

Hormone in fruit flies sheds light on diabetes cure, weight-loss drug for humans

August 9 2012

Manipulating a group of hormone-producing cells in the brain can control blood sugar levels in the body – a discovery that has dramatic potential for research into weight-loss drugs and diabetes treatment.

In a paper published in the October issue of *Genetics* and available online now, neurobiologists at Wake Forest University examine how fruit flies (*Drosophila*) react when confronted with a decreased diet.

Reduced diet or starvation normally leads to hyperactivity in fruit flies – a hungry fly buzzes around feverishly, looking for more food. That happens because an enzyme called AMP-activated kinase stimulates the secretion of the adipokinetic hormone, which is the functional equivalent of glucagon. This hormone acts opposite of insulin, as it tells the body to release the sugar, or food, needed to fuel that hyperactivity. The body uses up its energy stores until it finds food.

But when Wake Forest's Erik Johnson, an associate professor of biology, and his research team turned off AMP-activated kinase, the cells decreased sugar release and the hyperactive response stopped almost completely – even in the face of starvation.

"Since fruit flies and humans share 30 percent of the same genes and our brains are essentially wired the same way, it suggests that this discovery could inform metabolic research in general and diabetes research specifically," said Johnson, the study's principal investigator. "The basic biophysical, biochemical makeup is the same. The difference in

complexity is in the number of cells. Why flies are so simple is that they have approximately 100,000 neurons versus the approximately 11 billion in humans."

Medical advances as a result of this research might include:

Diabetes research: Adipokinetic hormone is the insect equivalent to the hormone glucagon in the human pancreas. Glucagon raises [blood sugar levels](#); insulin reduces them. However, it is difficult to study glucagon systems because the pancreatic cells are hard to pull apart. Studying how this similar system works in the fruit fly could pave the way to a drug that targets the [cells](#) that cause glucagon to tell the body to release sugar into the blood – thus reducing the need for insulin shots in diabetics.

Weight-loss drugs: An "exercise drug" would turn on all AMP-activated kinase in the body and trick the body into thinking it was exercising. "Exercise stimulates AMP-activated kinase, so manipulation of this molecule may lead to getting the benefits of exercise without exercising," Johnson said. In previous research published in the online journal PLoS ONE, Johnson and his colleagues found that, when you turn off AMP-activated kinase, you get [fruit flies](#) that "eat a lot more than normal flies, move around a lot less, and end up fatter."

More information: [www.genetics.org/content/early ... 143610.full.pdf+html](http://www.genetics.org/content/early/2012/08/09/gad.143610.full.pdf+html)

Provided by Wake Forest University

Citation: Hormone in fruit flies sheds light on diabetes cure, weight-loss drug for humans (2012, August 9) retrieved 10 April 2024 from <https://medicalxpress.com/news/2012-08-hormone-fruit-flies-diabetes-weight-loss.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.