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Educational Objectives

for your profession

Upon successful completion of this program you will be able to...

- Understand current issues in the use of vitamin D as a nutraceutical.
- Articulate the biochemical and health benefit differences that arise from vitamin D2 versus D3.
- Comprehend possible anti-cancer mechanisms of vitamin D.
- Recognize future roles regarding vitamin D for prevention and medical nutrition therapy.

Vitamin D: The New Nutraceutical Continuing Education Course

Instructions for continuing education exam



Read the article. Answer the continuing education exam questions.

Use the related article (p. 3-4) to complete the continuing education (CE) exam. The exam questions immediately follow the article (p. 5).



Submit your answers

For your convenience, an answer form is provided on p. 6

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Good luck!

The Year of Vitamin D

2008 could be regarded as the “Year of Vitamin D”. Adding to the excitement about this new nutraceutical were provocative findings describing the association between breast cancer prognosis and vitamin D which were presented at the annual meeting of the American Society of Clinical Oncology (May 2008). Mount Sinai Hospital in Toronto researchers reported that breast cancer patients with low levels of vitamin D were much more likely to die of the disease or have it spread than patients getting sufficient amounts of the nutrient.¹

Scientists collected blood from 512 women at three University of Toronto hospitals between 1989 and 1995, when the women’s early stage breast cancer was diagnosed. Fast forward a decade to data that indicate 83 percent of those who had adequate vitamin D blood levels were alive without extensive metastasis, versus 79 percent of those whose vitamin D levels were insufficient and 69 percent of those who were deficient, as defined by widely used medical standards for measuring dietary intake. Only 24 percent of women in the study had sufficient blood levels of D at the time they their breast cancer was diagnosed. Those who were deficient were nearly twice as likely to have their cancer recur or spread over the next 10 years, and 73 percent more likely to die of the disease.

Laboratory and animals tests have investigated the relationship between vitamin D and breast, prostate and colon cancers, and some findings suggest that vitamin D impairs abnormal cell growth and tumor angiogenesis (formation of blood vessels that feed tumors), among other anti-cancer effects.² The Toronto study is the first clinical documentation of the relationship between vitamin D and breast cancer progression. Researchers do precaution that it is unknown whether vitamin D supplementation (derived from the diet or sunlight) or even correcting a vitamin D deficiency can improve the prognosis in individuals with breast cancer. But here’s a caveat: The few women with the very highest levels of vitamin D seemed to have the worst survival.

Vitamin D: Where Is It?

Although good dietary sources of vitamin D are recognized (i.e., fortified milk and cereals, eggs, salmon, tuna, mackerel and sardines), most fortified foods provide ergocalciferol (D2), which has only a modest effect on blood levels³ --the primary indice for vitamin D status and its associated breast cancer prognosis. Furthermore, a study conducted at the Bone Research Laboratory at Boston University School of Medicine revealed that fortified milk may not be a reliable source of vitamin D. Specifically, 29 percent of commercial milk samples tested was within 80 to 120 percent of the amount stated on the label. Most milk products were overfortified, and a few milk cartons contained no vitamin D at all. Vitamin D milk fortification procedures vary widely from dairy to dairy. Some dairies do not refrigerate their vitamin D preparations, which may affect the vitamin D content of the final product.⁴

If an individual does elect to consume vitamin D supplements, they should seek out the D3 form, and consume it with a meal containing fat to enhance absorption. Vitamin D supplementation is not yet regarded as a panacea, however; experts from Tufts and Harvard Universities examined studies which looked at dental health, risk of falls, fractures and colon cancer, and that also reported blood levels of vitamin D. Vitamin D blood levels associated with beneficial health outcomes began at 75 nmol/L. Calculations showed that at least 1000 IU vitamin D daily is needed to bring half the population into that healthy range⁵. These findings led to a safety assessment of vitamin D⁶, and eventually to vitamin D experts urging that the RDA be raised⁷.

Vitamin D, affectionately regarded as the “sunshine vitamin” can be derived from ultraviolet B (UVB) rays of the sun. Namely, the skin’s cholecalciferol triggers subsequent renal and hepatic modification into the active vitamin D—a form thought to have a greater influence upon serum vitamin D concentrations. Paradoxically, excessive sunlight exposure can raise the risk of melanoma, however small amounts—15 minutes a few times weekly without sunscreen—may be beneficial. Sunning before 10 a.m. and after 3 p.m. avoids the sun's harshest UV radiation. Individuals who live in areas of winter cloud cover, are homebound, or don't get enough sun should consider naturally compounded vitamin D3 (cholecalciferol) supplements.

Dark-skinned people require more sun exposure to make vitamin D. The thickness of the skin layer called the stratum corneum affects the absorption of UV radiation. Black human skin is thicker than white skin and thus transmits only about 40 percent of the UV rays for vitamin D production. Darkly pigmented individuals who live in sunny equatorial climates experience a higher mortality rate (versus incidence) from breast and prostate cancer when they move to geographic areas that are deprived of sunlight exposure in winter months.⁸

Vitamin D: A Bright Future

Few vitamins can provide such an array of health benefits as vitamin D. Sunshine is still the most economical and beneficial way to improve circulating vitamin D levels. In fact, the lack of sunlight exposure could lead to more than thinning bones and an increased risk for cancer—there is the added benefit of controlling cholesterol. Since vitamin D is produced naturally within the body, technically it is a hormone. Vitamin D precursors require cholesterol for conversion into the hormone-vitamin. Without adequate sun exposure, vitamin D precursors turn to cholesterol instead of the vitamin. The increased concentration of blood cholesterol during winter months and the fact that outdoor activity (gardening) is associated with lower circulating cholesterol levels in the summer, but not in winter, may explain geographical differences in coronary heart disease incidence.⁹

To be sure, the “Year of Vitamin D” will continue into 2009, as we add more to the list of benefits for this new nutraceutical.

References

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5. Bischoff-Ferrari HA, et al. Estimation of optimal serum concentrations of 25-hydroxyvitamin D for multiple health outcomes. *AJCN* 84:18-28, 2006.
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9. Grimes DS, et al. Sunlight, cholesterol and coronary heart disease. *Q J Med* 1996;89:579-89.

Survey

Help us serve you better! Please answer the following questions, marking your answer form:

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Continuing education exam

1. What percentage of subjects in the Mount Sinai Hospital of Toronto study had sufficient blood levels of D at the time they their breast cancer was diagnosed?

- A. 10
- B. 24
- C. 33
- D. 50

2. Vitamin D has the following anti-cancer effect(s):

- A. Impairs abnormal cell growth
- B. Impairs angiogenesis
- C. Both of the above

3. Which form of vitamin D has only a modest effect upon blood levels?

- A. Ergocalciferol

B. Cholecalciferol

4. Which is the more preferred vitamin D supplement form?

- A. D2
- B. D3

5. According to researchers at Tufts and Harvard Universities, Vitamin D blood levels associated with beneficial health outcomes began at ___nmol/L.

- A. 10
- B. 25
- C. 55
- D. 75

6. Dark-skinned people require more sun exposure to make vitamin D.

- A. True
- B. False

7. Outdoor activity during the _____ is associated with lower blood cholesterol levels.

- A. winter
- B. summer

Congratulations! You have completed your exam!

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Vitamin D: The New Nutraceutical Answer Form

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Instructions



On this answer form, mark the answer that corresponds to the exam question.
A minimum score of 70% on the exam is required to receive CE credit.

Survey

- Fill in blank:

- Fill in blank(s):

- | | | | | |
|----|---|---|---|---|
| 1. | A | B | C | D |
| 2. | A | B | C | D |
| 3. | A | B | C | D |
| 4. | A | B | C | D |
| 5. | A | B | C | D |
| 6. | A | B | C | D |
| 7. | A | B | C | D |