

# The Miracle of Vitamin D

In April of 2000 a clinical observation published in *Archives of Internal Medicine* caught my attention. Dr. Anu Prabhala and his colleagues reported on the treatment of five patients confined to wheelchairs with severe weakness and fatigue. Blood tests revealed that all suffered from severe vitamin D deficiency. The patients received 50,000 IU vitamin D per week and all became mobile within six weeks.<sup>1</sup>

Dr. Prabhala's research sparked my interest and led to a search for current information on vitamin D, how it works, how much we really need and how we get it. The following is a small part of the important information that I found.

Any discussion of vitamin D must begin with the discoveries of the Canadian-born dentist Weston A. Price. In his masterpiece *Nutrition and Physical Degeneration*, Dr. Price noted that the diet of isolated, so-called "primitive" peoples contained "at least ten times" the amount of "fat-soluble vitamins" as the standard American diet of his day.<sup>2</sup> Dr. Price determined that it was the presence of plentiful amounts of fat-soluble vitamins A and D in the diet, along with calcium, phosphorus and other minerals, that conferred such high immunity to tooth decay and resistance to disease in nonindustrialized population groups.

Today another Canadian researcher, Dr. Reinhold Vieth, argues convincingly that current vitamin D recommendations are woefully inadequate. The recommended dose of 200-400 international units (IU) will prevent rickets in children but does not come close to the optimum amount necessary for vibrant health.<sup>3</sup> According to Dr. Vieth, the minimal daily requirement of vitamin D should be in the range of 4,000 IU from all sources, rather than the 200-400 currently suggested, or ten times the Recommended Daily Allowance (RDA). Dr. Vieth's research perfectly matches Dr. Price's observations of sixty years ago!

## Vitamin D Miracles

Sunlight and vitamin D are critical to all life forms. Standard textbooks state that the principal function of vitamin D is to promote calcium absorption in the gut and calcium transfer across cell membranes, thus contributing to strong bones and a calm, contented nervous system. It is also well recognized that vitamin D aids in the absorption of magnesium, iron and zinc, as well as calcium.

Actually, vitamin D does not in itself promote healthy bone. Vitamin D controls the levels of calcium in the blood. If there is not enough calcium in the diet, then it will be drawn from the bone. High levels of vitamin D (from the diet or from sunlight) will actually demineralize bone if sufficient calcium is not present.

Vitamin D will also enhance the uptake of toxic metals like lead, cadmium, aluminum and strontium if calcium, magnesium and phosphorus are not present in adequate

amounts.<sup>18</sup> Vitamin D supplementation should never be suggested unless calcium intake is sufficient or supplemented at the same time.

Receptors for vitamin D are found in most of the cells in the body and research during the 1980s suggested that vitamin D contributed to a healthy immune system, promoted muscle strength, regulated the maturation process and contributed to hormone production.

During the last ten years, researchers have made a number of exciting discoveries about vitamin D. They have ascertained, for example, that vitamin D is an antioxidant that is a more effective antioxidant than vitamin E in reducing lipid peroxidation and increasing enzymes that protect against oxidation.<sup>19;20</sup>

Vitamin D deficiency decreases biosynthesis and release of insulin.<sup>21</sup> Glucose intolerance has been inversely associated with the concentration of vitamin D in the blood. Thus, vitamin D may protect against both Type I and Type II diabetes.<sup>22</sup>

The risk of senile cataract is reduced in persons with optimal levels of D and carotenoids.<sup>23</sup>

PCOS (Polycystic Ovarian Syndrome) has been corrected by supplementation of D and calcium.<sup>24</sup>

Vitamin D plays a role in regulation of both the "infectious" immune system and the "inflammatory" immune system.<sup>25</sup>

Low vitamin D is associated with several autoimmune diseases including multiple sclerosis, Sjogren's Syndrome, rheumatoid arthritis, thyroiditis and Crohn's disease.<sup>26;27</sup>

Osteoporosis is strongly associated with low vitamin D. Postmenopausal women with osteoporosis respond favorably (and rapidly) to higher levels of D plus calcium and magnesium.<sup>28</sup>

D deficiency has been mistaken for fibromyalgia, chronic fatigue or peripheral neuropathy.<sup>1;28-30</sup>

Infertility is associated with low vitamin D.<sup>31</sup> Vitamin D supports production of estrogen in men and women.<sup>32</sup> PMS has been completely reversed by addition of calcium, magnesium and vitamin D.<sup>33</sup> Menstrual migraine is associated with low levels of vitamin D and calcium.<sup>81</sup>

Breast, prostate, skin and colon cancer have a strong association with low levels of D and lack of sunlight.<sup>34-38</sup>

Activated vitamin D in the adrenal gland regulates tyrosine hydroxylase, the rate limiting enzyme necessary for the production of dopamine, epinephrine and norepinephrine. Low D may contribute to chronic fatigue and depression.<sup>39</sup>

Seasonal Affective Disorder has been treated successfully with vitamin D. In a recent study covering 30 days of treatment comparing vitamin D supplementation with two-hour daily use of light boxes, depression completely resolved in the D group but not in the light box group.<sup>40</sup>

High stress may increase the need for vitamin D or UV-B sunlight and calcium.<sup>41</sup>

People with Parkinsons and Alzheimers have been found to have lower levels of vitamin D.<sup>42;43</sup>

Low levels of D, and perhaps calcium, in a pregnant mother and later in the child may be the contributing cause of "crooked teeth" and myopia. When these conditions are found in succeeding generations it means the genetics require higher levels of one or both nutrients to optimize health.<sup>44-47</sup>

Behavior and learning disorders respond well to D and/or calcium combined with an adequate diet and trace minerals.<sup>48;49</sup>

## **Vitamin D and Heart Disease**

Research suggests that low levels of vitamin D may contribute to or be a cause of syndrome X with associated hypertension, obesity, diabetes and heart disease.<sup>50</sup> Vitamin D regulates vitamin-D-binding proteins and some calcium-binding proteins, which are responsible for carrying calcium to the "right location" and protecting cells from damage by free calcium.<sup>51</sup> Thus, high dietary levels of calcium, when D is insufficient, may contribute to calcification of the arteries, joints, kidney and perhaps even the brain.<sup>52-54</sup>

Many researchers have postulated that vitamin D deficiency leads to the deposition of calcium in the arteries and hence atherosclerosis, noting that northern countries have higher levels of cardiovascular disease and that more heart attacks occur in winter months.<sup>55-56</sup>

Scottish researchers found that calcium levels in the hair inversely correlated with arterial calcium-the more calcium or plaque in the arteries, the less calcium in the hair. Ninety percent of men experiencing myocardial infarction had low hair calcium. When vitamin D was administered, the amount of calcium in the beard went up and this rise continued as long as vitamin D was consumed. Almost immediately after stopping supplementation, however, beard calcium fell to pre-supplement levels.<sup>27</sup>

Administration of dietary vitamin D or UV-B treatment has been shown to lower blood pressure, restore insulin sensitivity and lower cholesterol.<sup>58-60</sup>

## Toxicity Issues

Vitamin programs usually omit vitamin D because of concerns about toxicity. These concerns are valid because vitamin D in all forms can be toxic in pharmacological (drug-like) doses. The dangers of toxicity have not been exaggerated, but the doses needed to result in toxicity have been ill defined with the unfortunate result that many people currently suffer from vitamin-D deficiency or insufficiency.

Abnormally high levels of vitamin D are indicated by blood levels exceeding 65 ng/ml or 162 nmol/l for extended periods of time and may be associated with chronic toxicity. Levels of 200-300 nmol/l or higher have been seen in several studies using supplementation and quickly resolve when supplementation is stopped. In such cases no long-term problems have been found. Long-term supplementation, without monitoring, may have serious consequences.

Dr. Vieth suggests that critical toxicity may occur at doses of 20,000 IU daily and that the Upper Limit (UL) of safety be set at 10,000 IU, rather than the current 2,000 IU. While this may or may not be the definitive marker for safety in healthy persons with no active liver or kidney disease, there is no clinical evidence that long-term supplementation needs to be greater than 4,000 IU for optimal daily maintenance. This level would be somewhat lower when combined with exposure to UV-B.<sup>3;76</sup>

Doses used in clinical studies range from as little as 400 IU daily to 10,000-500,000 IU, given either as a single onetime dose or daily, weekly or monthly. Such large doses are given either as a prophylactic or because compliance is considered a problem. There seems to be some evidence that vitamin D works better, without toxicity, when given in lower, more physiologic doses of 2,000-4,000 IU daily rather than as 100,000 IU once a month. However, a single monthly dose of 100,000 IU did replete low levels of vitamin D in adolescents during winter.<sup>77</sup>