

## Vitamin D and PCOS

Vitamin D, the "sunshine vitamin", may play a very important role in dealing with PCOS and improving your overall health.

Optimal vitamin D levels are important for:

- Improved fertility
- Controlling weight
- Liver health
- Reducing insulin resistance and avoiding pancreas exhaustion
- Prevention of bone loss and osteoporosis
- Positive mood and cognitive performance
- Breast health
- Gastrointestinal tract health
- Nervous system health
- And more!

**Do PCOS Women Have Low Vitamin D?**  
**Vitamin D, Blood Sugar and Insulin Resistance**  
**Do Americans Have Vitamin D Deficiency?**

**Dosage**  
**Where Can You Get It?**

### Do PCOS Women Have Low Vitamin D Levels?

Vitamin D deficiency appears to occur frequently in women with PCOS, and may be a contributing factor to some of the biochemical abnormalities seen in this condition.

In a study of 13 women with PCOS, five were found to have obvious vitamin D deficiency and three others had borderline-low vitamin D status.(1) All 13 women were treated with vitamin D2 at a dose of 50,000 IU once or twice a week, and also received 1,500 mg of supplemental calcium per day.

Of the nine women with absent or irregular menstruation prior to vitamin D treatment, seven experienced normalization of their menstrual cycles within two months and the other two became pregnant. Dysfunctional uterine bleeding also resolved within two months in both cases in which it had been present.

Other studies have shown that some women with polycystic ovary syndrome had sub-optimal levels of vitamin D.(2,3) **Low vitamin D has been clearly linked to insulin resistance and obesity.**

In other words, the heavier you are and the more insulin resistant you are, the more likely it is that your vitamin D is too low.

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## **Vitamin D, Blood Sugar and Insulin Resistance**

Vitamin D plays a role in normal blood sugar metabolism.

Getting optimal amounts of vitamin D may have a positive influence on blood sugar levels and possibly preventing diabetes and "metabolic syndrome," which are metabolic disorders associated with insulin resistance.

Vitamin D deficiency is common in people with type 2 diabetes. Vitamin D supplementation has been reported to improve glucose tolerance, insulin secretion, and insulin sensitivity in diabetics.(4,5).

More than 10 million Americans suffer from diabetes, which often leads to heart disease, kidney damage, nervous system impairments and other health problems.

Even more people have "metabolic syndrome", which is characterized by heart disease risk factors such as high blood pressure, elevated levels of triglycerides, low levels of HDL ("good") cholesterol, and abdominal obesity.

PCOS shares many of attributes of metabolic syndrome, and women with PCOS are more likely to develop diabetes and cardiovascular disease.

In many cases of polycystic ovarian syndrome, diabetes and metabolic syndrome, insulin resistance is a significant contributing factor.

Insulin is a hormone produced by the pancreas that helps transport glucose from the bloodstream into the cells, where it is used to produce energy. In people with insulin resistance, plenty of insulin is available, but the body has an impaired capacity to recognize or respond to its hormonal signal.

In one study, vitamin D status was assessed in a group of healthy young people. The degree of insulin resistance and the capacity of the pancreas to secrete insulin were also measured. The results showed that lower blood levels of vitamin D were associated with a greater degree of insulin resistance and with weaker pancreatic function. Of those with subnormal vitamin D levels, 30% had one or more components of the metabolic syndrome, compared with only 11% of those with normal vitamin D levels.(6)

These results suggest that vitamin D deficiency increases the risk of insulin resistance or of the metabolic syndrome.

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## **Do Americans Have Vitamin D Deficiency?**

As many as 40% of Americans may have some degree of vitamin D deficiency. Vitamin D is present in only a few foods, such as cod-liver oil, oily fish (salmon, mackerel, sardines), and vitamin D-fortified dairy products and breakfast cereals.

Most of the vitamin D in your body is manufactured in the skin after exposure to sunlight. People who don't receive adequate amounts of sun exposure are at risk of developing vitamin D deficiency.

According to one report, adequate vitamin D levels can be achieved by daily exposure of your hands, face, and arms to sunlight for one-quarter the time it would take to produce a light pinkness of the skin. If you're unable to obtain that amount of sunlight exposure, vitamin D supplementation should be considered.

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## **How Much Should You Take?**

First of all, the amount of vitamin D you should take depends on what type of vitamin D you are taking. Vitamin D3 (the form of the vitamin produced in the human body after sunlight exposure) is at least 3.4 times as potent as vitamin D2, and may be as much as 9.4 times as potent.<sup>(7)</sup> Vitamin D2 is derived from fungal and plant sources.

Therefore, when supplementing with vitamin D3, lower doses than those administered in the study described at the top of this page should be used. The study used vitamin D2.

A reasonable dosage range for vitamin D3 supplementation is 800 to 1,200 IU per day. According to the Food and Nutrition Board of the National Research Council, long-term vitamin D intake up to 2,000 IU per day is unlikely to have any adverse effects among the general population.

You can increase your vitamin D levels by exposing your skin to more sunlight. You can also take a vitamin D supplement.

In extremely high doses, vitamin D can become toxic. Before taking unusually large amounts of vitamin D, we recommend that you consult with a physician and get a blood test to measure your vitamin D level before you start therapy.

You should especially consider vitamin D supplementation if you live in northern latitudes or cloudy climates, stay mostly indoors, or are fully clothed or use sunscreen when outdoors, or are a strict vegetarian.

In a study of 13 women with PCOS, five were found to have obvious vitamin D deficiency and three others had borderline-low vitamin D status. All 13 women were treated with vitamin D and calcium. Of the nine women with absent or irregular menstruation prior to vitamin D treatment, seven experienced normalization of their menstrual cycles within two months and the other two became pregnant. Dysfunctional uterine bleeding also resolved.

Low vitamin D has been linked to insulin resistance, obesity and fatty liver degeneration.

Functions of vitamin D include improved insulin sensitivity, better bone health, reduction of inflammation, and longer lifespan.