Gene Cell Tissue. 2018 January; 5(1):e74216. doi: 10.5812/gct.74216.

Published online 2018 January 31. **Letter**

Can Vitamin D Prevent Breast Cancer?

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Received 2017 November 30; **Revised** 2018 January 02; **Accepted** 2018 January 15.

Keywords: Vitamin D, Breast Cancer, Prevent

Dear Editor,

Vitamin D (25(OH)D) deficiency is a worldwide health problem. It can increase the risk of many diseases, notably cancers (1-3). More than two billion people have vitamin D deficiency (25(OH)D < 50 nmol/L) around the world (4). Vitamin D is classified in the secosteroids hormone, which is hydroxylated in the liver to form 25-hydroxy vitamin D (25(OH)D). After further hydroxylation, the biologically active metabolite, 1,25(OH)2D, was present in the kidneys (5). Breast cancer is one of the most frequently diagnosed cancers and it is one of the leading causes of cancer-related mortality around world (6). Growing evidences have shown that vitamin D deficiency can lead to breast cancer development (7, 8). Animal studies indicated that vitamin D can inhibit tumorigenic effects of fatty diet. Other studies have demonstrated that vitamin D can induce cell cycle arrest in G0/G1. Also, it can induce morphological and biochemical features of apoptosis in breast cancer cells (9).

A meta-analysis conducted by Chen et al., showed that vitamin D level has an effect on breast cancer susceptibility. They reported that vitamin D and calcium had a chemopreventive effect against breast cancer (10). Quite surprisingly in another meta-analysis, Ordonez-Mena et al. reported that increased breast cancer risk was linked with higher amount of 25(OH)D concentration (11). This discrepancy results may be contributed to different situations, different populations, and differences in the adjusted levels.

Stoll et al. recommended that serum level of 25(OH)D, which is obtained through sun exposure, dietary intake, and vitamin D supplementation is more than 400 IU per day, which can decrease breast cancer risk (12). Bilinski et al. showed that lower than 75 nmol/L 25(OH)D concentration was associated with a significantly higher risk of breast cancer (13). Also, Park et al. reported that serum 25(OH) D below 20 ng/mL was associated with 27% augmentation in the risk of breast cancer (14).

Some studies have shown low levels of vitamin D among breast cancer patients and about 94% of females with vitamin D level of less than 20 ng/mL developed metastases and 73% of them died from the advanced stage of the disease (15).

In conclusion, most vitamin D studies reported an opposite association between vitamin D level and breast cancer risk. However, more studies are needed to detect the optimum level of serum vitamin D as a prophylaxis therapy for breast cancer prevention.

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