency and insufficiency of this important nutrient has reached epidemic proportions around the world, making the achievement of optimal levels more important than ever to overall health and wellbeing. Liquid Vitamin D3 is delivered in the preferred cholecalciferol form for optimal use by the body and provides 1000 IU per drop, for easy administration and absorption, ideal for those who prefer an alternative to capsules.

## Overview

Known as the sunshine vitamin, one of the key roles of vitamin D is maintaining serum calcium and phosphorous balance. Our bodies make vitamin D by converting vitamin D2 to D3 or cholecalciferol, the active form, when exposed to sunlight; D3 is also the form which the body derives from dietary cholesterol. When calcium and phosphorus levels dip in the body, parathyroid hormone (PTH) is released to increase vitamin D conversion to the active form. D3 is then metabolized to Calcitriol, a steroid hormone that helps regulate a variety of genes through the vitamin D receptor (VDR). While vitamin D is available in both forms as supplements, studies have found vitamin D3 is the preferable form as it has been found to maintain active vitamin D levels for a longer period of time.

## Vitamin D Depletion<sup>†</sup>

While it has long been assumed that the majority of the

population achieves adequate levels of vitamin D through exposure to the sun, the biosynthesis of the nutrient is affected by time of day, seasons, location, smog/pollution, clothing, and sunscreen; in addition, those with darker skin require more exposure to the sun to attain adequate levels. These factors all contribute to the insufficiency seen in a growing portion of the population. In addition, it takes about 48 hours for vitamin D to be absorbed from the skin into the body and washing skin during that time period can interfere with absorption into the blood. Inadequate intake or levels of cholesterol can also inhibit the adequate production of the nutrient. Depleted levels of vitamin D may interfere with the normal development of teeth and bones, normal cell growth, and contribute to poor regulation of immune and nervous systems. Certain medications have been found to contribute to deficiency of vitamin D, including some anti-seizure medications, bile acid sequestrants, oral corticosteroids, and weight loss medications which bind fats.<sup>1</sup>

## Bone and Dental Health<sup>†</sup>

Numerous studies have highlighted the importance of vitamin D to maintaining healthy bone density. In one 2013 study, 52 overweight men and women with suboptimal vitamin D levels were given either 7,000 IU of cholecalciferol daily or a placebo for 26 weeks; the vitamin D group significantly increased vitamin D levels in the blood and improved biomarkers of bone health.<sup>2,3</sup>

## Cardiovascular Health and Blood Sugar Balance<sup>†</sup>

In light of the role that vitamin D plays in a variety of tissues and body systems, it comes as no surprise that much research from recent years has underscored its contribution to cardiometabolic wellness.<sup>4</sup> There is accumulating evidence that calcitriol helps strengthen cardiomyocyte function, vascular smooth muscle cells, and the vascular endothelium. Low levels of 25-hydroxyvitamin D are associated with diminished



cardiovascular health.<sup>5</sup> In a recent study of 222 participants, slow coronary function was significantly higher in those with insufficient blood levels of the vitamin<sup>6</sup>; optimal vitamin D status has also been linked with a 40% cardiovascular system protective effect<sup>7</sup> as well as maintenance of healthy blood pressure levels.<sup>8</sup> Vitamin D has also been shown to support healthy blood sugar metabolism.<sup>9,10</sup>

### Immune Health and Modulation<sup>†</sup>

One of the more profound functions of vitamin D is its ability to modulate immunity. An important recent study suggested that improving vitamin D status significantly affects the expression of genetic pathways linked to immune activity.<sup>11</sup> Vitamin D has been shown to boost the immune response by up-regulating specific genes that increase cellular production of natural compounds that protect us against pathogens.<sup>12</sup>

### Musculoskeletal Comfort<sup>†</sup>

Numerous studies also point to the key role of vitamin D in supporting musculoskeletal strength and comfort.<sup>13</sup> In one study, among 62 adult patients with nonspecific musculoskeletal discomfort, over 95% had vitamin D deficiency and responded to replenishment of vitamin D. Moderate deficiency of vitamin D has also been shown to predict knee discomfort over a 5 year period and hip discomfort over 2.4 years.<sup>14</sup>

### Directions

1 or more drops per day or as recommended by your health care professional. Can be taken directly on the tongue and swallowed or mixed with the beverage of your choice.

### Does Not Contain

Gluten, corn, yeast, artificial colors or flavors.

### Cautions

If you are pregnant or nursing, consult your physician before taking this product.

<b>Supplement Facts</b> <sup>V1</sup>		
Serving Size 1 Drop (0.05 mL)		
Servings Per Container About 600		
	<b>Amount Per Serving</b>	<b>% Daily Value</b>
Vitamin D (D3 as Cholecalciferol)	25 mcg (1,000 IU)	125%

### References

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