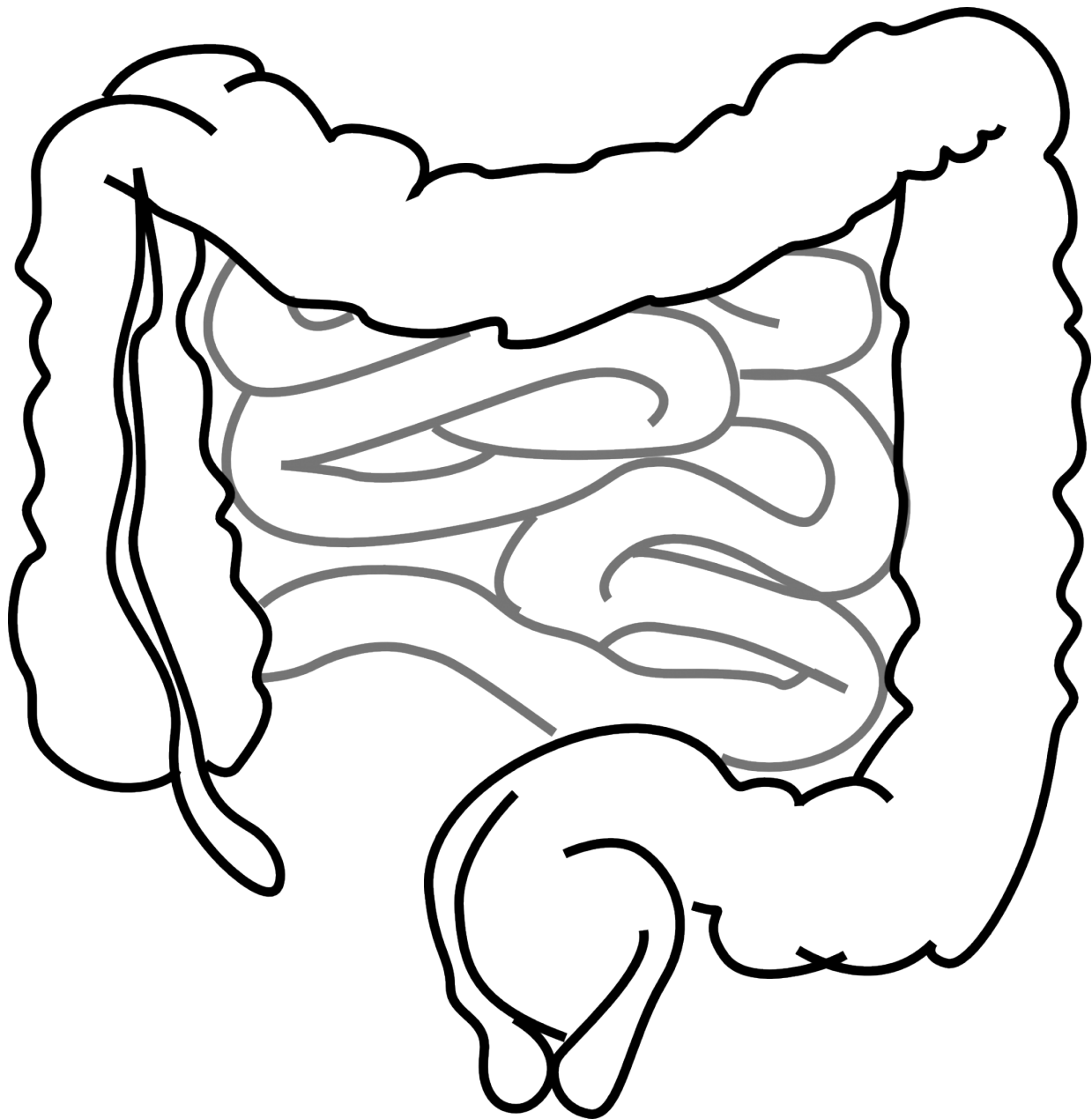


Study identifies processes in the gut that drive fat build-up around the waist

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Research by scientists at King's College London into the role the gut plays in processing and distributing fat could pave the way for the development of personalised treatments for obesity and other chronic diseases within the next decade. The research is published in *Nature Genetics*.

In the largest study of its kind, scientists analysed the faecal metabolome (the community of chemicals produced by gut [microbes](#) in the faeces) of 500 pairs of twins to build up a picture of how the gut governs these processes and distributes fat. The King's team also assessed how much of that activity is genetic and how much is determined by environmental factors.

The analysis of stool samples identified biomarkers for the build-up of internal fat around the waist. It's well known that this visceral fat is strongly associated with the development of conditions including type 2 diabetes, heart disease and obesity.

By understanding how microbial chemicals lead to the development of fat around the waist in some, but not all the twins, the King's team hopes to also advance the understanding of the very similar mechanisms that drive the development of obesity.

An analysis of faecal metabolites ([chemical](#) molecules in stool produced by microbes) found that less than a fifth (17.9 per cent) of gut processes could be attributed to hereditary factors, but 67.7 per cent of gut activity was found to be influenced by environmental factors, mainly a person's regular diet.

This means that important changes can be made to the way an individual's gut processes and distributes fat by altering both their diet and microbial interactions in their gut.

On the back of the study researchers have built a gut metabolome bank that can help other scientists engineer bespoke and ideal gut environments that efficiently process and distribute fat. The study has also generated the first comprehensive database of which microbes are associated with which chemical metabolites in the gut. This can help other scientists to understand how bacteria in the gut affect human health.

Lead investigator Dr. Cristina Menni from King's College London said: 'This study has really accelerated our understanding of the interplay between what we eat, the way it is processed in the gut and the development of fat in the body, but also immunity and inflammation. By analysing the faecal metabolome, we have been able to get a snapshot of both the health of the body and the complex processes taking place in the gut.'

Head of the King's College London's Twin Research Group Professor Tim Spector said: 'This exciting work in our twins shows the importance to our health and weight of the thousands of chemicals that gut microbes produce in response to food. Knowing that they are largely controlled by what we eat rather than our genes is great news, and opens up many ways to use food as medicine. In the future these chemicals could even be used in smart toilets or as smart toilet paper.'

Dr. Jonas Zierer, first author of the study added: 'This new knowledge means we can alter the gut environment and confront the challenge of obesity from a new angle that is related to modifiable factors such as diet and the microbes in the gut. This is exciting, because unlike our genes and our innate risk to develop fat around the belly, the [gut microbes](#) can

be modified with probiotics, with drugs or with high fibre diets.'

More information: Jonas Zierer et al, The fecal metabolome as a functional readout of the gut microbiome, *Nature Genetics* (2018). [DOI: 10.1038/s41588-018-0135-7](https://doi.org/10.1038/s41588-018-0135-7)

Provided by King's College London

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