

# Vitamin D and fish oil supplements reduce risk of autoimmune conditions



Written by [Annie Lennon](#) on February 2, 2022 — [Fact checked](#) by Alexandra Sanfins, Ph.D.



New research explores the impact of certain supplements on autoimmune risk. Raymond Forbes LLC/Stocksy

- **Recently, researchers have investigated the link between vitamin D and fish oil supplementation and the onset of autoimmune disease.**
- **They found an association between taking both supplements, but especially vitamin D, for 5 years and a decreased rate of autoimmune disease.**
- **The researchers caution, however, that people should seek medical advice before taking supplements, to ensure these will not interact with any preexisting health conditions.**

[infection](#) present.

Examples of autoimmune conditions include:

- autoimmune thyroid disease
- [type 1 diabetes](#)
- [inflammatory bowel disease](#)
- [multiple sclerosis](#)
- [psoriasis](#)
- [rheumatoid arthritis \(RA\)](#)

Autoimmune conditions are the [third most common](#) category of disease in the industrialized world, and the [leading cause](#) of mortality among females.

As there is currently no cure, and a person can only manage the symptoms, these conditions come with major [societal implications](#). Some studies show that in the United States, Native Americans and Black populations are at a disproportionately higher risk of autoimmune conditions than white individuals.

Moreover, people with autoimmune disease [often](#) miss extended periods of employment. In addition to having their productivity affected, they face thousands of dollars in medical expenses they can no longer afford.

Some [studies](#) have found that [vitamin D](#) and omega-3 fish oil may be able to regulate genes involved in [inflammation](#) and innate immune responses.

Although animal trials have found that vitamin D [inhibits](#) the development or progression of disease, [small trials](#) of vitamin D supplementation in people with autoimmune conditions have produced negative results.

Meanwhile, a Danish study found that RA risk decreased by [49%](#) for

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## **Clinical trials are necessary to determine whether vitamin D or omega-3 supplements really benefit people with autoimmune disease.**

In a recent study, researchers from Boston in the United States investigated the link between vitamin D and omega-3 fatty acid supplements and the onset of autoimmune disease in a nationwide, placebo-controlled trial.

They found that vitamin D supplementation led to a 22% lower rate of developing autoimmune disease.

In addition, omega-3 fatty acid supplementation led to a 15% lesser risk of autoimmune disease, although these results were not statistically significant.

“Autoimmune diseases are a group of over 80 different related diseases, and their prevalence and health impact increas[e] with age,” [Karen Harte Costenbader, M.D.](#), professor of medicine at Brigham and Women’s Hospital in Boston and lead author of the study, told *MNT*. “This is the first direct evidence that we can do something to prevent them in older adults.”

“The clinical importance of these findings is high because these are well-tolerated, nontoxic supplements, and other effective treatments to reduce the incidence of autoimmune diseases are lacking,” the researchers write in their study.

“Additionally, we saw consistent results across autoimmune diseases and increasing effects with time. We are continuing to follow participants for 2 years in an extension study to test the time course of this autoimmune disease reduction effect. Further trials could test these interventions in younger populations and those with high autoimmune disease risk,” they add.

The study appears in the journal [BMJ](#).

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## Clinical trial

The researchers enrolled 25,871 participants from across the U.S. in their [Vitamin D and Omega-3 Trial \(VITAL\)](#). At the beginning of the trial, 51% of the participants were women aged 55 years or over, while the rest were men aged 50 years or over.

None of the participants had a history of conditions such as [cancer](#), [cardiovascular disease](#), or [renal failure](#), and all received instructions to limit their vitamin D use from outside sources to no more than 800 international units (IU) per day and to not take fish oil supplements.

After enrollment, the researchers randomly split the participants into two treatment arms. The participants received daily either 2,000 IU of vitamin D and a 1-g fish oil capsule — both supplements — or placebos. The placebos contained either soybean oil or olive oil.

They took blood samples from the participants at baseline and over the course of the study to ascertain their levels of vitamin D and omega-3 fatty acids.

The participants also filled in questionnaires at baseline to identify lifestyle factors, such as vitamin D supplement use and fish and dairy intake.

They then filled in questionnaires annually to provide information about:

- new disease diagnoses
- supplement adherence

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- cancer and cardiovascular disease risk factors

The researchers tracked the participants over 5 years.

By the end of the study period, they noted that 93.1% of the participants responded to the questionnaires, and 81% took at least two-thirds of their supplements.

Blood tests demonstrated that after 1 year, 25-hydroxyvitamin D levels increased by 40% from baseline among those taking vitamin D. By contrast, in the placebo group, the changes were minimal.

The study authors also found that those taking omega-3 supplements had 54.7% more omega-3 in their blood, while the individuals in the placebo group had just 2% more.

**The participants in the vitamin D supplementation group — whether they were taking fish oil as well or not — were 22% less likely to develop an autoimmune condition than those in the vitamin D placebo group.**

Meanwhile, those in the fish oil supplementation group — regardless of whether they were also taking vitamin D supplements — were 15% less likely to have an autoimmune condition than those in the fish oil placebo group. After controlling for other factors, the researchers found that this relationship was not significant.

They add, however, that if probable cases of autoimmune conditions were included, then omega-3 fatty acid supplementation reduced their risk by 18%.

**Furthermore, the researchers observe that longer adherence to supplements led to greater benefits. Over the last 3 years of the trial, they found that vitamin D supplements led to 39% fewer confirmed autoimmune conditions than in the placebo group. They also note a link between fish oil supplements and a 10% lesser likelihood.**

lesser risk of developing an autoimmune condition, when compared with a placebo.

## Multiple mechanisms

The study authors say there are many biological mechanisms that may explain their results.

“Activated vitamin D enters the nucleus and binds the vitamin D receptor, regulating a large array of vitamin D-responsive genes, many of which are involved in both innate and adaptive immune system function,” said Dr. Costenbader. “There are many well-known immunomodulatory actions of vitamin D, including potentially beneficial effects on B and T lymphocytes, macrophages, monocytes, dendritic cells, etc.”

“Similarly for marine omega-3 fatty acids (fish oils), there are many well-known anti-inflammatory and ‘pro-resolving’ mechanisms, including downregulation of inflammatory mediators, such as prostaglandins and leukotrienes, and upregulation of ‘specialize[d] pro-resolving mediators,’ including the resolvins, protectins, maresins, and lipoxins, that act to ‘mop up’ after inflammation and definitely could be responsible for reducing new onset autoimmune disease,” she added.

**The researchers conclude that taking vitamin D and fish oil supplements over time may reduce the incidence of autoimmune disease.**

They also note that their research has some limitations. As they primarily assessed older adults, they say that their findings may not be generalizable to younger people.

“We studied only one dose and formulation of each supplement, so we cannot address other doses or formulations,” added Dr. Costenbader. “We [also] do not yet know about effectiveness among people at especially high risk by virtue of family history or early signs and symptoms.”



“I think everyone should talk to their doctor first before starting these supplements, as there could be interactions with other medications or health conditions, such as kidney stones for vitamin D or excess bleeding risk [for] fish oil if taking anticoagulants, and supplements with safety seals should be selected.”

“That being said, at the doses studied in VITAL, we did not see excess adverse events, and [the doses] were very well tolerated and led to a decrease in autoimmune diseases over the 5.3 years of randomized follow-up. We are continuing to follow people in the trial, and hope to have more information about who benefits most, for which diseases, etc.,” she concluded.

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