# Positive effects of omega-3 on immune system in cases of severe COVID

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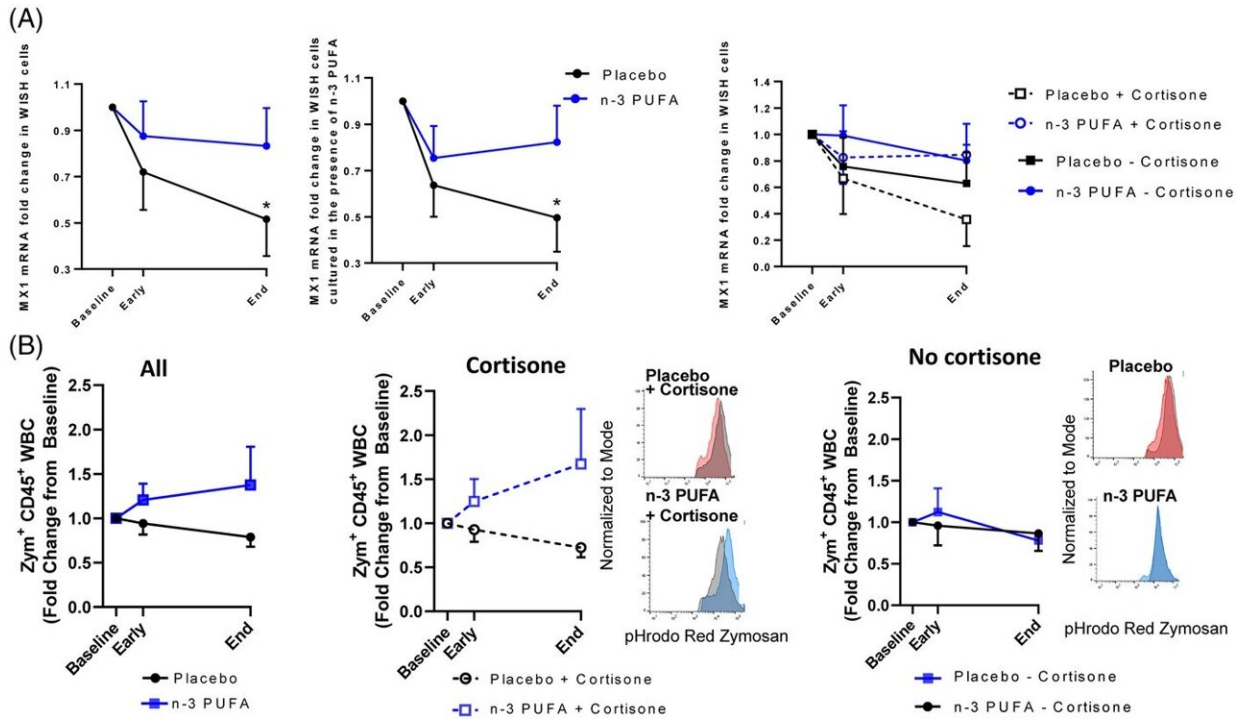


(A) RT-qPCR analysis of MX1 mRNA expression in WISH cells stimulated with patient serum in the absence (right panel) or presence (middle panel) of exogenous n-3 PUFA (placebo n = 12; n-3 PUFA n = 10). Subgroups with (dotted line; placebo n = 6, n-3 PUFA n = 7) and without (solid lines; placebo n = 6, n-3 PUFA n = 3) concomitant cortisone treatment are shown in right panel. (B) Fold change in phagocytosis of pHrodo-red labeled zymosan by human peripheral blood leukocytes (CD45+) after incubation for 45 min at 37°C (placebo n = 11; n-3 PUFA n = 9). Subgroups with (middle panel; placebo n = 6, n-3 PUFA n = 6) or without (right panel; placebo n = 5 and n-3 PUFA n = 3) concomitant cortisone treatment Representative histograms from each group and

subgroup at End are shown as inset. Plasma and whole blood were derived from patients at baseline, at 48 h (Early) and after treatment (End) with intravenous infusion (2 mL/kg) of either placebo (black symbols NaCl) or n-3 PUFA emulsion containing 10 g of fish oil per 100 mL (blue symbols). Credit: *Clinical and Translational Medicine* (2022). DOI: 10.1002/ctm2.895

Intravenous treatment with omega-3 fatty acids in elderly hospitalized patients in intensive care due to COVID-19 seems to have positive effects on the ability of the immune system to cope with the virus, according to a study from Karolinska Institutet. In the future, the study, published in the journal *Clinical and Translational Medicine*, could lead to a complementary, cost-effective treatment for COVID-19.

In patients with COVID-19, a result of infection with the SARS-CoV-2 virus, the immune system and the body's activation of white blood cells are over-activated. It can lead to a so-called systemic inflammatory storm, which worsens the disease state and can cause complications such as sepsis and heart failure.

Researchers at Karolinska Institutet, among others, have now shown that omega-3 fatty acids can stimulate active healing of inflammation, without inhibiting the immune response. By accelerating the healing of the inflammation without compromising the body's immune system, it could be possible to counteract the most serious complications of COVID-19, researchers believe.

## Stimulated inflammation-healing molecules

The study was conducted in 2020, at an early stage of the pandemic when there were no vaccines available. The study looked at 22 elderly hospitalized COVID-19 patients, one-half of whom were randomly

assigned to intravenous treatment with omega-3 fatty acids for five days and the other half to intravenous administration of corresponding volumes of saline.

The treatment effect was found by mapping inflammatory biomarkers and immunological reactions.

"First, we showed that fatty acid metabolism to inflammation-healing molecules was stimulated in those patients treated with omega-3 fatty acids. By isolating immune cells before, during, and after treatment, we were able to show that immune function improved," says Magnus Bäck, senior consultant in cardiology and professor at the Department of Medicine, Solna, Karolinska Institutet, and the study's corresponding author.

The biochemical analyses were carried out in collaboration with Craig Wheelock's research group at the Department of Medical Biochemistry and Biophysics, Karolinska Institutet.

## Planning further studies

Researchers are now planning for larger clinical studies, which will be needed to show whether the course of the disease in severe COVID-19 is improved through treatment with omega-3 fatty acids.

"It is important that even our weakest and frailest patients have the opportunity to participate in studies when the enemy, in this case, COVID-19, is on the attack and that they can fight the disease with the help of the medicine," says Dorota Religa, senior consultant and professor in geriatrics at the Department of Neurobiology, Care Sciences and Society, Karolinska Institutet.

"Stimulating the healing of inflammation with omega-3 fatty acids has

the potential to lead to a new, cost-effective low-risk treatment for COVID-19, as a complement to existing treatment," says Magnus Bäck.

**More information:** Hildur Arnardottir et al, Immunomodulation by intravenous omega-3 fatty acid treatment in older subjects hospitalized for COVID-19: A single-blind randomized controlled trial, *Clinical and Translational Medicine* (2022). DOI: 10.1002/ctm2.895

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