

Apelin hormone injections powerfully lower blood sugar

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By injecting a hormone produced by fat and other tissues into mice, researchers report in the November *Cell Metabolism* that they significantly lowered blood sugar levels in normal and obese mice. The findings suggest that the hormone known as apelin might be a promising target for managing insulin resistance and type 2 diabetes.

Insulin resistance, in which normal amounts of insulin are insufficient to lower blood sugar (glucose) levels, is a precursor to diabetes.

" The effects of apelin appear to be similar to insulin," although they operate in different ways, said Isabelle Castan-Laurell of Institut National de la Santé et de la Recherche Médicale and Université de Toulouse.

Earlier studies had suggested a link between apelin and insulin, Castan-Laurell said. Apelin levels were shown to parallel insulin levels in mice and humans. Apelin levels in the blood also rise in those who are obese and in those with type 2 diabetes.

Those findings led the researchers to suspect that apelin and insulin might have other similarities.

Now, they show that acute intravenous injections of apelin have a powerful blood sugar-lowering effect on mice. They also show evidence that apelin stimulates muscle and fat tissue to take up glucose from the bloodstream by stimulating a known glucose transport pathway.

Specifically, apelin activates a pathway including an enzyme called AMP-activated protein kinase (AMPK), which plays a pivotal role in the control of skeletal muscle glucose and the metabolism of fatty acids.

Moreover, they showed that apelin treatment restores glucose tolerance and improves glucose uptake in mice that are obese and insulin resistant.

Castan-Laurell said they aren't quite sure yet what it means that obese individuals tend to have high apelin levels. It could be that apelin levels don't rise enough to curb rising blood sugar or perhaps insulin resistance without apelin would be even worse. Alternatively, obese animals and humans might grow resistant to the action of apelin just as they do insulin.

The researchers said they will now examine the effects of chronic apelin treatment in the mice to see if the hormone can ward off obesity and insulin resistance in the longer term.

"In conclusion," the researchers wrote, "the present study reveals apelin as a new endocrine regulator of AMPK and strengthens the crosstalk between [fat] and skeletal muscle. The involvement of AMPK in apelin-mediated glucose uptake represents an attractive pathway that could conceivably lead to a new drug target for the treatment of metabolic disorders."

Either way, they added, the discovery offers new insights into the physiology of glucose and lipid metabolism in health and disease.

Source: Cell Press

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