

Urine profiles provide clues to how obesity causes disease

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

Scientists have identified chemical markers in urine associated with body mass, providing insights into how obesity causes disease.

Being overweight or obese is associated with higher risk of [heart disease](#), stroke, diabetes and cancer, but the mechanisms connecting body fat and disease are not well understood.

The new study, led by Imperial College London, shows that [obesity](#) has a 'metabolic signature' detectable in urine samples, pointing to processes that could be targeted to mitigate its effects on health. The findings are published in *Science Translational Medicine*.

Urine contains a variety of chemicals known as metabolites, from a vast range of biochemical processes in the body. Technologies that analyse the metabolic makeup of a sample can therefore offer huge amounts of information that reflects both a person's genetic makeup and lifestyle factors.

The Imperial researchers analysed [urine samples](#) from over 2,000 volunteers in the US and the UK. They found 29 different metabolic products whose levels correlated with the person's [body mass](#) index, and how they fit together in a complex network that links many different parts of the body.

Some of these metabolites are produced by bacteria that live in the gut, highlighting the potentially important role these organisms play in obesity. Altered patterns of energy-related metabolites produced in the muscles were also identified as being linked to obesity.

Professor Jeremy Nicholson, Director of the MRC-NIHR National Phenome Centre at Imperial College London and a senior author of the study said: "Obesity has become a huge problem all over the world, threatening to overwhelm health services and drive life expectancy gains into reverse. Tackling it is an urgent priority and it requires us to have a much better understanding of how body fat and other aspects of biology are related. These findings provide possible starting points for new approaches to preventing and treating obesity and its associated diseases."

Professor Paul Elliott, Head of the Department of Epidemiology and

Biostatistics at Imperial, said: "Our results point to patterns of metabolic markers in the urine associated with obesity. It may be possible to identify non-obese people who have such patterns in their [urine](#) profile. These people could be at risk of developing obesity and metabolic diseases, and might benefit from personalised preventative interventions."

More information: P. Elliott et al. 'Urinary Metabolic Signatures of Human Adiposity.' *Science Translational Medicine*, 2015. Sci. Transl. Med. 7, 285ra62 (2015). [stm.sciencemag.org/lookup/doi/...scitranslmed.aaa5680](http://stm.sciencemag.org/lookup/doi/10.1126/scitranslmed.aaa5680)

Provided by Imperial College London

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