

Scientists find evidence of a biological trigger for high blood pressure

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(Medical Xpress) -- Scientists have identified what could be a biological tipping point in the development of high blood pressure, in a discovery that could one day lead to new treatment.

High blood pressure affects around one in three adults, the equivalent of approximately 16million people in the UK. People with [high blood pressure](#) are at much greater [risk of heart attack](#), [heart failure](#) and [kidney disease](#), and it is the main risk factor for [stroke](#).

It is well known that blood pressure is influenced by three [biological factors](#) – how fast the heart beats; how open and flexible the arteries are; and how much blood there is pumping through the [blood vessels](#). High blood pressure is thought to be a result of an imbalance in certain chemicals that control these factors. Yet no one knows exactly what goes

on within the body to influence these blood pressure controls.

Researchers from St George's, University of London have discovered that reduced activity of a protein involved in keeping arteries relaxed – a potassium channel called Kv7.4 – may be a fundamental step in the development of high blood pressure. They found that this channel is present in the main artery supplying blood to the kidney – the renal artery – and believe that reduced levels of activity here could kick-start a chain reaction inside the body that is known to increase blood pressure.

Kv7.4 channels allow the passage of potassium out of the muscle cells in blood vessels and they have to be open and closed at the right times so that the vessel muscles can contract or relax when required. They are most commonly recognised for their role in instructing the blood vessels to expand in reaction to triggers, such as adrenaline, to allow more blood and oxygen to travel to the tissues when needed.

In laboratory studies, the St George's researchers have shown that when the Kv7.4 channel is disabled the body does not react to triggers telling it to widen the artery and blood flow becomes constricted. The researchers explain that the impact of this in one artery or two arteries is unlikely to cause high blood pressure. But because they found that Kv7.4 channels were present in the renal artery they believe this could act as a “tipping point” for high blood pressure

Dr. Iain Greenwood from St George's, University of London, who led the study, said: “Although we did not study how kidneys responded to arteries that are constricted due to deactivated Kv7.4 channels as part of this study, we do know that under-perfused kidneys, or more simply put, those that do not receive sufficient blood, respond by secreting an enzyme called renin. Once this has been produced, it travels around the body instructing blood vessels to constrict and consequently raising blood pressure.”

Although the researchers emphasise that more investigations are needed before treatment can be developed from their findings, they explain that this is a shift in how high blood pressure is known to develop and that this type of information could be the cornerstone of new treatment.

Dr. Iain Greenwood said: “As deaths from cardiovascular disease such as [heart attack](#) and stroke resulted in 50,000 premature deaths in the UK alone in 2008 and the financial burden is approximately £30billion, a better understanding of how these conditions develop is crucial.

“If the Kv7.4 channels dilate arteries to lower blood pressure in the way we think they do then the identification that they underlie the relaxation caused by naturally occurring hormones such as adrenaline means that, eventually, we may be able to target these channels to influence [blood pressure](#). More investigations are needed before this will become a reality.”

More information: This research was funded by the British Heart Foundation and the findings are published in the April edition of the journal [Hypertension](#).

Provided by St. George's University of London

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