Nerve stimulation promotes resolution of inflammation

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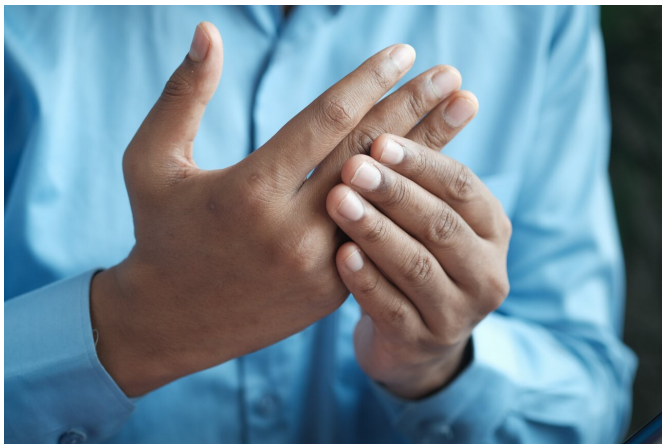

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The nervous system is known to communicate with the immune system and regulate inflammation in the body. Researchers at Karolinska Institutet in Sweden now show how electrical activation of a specific nerve can promote healing in acute inflammation. The finding, which is published in the journal *PNAS*, opens new ways to accelerate resolution of inflammation.

The way the body regulates inflammation is only partly understood. Previous research by Peder Olofsson's group at Karolinska Institutet and other research groups has shown that electrical stimulation of the vagus nerve can reduce inflammation. Such nerve stimulation has been used with encouraging results in clinical studies of patients with inflammatory bowel disease and rheumatoid arthritis. However, how nerve signals regulate active resolution of inflammation was unclear.

"We have now studied effects of signals between nerves and immune cells at the molecular level," says April S. Caravaca, a researcher in Peder Olofsson's group at the Department of Medicine, Solna, Karolinska Institutet and the Stockholm Center for Bioelectronic Medicine at MedTechLabs. "A better understanding of these mechanisms will allow for more precise applications that harness the nervous system to regulate inflammation."

The researchers showed that electrical stimulation of the vagus nerve in inflammation shifts the balance between inflammatory and specialized anti-inflammatory molecules, which promotes healing.

"Inflammation and its resolution plays a key role in a wide range of common diseases, including autoimmune diseases and cardiovascular diseases," says Peder Olofsson. "Our findings provide insights on how the nervous system can accelerate resolution of inflammation by activating defined signaling pathways."

The researchers will continue to study how nerves regulate the healing of inflammation in more detail.

"The vagus nerve is only one of many nerves that regulate the immune system. We will continue to map the networks of nerves that regulate inflammation at the molecular level and study how these signals are involved in disease development," says Dr. Olofsson. "We hope that this research will provide a better understanding of how pathological inflammation can resolve, and contribute to more effective treatments of the many inflammatory diseases, such as atherosclerosis and rheumatism."

More information: April S. Caravaca et al, Vagus nerve stimulation promotes resolution of inflammation by a mechanism that involves Alox15 and requires the ?7nAChR subunit, *Proceedings of the National Academy of Sciences* (2022). DOI: 10.1073/pnas.2023285119

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