

'Satiety hormone' leptin links obesity to high blood pressure

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This is an image of a weight scale. Credit: CDC/Debora Cartagena

Leptin, a hormone that regulates the amount of fat stored in the body, also drives the increase in blood pressure that occurs with weight gain, according to researchers from Monash University and the University of Cambridge.

Being obese or overweight is a major risk factor for the development of

high [blood pressure](#) and cardiovascular disease. Whilst a number of factors may be involved, the precise explanation for the link between these two conditions has been unclear.

In a study published today in the journal *Cell*, a research team led by Professor Michael Cowley, Monash University, Australia, in collaboration with Professor Sadaf Farooqi, from the University of Cambridge, UK, studied mice and humans who have problems producing or processing the [hormone leptin](#) and compared them with 'healthy' individuals to see whether this hormone could provide the link. Leptin is made by fat and circulates in the bloodstream to reach the brain, where it acts as a signal for energy reserves, adjusting both energy expenditure and the sensation of hunger - hence it is sometimes referred to as the 'satiety hormone'.

The group showed that some obese people who were lacking the [hormone leptin](#) because of a genetic disorder had [low blood pressure](#) despite being very heavy. This was also the case for people lacking the gene for the leptin receptor in the brain, meaning that the brain was unable to respond to the hormone.

Modelling the human condition, Professor Cowley's team in Australia showed that mice with normal leptin signalling developed an increase in blood pressure when they became obese on a [high fat diet](#). These effects were not seen in mice that lacked leptin or where leptin was unable to work because of a defect or block on the [leptin receptor](#).

These experiments demonstrate that leptin signalling is necessary for obesity-induced increased blood pressure. The clinical studies in severely obese humans showed that these observations are relevant to humans.

Professor Cowley said: "High blood pressure is a well-known consequence of obesity. Our study explains the mechanism behind this

link, showing that leptin, a hormone secreted by fat, increases blood pressure."

The researchers are now investigating the precise pathways in the brain by which leptin acts to regulate blood pressure.

Professor Farooqi, from the Wellcome Trust-Medical Research Council Institute of Metabolic Science, added: "We now know that leptin regulates both our weight and our blood pressure through its action on the brain. Targeting this action could offer a useful way of helping people fight obesity and associated problems such as [high blood pressure](#) and heart disease."

More information: Simonds, SE et al. Leptin Mediates the Increase in Blood Pressure Associated with Obesity. *Cell*; 4 December 2014

Provided by University of Cambridge

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