

Omega-3 fatty acid stops known trigger of lupus

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A team of Michigan State University researchers has found that consuming an omega-3 fatty acid called DHA, or docosahexaenoic acid, can stop a known trigger of lupus and potentially other autoimmune disorders.

DHA can be found in fatty, cold-water fish and is produced by the algae that fish eat and store in their bodies. It can be found in [fish oil supplements](#) as well, used by more than 30 million Americans.

"What we discovered was when [lupus](#) was triggered by crystalline silica, a toxic mineral also known as quartz that's linked to human autoimmunity, DHA blocked the activation of the disease," said Melissa Bates, one of the study's lead authors and a doctoral student in MSU's Department of Food Science and Human Nutrition and the Institute of Integrative Toxicology.

The findings have been published in *PLOS ONE*.

The preclinical study looked at the effect of DHA on lupus lesions in the lungs and kidneys of female mice that were already genetically predisposed to

the disease. Their results were overwhelmingly positive.

"Ninety-six percent of the [lung lesions](#) were stopped with DHA after being triggered by the silica," said Jack Harkema, another study author and pulmonary pathologist. "I've never seen such a dramatic protective response in the lung before."

Lupus is considered a genetic disease and is triggered not only by inhaling crystalline silica toxicants, but also by other environmental factors such as sun exposure. Quartz is the most common, and most dangerous, form of crystalline silica and is often found in the agriculture, construction and mining industries where workers can breathe in the mineral dust.

"Lupus is the body's immune system attacking itself and it can damage any part of the body including skin, joints and organs," said James Pestka, a University Distinguished Professor of [food science](#) and [human nutrition](#), who also co-led the research with Bates and Harkema.

Although it's still unknown exactly why DHA is able to prevent the onset of lupus, the researchers said this study provides scientists with a better model for looking at just how much DHA is needed to ward off the environmental trigger of the disease.

"Cells in the lung can gobble up the silica, but it's so toxic, it kills these [cells](#)," Harkema said. "When they die, signals are sent out to the immune system that something is wrong. The body then produces such a strong response that it also starts to target healthy cells."

According to Harkema, the DHA could be changing the way these cells, also known as macrophages, react to the silica in the lungs and somehow alter the immune system's response.

"Our next step is to figure out exactly what's

happening," he said.

One theory is the DHA helps cells send an anti-inflammatory signal to the body so it doesn't overcompensate and trigger an autoimmune response. Another thought is somehow the DHA allows the cells to swallow up and remove the toxic silica from the lung without dying, preventing any inflammatory signals from being sent.

"What we do know is this study is a clear indication that eating DHA can prevent this one type of environmental triggering of lupus," Pestka said. "It can suppress many of the disease's signaling pathways, which current drugs on the market now try to target and treat."

More information: Melissa A. Bates et al. Silica-Triggered Autoimmunity in Lupus-Prone Mice Blocked by Docosahexaenoic Acid Consumption, *PLOS ONE* (2016). DOI: [10.1371/journal.pone.0160622](https://doi.org/10.1371/journal.pone.0160622)

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