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Nutrition 101

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Vitamin D

According to our textbook, *Understanding Nutrition*, Vitamin D (calciferol) is a fat-soluble vitamin that comes in many different forms. The two most important forms are vitamin D₂ (ergocalciferol), which is derived from plant food sources, and vitamin D₃ (cholecalciferol), which is derived from exposure to the sun's ultraviolet rays and animal food sources. When aided by sunlight, the human body is able to synthesize vitamin D from a precursor that the body makes from cholesterol. Because the body can make vitamin D, it is not considered an essential nutrient. While overt deficiency is relatively rare, vitamin D insufficiency is quite common.

The active form of vitamin D is actually a hormone with a binding protein that carries it to target organs, such as the intestines, kidneys and bones. These parts of the body respond by making minerals that are needed for bone growth and maintenance. Vitamin D assists in the absorption of calcium and phosphorus, which make bones grow denser and stronger. Other tissues that respond to vitamin D include cells of the immune system, brain and nervous system, pancreas, skin, muscles and cartilage, and reproductive organs. Vitamin D is also involved in gene activity that regulates cell growth.

In the article, "Vitamin D: a hormone for all seasons", R.S. Mason discusses vitamin D's major function – the active absorption of calcium and phosphate for bones and muscles – as well as its synthesis, metabolism, target levels, interactions with calcium, the risks associated with insufficiency and adequate intake from sunlight or supplements. Mason mentions that there is pressure to increase the target level of vitamin D from 50 nmol/l (25 OHD) to 75-80 nmol/l, but

goes on to caution that “mass medication of the population is not appropriate or desirable” (2011, p. 201). The author explains that encouraging the public to go for a 6-8 minute walk in the summer or a 20 minute walk in the winter, most days, should be sufficient to raise vitamin D levels without much skin damage risk. Mason indicates that vitamin D, calcium and exercise are needed to promote healthy bone and muscle function, but adds that “there is emerging evidence that maintaining a good vitamin D status may have other health benefits as well” (2011, p. 201).

In “Vitamin D in health and disease: Current perspectives”, Ran Zhang and Declan P, Naughton address vitamin D deficiency, UVB in vitamin D formation, disease management and prevention, and health maintenance. The authors characterize vitamin D inadequacy as a “global problem” and state that “36% of otherwise healthy young adults and up to 57% of general medicine inpatients in the United States suffer from vitamin D inadequacy” (Zhang & Declan, 2010, p. 9). Zhang and Declan indicate that vitamin D deficiency has been linked with several disorders, including cancer, hypertension, multiple sclerosis and diabetes, although they admit that the evidence for their associations is “generally weaker than it is for bone-related disease” (2010, p. 9). The authors conclude that “vitamin D inadequacy is not widely recognized as a problem by physicians and patients” (2010, p. 9) and suggest that greater awareness among researchers, clinicians and patients is needed.

Beth A. Schodin attempts to answer questions regarding target levels in her article “Vitamin D: how much is enough, too much, or too little?” (2012) The article also covers health risks for vitamin D deficiency, published recommendations and vitamin D testing. Schodin indicates that “vitamin D deficiencies are on the rise in the United States and around the world” (2012, p. 26). The author cites several reasons for low vitamin D levels, including sun avoidance, melanin (dark skin), liver or kidney problems, malabsorption, a vegetarian diet and obesity. She

references a 2010 report published by the Institute of Medicine (IOM) of the National Academy of Sciences wherein they concluded that “vitamin D is essential for bone health but...the evidence is inconclusive with regard to its benefits for preventing cardiovascular disease, diabetes, cancer, and other conditions” (Schodin, 2012, p. 26). The IOM report went on to recommend that most adults increase their daily intake of vitamin D from 400 IU/day to 600 IU/day.

My personal recommendations for continued research focus on the following outcomes:

- Determining (higher?) safe but effective target levels/daily intake recommendations to maximize health;
- Educating the public about the importance of adequate vitamin D intake and how to get it (safe sun exposure, food sources and supplementation when appropriate); and
- Continue investigating the role of vitamin D in preventing conditions other than bone diseases

While there are many questions left to be answered regarding vitamin D, everyone seems to agree that there is more to this fascinating hormone than meets the eye. It is my hope that the scientific community will continue to explore the secrets of vitamin D so that the public can make wise choices that will allow them to get the most out of this vital nutrient.

References

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