

Modulating your own immune response

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Radboudumc - Modulating your own immune response

With the help of simple techniques like breathing exercises, meditation and repeated exposure to cold, you can activate the autonomic nervous system and inhibit the response of your immune system. Researchers from the Radboud university medical center have provided the first scientific evidence for this in an article published yesterday in the leading scientific journal *PNAS*.

A well-functioning [immune system](#) protects our body from pathogens.

But sometimes the immune response is too pronounced or persistent. This can lead to the development of autoimmune diseases such as rheumatism. Our immune system is controlled, amongst other things, by the autonomic nervous system, which is involved in the 'fight-or-flight response'. It was always thought that we could not voluntarily influence either the immune system or the autonomic nervous system. However, experiments from [intensive care](#) researcher Dr. Matthijs Kox and Professor of Experimental Intensive Care Medicine Peter Pickkers now demonstrate that this is possible using certain techniques. Importantly, the researchers emphasize that it has not yet been investigated whether these techniques could be effective in patients.

Training

'Iceman' Wim Hof trained twelve healthy young male volunteers for ten days in a number of specific techniques. The training partly took place in Poland where the volunteers learned breathing and meditation exercises and to walk in short trousers through the snow and swim in ice-cold waters. Back in the Netherlands, scientists gave both the twelve trained subjects and twelve healthy non-trained volunteers an injection containing endotoxin, a component from the cell-wall of bacteria that elicits a response from the immune system. Pickkers: "By administering a dead bacterial component we are actually fooling the body. The immune system responds as if living bacteria are present in the blood stream and produces [inflammatory proteins](#). As a result of this the subjects develop symptoms such as fever and headache. We can therefore use this approach to investigate the immune system of humans."

Stress hormone

Kox: "The trained men produced more of the hormone epinephrine as a

result of the techniques they had learned." Epinephrine is a stress hormone that is released during increased activity of the sympathetic [nervous system](#) and it suppresses the [immune response](#). "We indeed observed that in the trained subjects the release of inflammatory proteins was attenuated and that they experienced far less flu-like symptoms," says Kox.

Previous iceman research

'Iceman' Wim Hof is famous for his various records related to cold-exposure. In his own words he can realize these by influencing his [autonomic nervous system](#). In 2011, researchers from Radboud university medical center investigated the response of Hof's body to an endotoxin injection while he was practicing the techniques he had developed himself. He was found to produce less than half the quantity of inflammatory proteins than healthy volunteers who had not mastered his method. Furthermore, he exhibited almost no flu-like symptoms. The result was so remarkable that the researchers decided to carry out a follow-up study.

More information: "Voluntary activation of the sympathetic nervous system and attenuation of the innate immune response in humans." *PNAS (Proceedings of the National Academy of Sciences)*, 5 May 2014. Matthijs Kox, Lucas van Eijk, Jelle Zwaag, Joanne van den Wildenberg, Fred Sweep, Hans van der Hoeven and Peter Pickkers
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