Voles and weasels offer clues into human obesity

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Internationally renowned obesity researcher John Speakman uses voles and weasels to illustrate his "drifty genes" theory, Feb. 2 during this year's McCay lecture.

The key to understanding why some of us seem genetically programmed to pile on the pounds may lie in two tiny animals: the vole and the weasel.

Internationally renowned obesity researcher John Speakman used the example of the predatory pair to illustrate his "drifty genes" theory, Feb. 2 at Cornell University in delivering this year's McCay lecture.

He suggests that many cases of obesity occur because we either no longer respond to a genetic trigger that stops us from eating too much once we reach a certain weight, or the weight threshold has drifted too

high.

Speakman's belief contradicts the commonly held "thrifty genes" theory, which argues that the feast-or-famine lifestyle faced by our hunter-gatherer ancestors made it genetically advantageous to be able to put on weight during times of plenty.

If that were true, then all of us should be bulking up between famines, but this is not the case, Speakman said. And famine events generally do not kill off the lean and favor those who are fat and fertile to carry on the genetic line -- it is the very young and very old who tend to die, from disease and not starvation, he said.

"The question is not why we get obese, but why only some of us do," said Speakman, a professor at the University of Aberdeen.

To answer this question, Speakman turned to voles -- small, mouselike rodents in abundance in his native Scotland that have a remarkable innate ability to regulate weight.

Speakman fed the animals a high-fat diet and watched as the voles adjusted their food intake accordingly so that they had nearly the same body mass at the end of the experiment as their peers in the field.

He realized that they had a strong biological feedback system that kept their weight at a happy medium -- not too lean to be at risk of starvation, but not too fat to make them an easy target for their natural predator, the weasel.

Speakman suspects that our ancient ancestors had the same system, but it has eroded over time as the threat of predators has nearly vanished. That upper boundary of body weight has now drifted higher for many people, while others maintain better self-regulation.

"In some people, it doesn't matter what environment you put them in, because they have very strong intervention points," Speakman said. "It does not seem to be driven by changes in sedentary behavior."

In the case of the vole, the feedback system seems to be triggered by the length of daylight that signifies the change of seasons, and it varies with the presence or absence of weasel feces, indicating nearby predator activity.

If we were able to determine how the system works in humans, we might be able to shift the upper boundaries back down, Speakman said.

"It could be a very powerful way to treat obesity," he said.

Provided by Cornell University