UW School of Medicine and Public Health: Forget calorie counting: Diet low in specific amino acids may be the key to weight loss

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Madison, Wis. –A new study in mice has suggested that counting calories might not be the only way to improve humans' metabolic health.

Researchers at the University of Wisconsin-Madison, in a study published today in The Journal of Physiology, found lowering the consumption of specific types of amino acids (the building blocks of protein) called branched-chain amino acids (BCAAs) improved metabolic health, even when overall calories were not reduced.

Led by Dr. Dudley Lamming, associate professor of medicine (endocrinology) at the UW School of Medicine and Public Health, the work indicates that reducing the intake of these specific building blocks of proteins improved the symptoms of metabolic syndrome, a group of conditions including high blood pressure, high blood sugar, abnormal cholesterol levels, and excess abdominal fat that collectively increase the risk of diabetes, heart disease, and stroke.

"We've identified an unanticipated role for dietary BCAAs in the regulation of

energy balance, and we show that a diet with low levels of BCAAs promotes leanness and good control of blood sugar," said Lamming. "Our results also suggest that the specific amino-acid composition of dietary protein – not just how much protein we eat – regulates metabolic health."

If these results can be translated to humans, it is possible that such diets, or drugs that mimic the effect of a low-BCAA diet, would be easier for people to follow and more effective than traditional calorie-counting diets.

The study found that feeding obese, pre-diabetic mice a specialized diet low in the amino acids leucine, isoleucine and valine promoted leanness and improved the regulation of blood sugar. The researchers examined the animals' weight, body composition, glucose metabolism and energy expenditure.

While all dietary protein contains BCAAs, some protein-rich foods are inherently lower in BCAAs compared to others. "Today is the last day of fall, a time of the year where turkey is popular on holiday menus. Turkey is relatively low in BCAAs compared to many other meats. If our findings apply to humans we'll have something more to be thankful for," said Lamming.

Importantly, mice in this study were free to eat as much of the low-BCAA food as they wanted, and thus did not experience overall calorie reduction. Despite continuing to eat an unhealthy high-fat and high-sugar diet, mice on the low-BCAA diet still experienced an improvement in metabolic health.

Researchers will next investigate whether reducing dietary BCAAs can improve the metabolic health of humans, and how the specific amino-acid composition of dietary protein regulates metabolic health. This could help explain the wide variation seen between individuals in response to different weight-loss diets.

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