OBESITY

Mapping metabolites—specific metabolic signatures in urine are associated with adiposity

A specific pattern of metabolites detectable in urine samples is associated with increased BMI according to new data published in *Science Translational Medicine*. Using an exploratory metabolic phenotyping approach, investigators have identified how different groups of metabolites interact to create a 'metabolic signature' of adiposity.

The researchers used samples from the INTERMAP study. In the original study, 24-h urine samples, height and weight measurements and detailed dietary information were collected from all

participants, who were aged 40–59 years, between 1996 and 1999, to identify factors associated with increased blood pressure.

In their analysis, Elliott *et al.* used the 24-h urine samples collected from 1,880 individuals from the USA (962 men and 918 women). These samples were analysed by both high-resolution NMR spectroscopy and ion-exchange chromatography to identify excreted metabolites; these findings correlated with BMI calculated from original height and weight data. The investigators then validated these data using identically collected urine samples from 444 participants from the UK (245 men and 199 women).

The team identified a panel of urinary metabolites associated with increased BMI, including those linked to renal function, composition of the gut microbiota, branched-chain amino acid turnover and diet. Finally, the investigators generated a network map of urinary

metabolites, which shows how these substances are interlinked. This map reflects a potential 'metabolic signature' of obesity, and identifies new relationships between different metabolites associated with BMI.

The investigators note that BMI is a fairly crude indicator of adiposity. Consequently, interpretation of any direct association between these metabolites and BMI is difficult. However, these data indicate that deep, symbiotic links exist between different metabolic pathways. Furthermore, ~50% of the metabolites identified had not previously been associated with obesity. This knowledge might be useful for the development of new anti-obesity strategies.

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Original article Elliott, P. *et al.* Urinary metabolic signatures of human adiposity. *Sci. Transl. Med.* **7**, 285ra62 (2015)

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