

New discovery throws light on blood pressure regulation

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Researchers have discovered that a protein found in the walls of blood vessels plays a key role in maintaining healthy blood pressure; a discovery that could one day lead to new treatments for people with high blood pressure.

The research, funded by the Biotechnology and Biological Sciences Research Council (BBSRC) and the British Heart Foundation (BHF), shows that malfunction of the [protein](#) – a potassium channel called Kv7.4 – contributes to the maintenance of high [blood pressure](#). The discovery is published this evening (2100hrs, 11 July) in the journal *Circulation*.

Dr Iain Greenwood from St George's, University of London led the study. He said "High blood pressure is one of the most common diagnoses in the UK and one in three adults has it – that's around 16 million people. People with high blood pressure are at much greater risk of heart attack, heart failure, and kidney disease and it's the main risk factor for stroke.

"We are trying to understand how our bodies go about regulating our blood pressure under normal circumstances – the more we understand, the better we can get at spotting what is going wrong and intervening when someone has this common chronic health issue. This discovery is an important part of the puzzle and might one day lead to new treatments."

Dr Greenwood and his team have shown that Kv7.4 plays an essential role in maintaining the extent to which arteries are constricted or dilated. He said "We have to be able to change our blood pressure at the drop of a hat – quite literally! If you dropped your hat and bent over to pick it up, your body would automatically reduce your blood pressure to account for the position of your head relative to your heart and the effect of gravity and then when you stood up again, your body would adjust it back up.

"The muscles in the walls of your blood vessels play a role in adjusting blood pressure and if they need to increase it, they squeeze the blood vessels more tightly to literally put mechanical pressure on your blood."

The researchers examined rodents that had high blood pressure and discovered that in some cases the Kv7.4 channels weren't working properly. These channels allow the passage of potassium out of the muscle cells in our [blood vessels](#) and they have to be open and closed at the right times so that the muscles can contract or relax when we need them to. In the animals that had high blood pressure and malfunctioning Kv7.4 channels, the problem was that the channels were blocked. This caused an imbalance in the finely controlled chemical environment of the muscle cell.

"The problem is," continued Dr Greenwood, "if the Kv7.4 channels cannot function, the muscle cells overreact to the signals the body is giving to increase blood pressure. We think that in the animals we studied the redundant Kv7.4 channels contributed markedly to their high blood pressure."

Whilst it is extremely unlikely that most people with high blood pressure have defective Kv7.4 channels, the researchers hope that by understanding the key role they play in maintaining healthy blood pressure we can use this knowledge to develop new strategies for

adjusting blood pressure using drug treatments in the future.

Professor Douglas Kell, Chief Executive, BBSRC said "If we are to have long, healthy lives, we need to understand how our bodies cope with the demands we place on them. Increasing our knowledge of the biology that underpins normal, healthy processes will pave the way for future strategies to prevent or treat health problems. Maintaining healthy blood pressure is an important part of keeping us all well and so this research could be of great benefit to many people in the future."

Professor Jeremy Pearson, Associate Medical Director at the British Heart Foundation, said "Physical activity, maintaining a healthy weight, reducing the amount of salt and alcohol you consume, and increasing the amount of fruit and vegetables you eat can all play a part in lowering your risk of having high blood pressure. However, we still do not fully understand what causes the condition in most people - and current medicines to treat it are often not fully effective. Crucial research such as this could lead to new medical treatments for [high blood pressure](#)."

Provided by Biotechnology and Biological Sciences Research Council

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