

Vitamin D for Cancer Prevention: Global Perspective

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This article has 144 references.

FROM ABSTRACT:

Purpose

Higher serum levels of the main circulating form of vitamin D, 25-hydroxyvitamin D 25(OH)D, are associated with substantially lower incidence rates of colon, breast, ovarian, renal, pancreatic, aggressive prostate and other cancers.

Results/Conclusions

It is projected that raising the minimum year-around serum 25(OH)D level to 40 to 60 ng/mL (100–150 nmol/L) would prevent approximately 58,000 new cases of breast cancer and 49,000 new cases of colorectal cancer each year, and three fourths of deaths from these diseases in the US and Canada, based on observational studies combined with a randomized trial.

Such intakes also are expected to reduce case-fatality rates of patients who have breast, colorectal, or prostate cancer by half.

There are no unreasonable risks from intake of 2,000 IU per day of vitamin D₃, or from a population serum 25(OH)D level of 40 to 60 ng/mL.

The time has arrived for nationally coordinated action to substantially increase intake of vitamin D and calcium.

THESE AUTHORS ALSO NOTE:

“Approximately 3,000 research studies have been published in biomedical journals investigating the inverse association between vitamin D, its metabolites, and cancer, including 275 epidemiological studies, according to a PubMed search.”

Most of these studies show an inverse relationship between high levels of vitamin D₃ and cancer rates, noting that both sun exposure and supplementation appear to be effective.

High sun exposure essentially reduces both the incidence of and mortality from breast and prostate cancers.

Higher sun exposure in childhood and adolescence reduce the lifetime incidence of prostate cancer by about 50%.

Studies using tissue cultures have show inhibition of malignant cell growth in response to vitamin D metabolites.

“Breast cancer patients with serum 25(OH)D levels higher than 29 ng/mL (72 nmol/L) at diagnosis had a 42% lower 15-year death rate than those with less than 20 ng/mL (50 nmol/L).”

The incidence of breast cancer metastases is half as high in women with 25(OH)D greater than 29 ng/mL than in those with less than 20 ng/mL.

“Intake of 2,000 IU/day of vitamin D3 would lead to 25% reduction in incidence of breast cancer and 27% reduction in incidence of colorectal cancer in North America.”

“Approximately 220,149 new cases of breast cancer and 254,105 new cases of colorectal cancer would be prevented annually in the world by raising serum 25(OH)D concentrations to approximately 40 to 60 ng/mL, which is, in general, associated with oral intake of 2,000 IU of vitamin D3 per day.”

Approximately 58,000 cases of breast cancer would be prevented in the US and Canada each year with a vitamin D3 serum level of 40 to 60 ng/mL.

Approximately 49,000 cases of colorectal cancer would be prevented in the US and Canada each year with a vitamin D3 serum level of 40 to 60 ng/mL.

Vitamin D3 serum level of 40 to 60 ng/mL would prevent three fourths of deaths from breast and colorectal cancer in the US and Canada. **[Wow!]**

These authors cite references to support that there are ten separate mechanisms by which vitamin D3 and calcium reduce cancer incidence and mortality.

“Vitamin D is not an antioxidant, so it does not prevent reactive oxygen species from attacking DNA.”

A newly proposed model of cancer pathogenesis is termed the Disjunction–Initiation–Natural selection–Overgrowth–Metastasis–Involution–Transition (DINOMIT) model:

In this cancer model, cancer begins with the **Disjunction** of cells. Vitamin D metabolites prevent this **Disjunction** of cells.

In this cancer model, the **Metastasis** phase is followed by the **Involution** phase. In the **Involution** phase there is an arrest of metastases as a consequence of re-establishment of intercellular junctions. This re-establishment of intercellular junctions is controlled by one’s vitamin D status. This explains why there are higher

cancer diagnoses in winter months: lower vitamin D status cannot adequately initiate the **Involution** phase, allowing the metastatic mass to grow.

The last phase in this cancer model is **Transition**. In this phase, the cancer will transition to a disseminated malignancy or to a chronic disease. With high levels of vitamin D and calcium, there is evidence suggesting that the transition is favored to chronic disease. "While making a favorable transition would require lifelong vitamin D and calcium repletion, it could theoretically serve in the role of a partial cure for individuals who are willing to adopt lifelong vitamin D and calcium repletion."

Preventing the spread of cancerous cells is dependent upon intercellular adherence. Intercellular adherence requires extracellular calcium ions. Low calcium levels thus allow the spread of cancer cells.

Intercellular adherence is also degraded by omega-6 vegetable oils. "Unfortunately, omega-6 linoleic acid is the most common polyunsaturated fatty acid consumed in the Western diet (median intake 15 g/day)."

"Extreme exposures to powerful carcinogens, such as tobacco smoke, or high intakes of ethanol and mycotoxins, may overwhelm the influence of vitamin D and calcium."

"There have been 748 RCTs that assigned vitamin D supplements to study participants, according to a PubMed search in August 2008." Supplementation was found to be safe at levels up to 4,000 IU per day.

The "National Academy of Sciences–Institute of Medicine recommended adequate intake [of vitamin D3] should be revised upward to at least 2,000 to 4,000 IU/day. Adoption of the new adequate intake [of vitamin D3] would substantially reduce the incidence of cancer, and there are no consistently established adverse effects of vitamin D3 intake in the range below 4,000 IU/day that would be sufficient to justify a lower adequate intake [of vitamin D3]."

"The upper limit [of vitamin D3] should be increased to at least 5,000 IU/day, based on expected benefits compared to anticipated minor risks." Some knowledgeable vitamin D scientists and physicians have recommended a higher upper limit of 10,000 IU/day.

"Vitamin D3 (cholecalciferol) should replace vitamin D2 (ergocalciferol) because vitamin D3 is more effective in humans."

"The preventive effects of higher vitamin D3 intake have led 16 vitamin D scientists and concerned physicians in the United States and Canada to disseminate a call to action recommending universal daily intake of 2000 IU of vitamin D3."

Low vitamin D levels also increase the incidence of myocardial infarction, type-1 diabetes, multiple sclerosis, and falls.

"Populations living at or higher than 30° latitude in either the northern or southern hemisphere, or who have a mainly indoor lifestyle, should be considered at high risk of breast, colon, ovarian, and many other types of cancer as a result of highly prevalent vitamin D deficiency."

Vitamin D should be used to "reduce incidence and mortality from cancer, and substantially increase treatment success."

KEY POINTS FROM DAN MURPHY

- 1) Higher serum levels of vitamin D3 are associated with substantially lower incidence rates of colon, breast, ovarian, renal, pancreatic, aggressive prostate and other cancers.
- 2) Raising the minimum year-around serum vitamin D3 level to 40 to 60 ng/mL (100–150 nmol/L) would prevent approximately 58,000 new cases of breast cancer and 49,000 new cases of colorectal cancer each year, and three fourths of deaths from these diseases in the US and Canada. This would also reduce fatality rates of patients who have breast, colorectal, or prostate cancer by half.
- 3) Raising serum vitamin D3 level 40 to 60 ng/mL would require supplementation with about 2,000 IU of vitamin D3 per day. "There are no unreasonable risks from intake of 2,000 IU per day of vitamin D3."
- 4) High sun exposure reduces both the incidence of and mortality from breast and prostate cancers.
- 5) Higher sun exposure in childhood and adolescence reduce the lifetime incidence of prostate cancer by about 50%.
- 6) "Approximately 220,149 new cases of breast cancer and 254,105 new cases of colorectal cancer would be prevented annually in the world by raising serum vitamin D3 concentrations to approximately 40 to 60 ng/mL, which is, in general, associated with oral intake of 2,000 IU of vitamin D3 per day."
- 7) Vitamin D3 serum level of 40 to 60 ng/mL would prevent three fourths of deaths from breast and colorectal cancer in the US and Canada. **[Wow!]**
- 8) There are ten separate mechanisms by which vitamin D3 and calcium reduce cancer incidence and mortality.
- 9) Preventing the spread of cancerous cells is dependent upon intercellular adherence. Intercellular adherence is requires extracellular calcium ions. Low calcium levels thus allow the spread of cancer cells.

- 10) Intercellular adherence is also degraded by omega-6 vegetable oils. "Unfortunately, omega-6 linoleic acid is the most common polyunsaturated fatty acid consumed in the Western diet (median intake 15 g/day)."
- 11) The "National Academy of Sciences–Institute of Medicine recommended adequate intake [of vitamin D3] should be revised upward to at least 2,000 to 4,000 IU/day. Adoption of the new adequate intake [of vitamin D3] would substantially reduce the incidence of cancer, and there are no consistently established adverse effects of vitamin D3 intake in the range below 4,000 IU/day that would be sufficient to justify a lower adequate intake [of vitamin D3]."
- 12) "The upper limit [of vitamin D3] should be increased to at least 5,000 IU/day, based on expected benefits compared to anticipated minor risks." Some knowledgeable vitamin D scientists and physicians have recommended a higher upper limit of 10,000 IU/day.
- 13) Vitamin D3 (cholecalciferol) should replace vitamin D2 (ergocalciferol) because vitamin D3 is more effective in humans.
- 14) "The preventive effects of higher vitamin D3 intake have led 16 vitamin D scientists and concerned physicians in the US and Canada to disseminate a call to action recommending universal daily intake of 2000 IU of vitamin D3."
- 15) Low vitamin D levels also increase the incidence of myocardial infarction, type-1 diabetes, multiple sclerosis, and falls.
- 16) "Populations living at or higher than 30° latitude in either the northern or southern hemisphere, or who have a mainly indoor lifestyle, should be considered at high risk of breast, colon, ovarian, and many other types of cancer as a result of highly prevalent vitamin D deficiency."
- 17) Vitamin D should be used to "reduce incidence and mortality from cancer, and substantially increase treatment success."

COMMENT FROM DAN MURPHY

For a couple of years now I have been recommending that most of us and our patients supplement with 2,000 IU vitamin D3 per day. This article certainly supports that recommendation.