

## **What role does vitamin D play during menopause?**

**Vitamin D influences the regulation of estrogen and progesterone through its vitamin D receptors in various tissues. Estrogen is also involved in regulating vitamin D metabolism. Studies show that postmenopausal women may have lower vitamin D levels, as the decline in estrogen affects the expression of vitamin D receptors.**

### **In osteoporosis prevention, avoid vitamin D deficiency<sup>1,2,3</sup>**

Calcium for bone health is only partially available to the bones without optimal vitamin D levels. Vitamin D, in addition to hormones like calcitonin and parathyroid hormone, regulates calcium and phosphate metabolism. A vitamin D deficiency can reduce bone mass and strength, increase the risk of osteoporosis, and lead to more vertebral and hip fractures. According to the guidelines of the German Osteology Society (DVO), postmenopausal women should take 800 to 1,000 IU of vitamin D orally to correct a deficiency, especially with low sun exposure and increased risk of falls and fractures.

### **Vitamin D also plays a role in these menopausal symptoms:**

#### **Immune System<sup>4,5</sup>**

Estrogen influences the activity of genes that control immune functions and stimulate immune cells, particularly enhancing the humoral immune response and promoting the development of autoimmune diseases. Progesterone modulates the immune response by inhibiting pro-inflammatory cytokines. The hormonal decline in menopause can affect the immune system, increasing the risk of infections and contributing to or exacerbating autoimmune diseases.

Existing vitamin D deficiency further increases the risk of infections and autoimmune diseases. There is also evidence that vitamin D supplementation can have a positive effect.

#### **High Blood Pressure and Cardiovascular Diseases<sup>6,7,8</sup>**

Vitamin D deficiency can lead to overactivation of the renin-angiotensin-aldosterone system, increasing the risk of developing hypertension. Additionally, the biofactor influences endothelial cell function, immune function, and calcium metabolism. These processes are critical for cardiovascular health, so a vitamin D deficiency can contribute to the development of arteriosclerosis and cardiovascular diseases. Women in menopause with a predisposition to these conditions and a diagnosed deficiency may benefit from vitamin D supplementation.

#### **Psychological and Mental Symptoms<sup>9,10,11</sup>**

Vitamin D has been shown to be helpful in treating depressive patients, especially those with a confirmed vitamin D deficiency. Supplementation to correct such a deficiency can also improve the quality of life and well-being in menopausal women.

## **Literature:**

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