

High-fat diets plus extra protein make for bad mix

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It's basically a given that diets loaded with fat can lead to considerable health problems. But a new study in the April issue of *Cell Metabolism*, a Cell Press publication, shows that in some cases diets that are high in both fat and protein can be even worse.

The researchers led by Christopher Newgard of Duke Medical Center report that rats fed high-fat (HF) diets supplemented with extra so-called branched chain [amino acids](#) (BCAA) don't have to eat as much or gain as much weight to develop [insulin resistance](#) as do chubbier animals fed a high-fat diet alone. Moreover, those ill effects of branched chain amino acids, which include 3 of the 20 amino acids that are the building blocks of proteins, occurred only in the context of a high-fat diet.

"We've all made a big deal out of the fact that people in the U.S. eat too much fat and sugar, but we've underestimated the protein component," Newgard said. And indeed, he said, surveys have shown that most people who overeat don't show any particular prejudice toward one food group or another.

By comparing the metabolic profiles of obese versus lean people in the new study, the researchers found that key among the many differences between the two groups were elevated levels of BCAA in those who were overweight. They also showed that BCAA tend to climb along with insulin resistance, a condition that is a precursor to diabetes.

To further explore that correlation, they turned to studies of rats. Those controlled feeding studies revealed that, despite having reduced food intake and a low rate of weight gain equivalent to animals on standard chow, rats that consume more fat and BCAA were as insulin resistant as rats fed an HF diet. When added to a normal mouse diet, extra BCAA didn't result in insulin resistance.

The insulin resistance in the animals eating extra fat and BCAA was accompanied by changes in molecular players in the insulin signaling pathway, they report. The ill effects of BCAA in combination with high fat might be explained in part by a buildup of chemicals known as acylcarnitines in the animals' skeletal muscles, the researchers suggest. Consistent with their prior studies, they report that high-fat feeding caused significant accumulation of multiple acylcarnitines in muscle relative to the standard chow or standard chow plus BCAA groups.

"Surprisingly," they report, "the HF/BCAA diet caused accumulation of the same array of muscle acylcarnitines, despite the fact that the HF/BCAA animals weighed less and consumed less food than the HF-fed animals." HF/BCAA feeding also led to levels of certain acylcarnitines exceeding those in animals in all other feeding groups.

Overall, the results suggest that "in the context of a dietary pattern that includes high-fat consumption, BCAA may make an independent contribution to development of insulin resistance and diabetes," they concluded.

Source: Cell Press ([news](#) : [web](#))

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