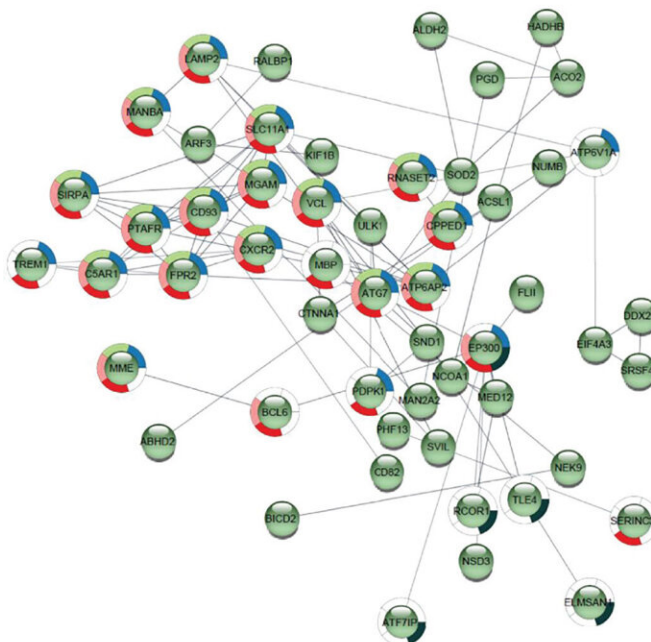


# Vitamin D2's impact on human health questionable, but vitamin D3 could be important for fighting infections

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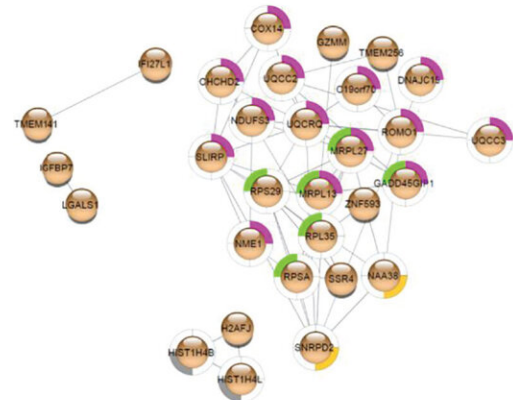
**A** Significantly down-regulated by D<sub>2</sub> and D<sub>3</sub>, but not placebo (blue points in Fig. 2d)



Significant functional enrichment (FDR<0.05)

- Immune system process
- Innate immune system
- Transcription factor complex
- Neutrophil degranulation
- Leukocyte activation

**B** Significantly up-regulated by D<sub>2</sub> and D<sub>3</sub>, but not placebo (red points in Fig. 2d)



Significant functional enrichment (FDR<0.05)

- Mitochondrion
- Ribosomal protein
- snRNP Sm proteins
- Histone H4

Protein-protein interaction networks for gene products corresponding to the probes (A) significantly down-regulated or (B) significantly up-regulated in both

the D<sub>2</sub> and D<sub>3</sub> treatment groups of the WE cohort, but not the placebo group. Details given in Supplementary Data File 3. The networks were generated using the STRING database of Homo sapiens medium confidence (0.4) interactions, and only connected nodes are shown. Networks for both (A, B) are significantly enriched for interactions compared to randomized sets, yielding p-values of  $1.98 \times 10^{-6}$  and  $4.99 \times 10^{-9}$ , respectively. Credit: DOI: 10.3389/fimmu.2022.790444

New research has found significant differences between the two types of vitamin D, with vitamin D<sub>2</sub> having a questionable impact on human health. However, the study found that vitamin D<sub>3</sub> could balance people's immune systems and help strengthen defenses against viral infections such as COVID-19.

In a collaborative study by the Universities of Surrey and Brighton, researchers investigated the impact of [vitamin](#) D supplements—D<sub>2</sub> and D<sub>3</sub>—taken daily over a 12-week period on the activity of genes in people's blood.

Contrary to widely held views, the research team discovered that both types of vitamin D did not have the same effect. They found evidence that vitamin D<sub>3</sub> had a modifying effect on the [immune system](#) that could fortify the body against viral and bacterial diseases.

Professor Colin Smith, lead-author of the study from the University of Surrey, who began this work while at the University of Brighton, said:

"We have shown that vitamin D<sub>3</sub> appears to stimulate the type I interferon signaling system in the body—a key part of the immune system that provides a first line of defense against bacteria and viruses. Thus, a healthy vitamin D<sub>3</sub> status may help prevent viruses and bacteria from gaining a foothold in the body.

"Our study suggests that it is important that people take a vitamin D<sub>3</sub> supplement, or suitably fortified foods, especially in the winter months."

Although some foods are fortified with vitamin D, like some breakfast cereals, yogurts, and bread, few naturally contain the vitamin. Vitamin D<sub>3</sub> is produced naturally in the skin from exposure to sunlight or artificial ultraviolet UVB light, while some plants and fungi produce vitamin D<sub>2</sub>.

Many people have insufficient levels of vitamin D<sub>3</sub> because they live in locations where sunlight is limited in the winter, like the UK. The COVID-19 pandemic has also limited people's natural exposure to the sun due to people spending more time in their homes.

Professor Susan Lanham-New, co-author of the study and Head of the Department of Nutritional Sciences at the University of Surrey, said:

"While we found that vitamin D<sub>2</sub> and vitamin D<sub>3</sub> do not have the same effect on gene activity within humans, the lack of impact we found when looking at vitamin D<sub>2</sub> means that a larger study is urgently required to clarify the differences in the effects. However, these results show that vitamin D<sub>3</sub> should be the favored form for fortified foods and supplements."

The study has been published in *Frontiers in Immunology*.

**More information:** Louise R. Durrant et al, Vitamins D2 and D3 Have Overlapping But Different Effects on the Human Immune System Revealed Through Analysis of the Blood Transcriptome, *Frontiers in Immunology* (2022). [DOI: 10.3389/fimmu.2022.790444](https://doi.org/10.3389/fimmu.2022.790444)

Provided by University of Surrey

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