

## Everything you need to know about vitamin D

Vitamin D supplementation could be an adjuvant and/or preventive therapy in the current COVID-19 pandemic. This could be possible thanks to the infection-fighting actions of vitamin D and the interference of the immune response mechanisms of vitamin D used by SARS-CoV-2 for viral replication.

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**TODO LO QUE HAY QUE SABER SOBRE LA VITAMINA D**

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The role of vitamin D in women's health and patients with COVID-19 were reviewed and assessed by Dr. Santiago Palacios, gynecologist and menopause research expert (Madrid) and Dr. José López Miranda, professor and head of the Internal Medicine Unit of the Reina Sofía Hospital (Córdoba). This was reviewed during a webinar, moderated by Dr Fernando Losa, obstetrician, gynecologist and menopause expert (Barcelona).

### Prevention of falls and fractures

According to Dr. Palacios, the relationship between the prevention of falls and fractures with vitamin D supplementation has been demonstrated<sup>1,2</sup>. On the other side, 25(OH)D levels have been correlated with parathyroid hormone (PTH) levels and bone mineral density (BMD)<sup>3</sup>. Therefore, current recommendations support favorable vitamin D supplementation in any osteoporosis prevention plan. A dose of 800 to 1,200 UI/day is generally recommended.

In addition, vitamin D supplementation can prevent sarcopenia, as it has a close relationship with muscle. Vitamin D binds to the vitamin D receptor on muscle fibers and increases their size improving muscle strength and physical performance. The progressive loss of vitamin D receptors during aging causes a loss of muscle mass and strength, which correlates with an increased risk of falls and fractures.

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## Vitamin D in women's health

In Gynecology field, vitamin D levels can influence various pathologies during adolescence (menarche, developmental disorders, gynecological infections), as well as during the fertile period or in polycystic ovary syndrome. In addition, vitamin D deficiency in pregnancy can have consequences for both the mother (pre-eclampsia, gestational diabetes, premature birth, recurrent miscarriage, postpartum depression) and the fetus (low birth weight, respiratory tract infections, asthma, low immunity, autism).

Therefore, prophylactic administration of vitamin D may be indicated in many situations to improve women's health. In these cases, the dosage should be individualized and based on doses dependent on 25(OH)D concentration, the patient's age, body weight and lifestyle.

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## Vitamin D and COVID-19

Dr. López Miranda focused on the current COVID-19 pandemic and the effects of acute respiratory distress syndrome (ARDS) triggered by SARS-CoV-2. COVID-19 is characterized by lung inflammation, thick mucus secretions in the airways, high levels of pro-inflammatory cytokines, extensive lung damage and microthrombosis.

ARDS is very difficult to treat in the late stages. Currently, there is no pharmacological treatment that had shown to be effective in reversing the damage caused or reversing the natural history of the disease. Early treatment is essential to prevent infections and to avoid the development of a severe systemic inflammatory response, thus improving the prognosis of ARDS patients.

According to Dr. López Miranda, one of the therapeutic strategies being investigated to mitigate the effects of COVID-19 is the stimulation of the vitamin D endocrine system. It has been demonstrated that it has pleiotropic effects on multiple organs, such as modulation of the immune system, prevention of viral infections and improvement of lung function.

Immune modulating actions include inhibition of the maturation of dendritic cells to antigen-presenting cells, inhibition of the major histocompatibility complex and, consequently, inhibition of cytokines IL-12 and IL-23.

In addition, the vitamin D metabolic system is able to modulate innate immune signaling, regulating the production of antimicrobial peptides and the expression of genes involved in the intracellular destruction of pathogens. They are fundamental mechanisms for airway defense.

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## SARS-CoV-2 infection

Dr. López Miranda also showed some evidence that vitamin D levels may determine the probability of being infected by Sars-CoV-2, as well as the severity of COVID-19.

Therefore, **Vitamin D supplementation** could be an adjuvant and/or preventive therapy in the current COVID-19 pandemic. This is possible due to the infection-fighting actions of vitamin D and the interference of the immune response mechanisms of vitamin D with those used by SARS-CoV-2 for viral replication<sup>4-6</sup>.

These data suggest that vitamin D supplementation could reduce the risk of infection and the severity of COVID-19, resulting in fewer admissions to intensive care units, reduced mechanical ventilation requirements and lower mortality. Vitamin D supplementation could mitigate the impact of the Sars-CoV-2 pandemic in a cost-effective, accessible and safe manner.

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