

New migraine medications could endanger patients with high blood pressure

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New migraine medications block α CGRP, a neuropeptide which causes vasodilation, for example in the meninges. The very same peptide, which is formed in the muscles during physical activity, protects the heart—which is vital for people with chronic high blood pressure. The innovative migraine prophylaxis could endanger these people, as

researchers at the University of Zurich have demonstrated in mice.

The neuropeptide α CGRP (α calcitonin gene-related peptide) works in two different ways. It leads to inflammation and dilates the [blood vessels](#) right at the release point of the nerve cells, for example in the meninges, which can trigger migraine attacks. However, it has a completely different effect on the heart, as has now been discovered by a team of researchers at the University of Zurich (UZH).

Bad for the meninges, good for the heart

As demonstrated by the scientists through studies on mice, α CGRP is also released from active skeletal muscles. It is transported via the [blood](#) from the muscle to the heart where it inhibits the pathological heart remodeling caused by chronic [high blood pressure](#).

"It is exactly the same for humans as it is for mice," says study leader Johannes Vogel, professor at the UZH Institute of Veterinary Physiology. "Physical activity and sport increase the blood plasma levels of α CGRP, which has a [positive effect](#) on the heart in patients with high blood pressure."

Treatment option for certain patients with high blood pressure

The work carried out by the researchers involved comparing normal mice with others having chronic high blood pressure, which were either sedentary or repeatedly and voluntarily ran in a running wheel.

The study revealed that having normal concentrations of α CGRP in the blood plasma is vital and that the peptide is crucial for the positive effects of [physical activity](#) on the heart. α CGRP also provides the [heart](#)

with extra protection, regardless of its antihypertensive properties in high doses. "In the future, substances that activate the release of α CGRP or mimic its action could be used in hypertensive patients who can only be physically active to a very limited extent or in whom antihypertensive medications have little or no effect," explains Johannes Vogel.

Caution required with migraine medications and chronic high blood pressure

The research work also brought another finding to light—long-term administration of α CGRP blockers in mice with chronic high blood pressure resulted in life-threatening cardiac dysfunction. Medications of this kind, which take a targeted approach to blocking the neuropeptide, have recently been approved for migraine prophylaxis. As the neuropeptide α CGRP in species from zebrafish to humans is very similar, it must be part of a key biological mechanism that works in the same way in different organisms.

According to cardiovascular specialist Vogel, the results are therefore also relevant to humans: " α CGRP blockers should only be used for [migraine](#) prevention with the proviso that patients' blood pressure is monitored regularly. Chronic high blood pressure should be added to the list of contraindications for the long-term use of α CGRP blockers."

More information: Tom Skaria et al. Blood Pressure Normalization-Independent Cardioprotective Effects of Endogenous, Physical Activity-Induced Alpha Calcitonin Gene-Related Peptide (α CGRP) in Chronically Hypertensive Mice, *Circulation Research* (2019). [DOI: 10.1161/CIRCRESAHA.119.315429](https://doi.org/10.1161/CIRCRESAHA.119.315429)

Provided by University of Zurich

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