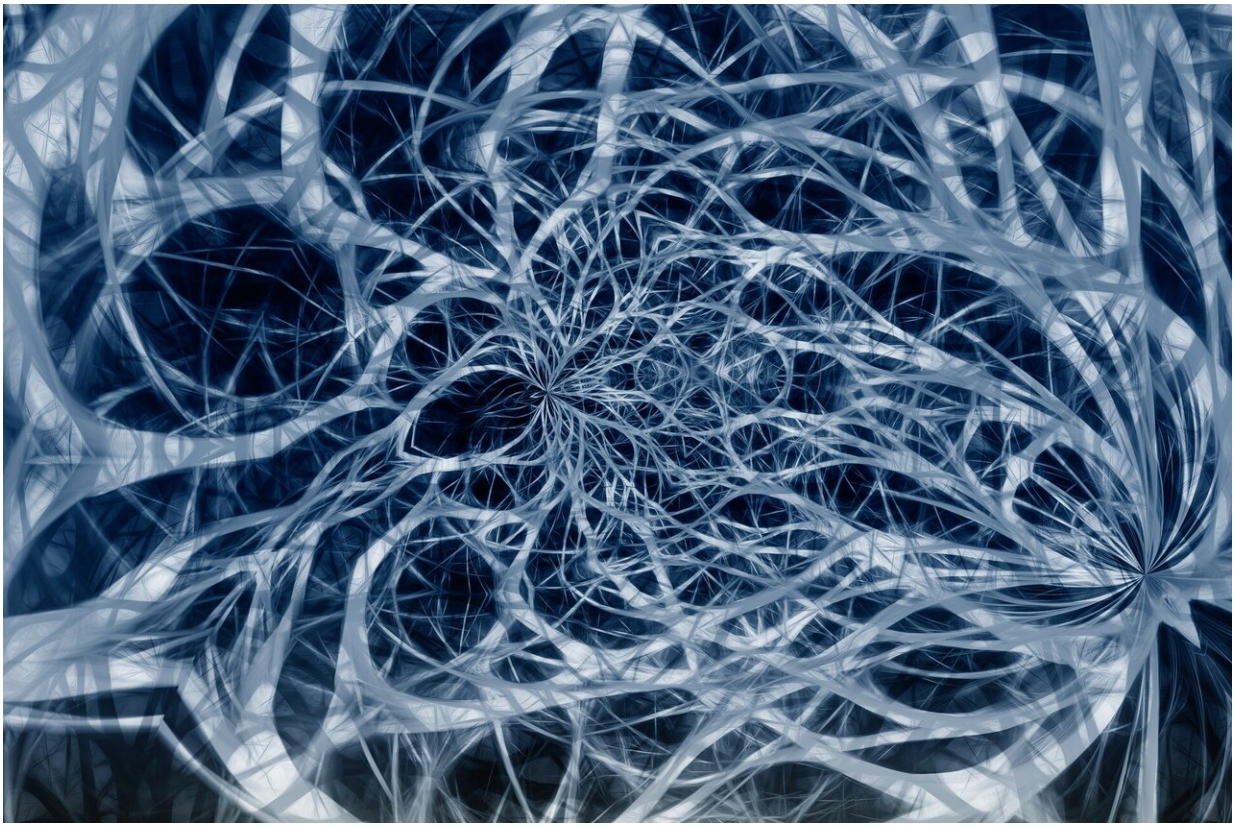
Fighting hypertension through electrical impulses

December 15 2020



Credit: CC0 Public Domain

Electrical impulses applied to a particular branch of the vagus nerve could be used in the future to reduce complications of arterial hypertension. These are the results of a research conducted, on animal

models, by the Department of Angiocardioneurology and Translational Medicine of the I.R.C.C.S. Neuromed, in Italy, and published in the scientific journal *Cell Reports*.

The research origins from the role that immune system plays in the genesis and development of high blood pressure, with the spleen as a main character: it is there that specific immune cells, T lymphocytes, are activated and then released into the blood, migrating to the organs typically affected by hypertension ("target organs"). On one hand, they contribute to the etiology of the hypertensive condition, on the other they cause the well-known related damages. The T lymphocytes activation process, as already stated by previous observations conducted by the same Department, is the result of an interaction between parasympathetic and sympathetic nervous systems, at the level of celiac vagus nerve and splenic nerve.

Engineer Lorenzo Carnevale, first author of the paper, says, "First of all, with this research, we observed that Angiotensin II, a hormone involved in the control of blood pressure, is capable of increasing nerve impulses which, through the celiac branch of the vagus nerve, stimulate T lymphocyte activation in the spleen. But we were able to obtain the same effect also by applying electrical impulses, of specific frequency and amplitude, to the same nerve."

In other words, a bioelectronic intervention is able to modulate lymphocyte activation in the spleen. Carnevale says, "This is a first step showing us the possibility to intervene by electronic means, without drugs, on some fundamental mechanisms of hypertension. In the immediate future, we aim to identify specific bioelectronic stimulation techniques capable of therapeutically influencing the immune system activity in the spleen."

Giuseppe Lembo, professor at the Faculty of Medicine of the Sapienza

University of Rome and director of the Department of Angiocardioneurology and Translational Medicine, says, "Arterial hypertension is a huge public health problem, affecting around one billion people in the world. Despite currently available therapies, an optimal control of blood pressure levels is often not achieved. This research, which of course will need further studies to find clinical applications, shows us the possibility of developing brand new, non-pharmacological, therapies that could help a large number of patients."

More information: *Cell Reports* (2020). DOI: 10.1016/j.celrep.2020.108494

Provided by Istituto Neurologico Mediterraneo Neuromed I.R.C.C.S.