

Carbohydrate in the heart seems to help regulate blood pressure

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Credit: University of Copenhagen

New research suggests that a particular type of carbohydrate plays an important role in regulating the blood pressure in the human body. This has been shown by researchers from the University of Copenhagen and Rigshospitalet in a new study using rats. The researchers believe that the finding may have a vast potential for improved medications for high blood pressure.



Both hypertension and hypotension can have adverse consequences for health and lead to cardiovascular diseases and syncope, respectively. Now, researchers from the University of Copenhagen and Rigshospitalet know a little more about the factors that help regulate blood pressure. The new results have been published in the scientific journal, *Journal of Biological Chemistry*.

In <u>interdisciplinary collaboration</u> between researchers at the University of Copenhagen and Rigshospitalet, Ph.D. student Lasse Holst Hansen found a particular form of carbohydrate or <u>sugar</u> on a particular peptide hormone in humans. In addition, in tests with rats the research team found that the peptide hormone with that particular form of sugar affects the regulation of the blood pressure. They hope that in the long term, their results can be used to develop better medications for hypertension.

"It may be a really good bet for a modern way to treat hypertension without side effects, such as syncope. It has long been known that this peptide hormone is extremely important for the blood pressure, but so far it has not been possible to use it in the treatment. This finding was only possible because we collaborated across disciplines and combined basic and clinical research," says Professor Jens Peter Gøtze, Rigshospitalet, the Department of Clinical Biochemistry.

About one in five Danes has hypertension. This increases the risk of cardiovascular diseases, such as coronary thrombosis and <u>heart failure</u>. According to the Danish Heart Association, one in four Danes will die from cardiovascular diseases.

New Insight into Physiological Processes

The cells of the body use sugar to combine with proteins—a process also called glycosylation—in order to control the function and stability of the proteins. In the study, the researchers show how a particular type of



sugar attaches to a peptide hormone called atrial natriuretic peptide (ANP). This peptide hormone is secreted from the heart and is important for regulation of the blood pressure and the fluid balance in the body.

"We can see that when that particular sugar is located on the peptide hormone, it regulates the fluid balance and <u>blood pressure</u> differently than if the sugar is not located there. In our animal models, we could see that the peptide <u>hormone</u> with and without sugar behaves differently. It gives us an insight into a new mechanism for regulation of these important <u>physiological processes</u> in the body," says Associate Professor Katrine Schjoldager, Copenhagen Center for Glycomics.

The next step for the researchers will now be in-depth studies of the function of that particular sugar and studies as to how the heart regulates the attachment of the sugar. At the same time, the researchers wish to investigate the function in humans to find out whether the phenomenon is more prevalent in some patient groups than in others, such as patients with heart failure.

More information: Lasse H Hansen et al, Discovery of O-glycans on atrial natriuretic peptide (ANP) that affect both its proteolytic degradation and potency at its cognate receptor, *Journal of Biological Chemistry* (2019). DOI: 10.1074/jbc.RA119.008102

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