

Molecular techniques are man's new best friend in pet obesity research

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Illinois professor of animal and nutritional sciences Kelly Swanson, left, and his research team, including Maria de Godoy, recently published a study that shows how molecular biology technologies are making the mechanisms underlying the pet obesity epidemic more easily understood. Credit: L. Brian Stauffer

According to the World Health Organization, more than two-thirds of Americans are overweight or obese. And it's not just humans who are packing on the pounds. Our furry companions are plagued by an obesity



epidemic of their own. More than 50 percent of the dogs and cats in the United States are overweight or obese.

In a new paper on pet obesity in the *Journal of Animal Science*, University of Illinois professor of animal and <u>nutritional sciences</u> Kelly Swanson and his colleagues describe how nutrients and <u>biological</u> <u>compounds</u> in foods can affect gene expression in animals. Their field, called nutrigenomics, offers new insights into the why and how of companion animal obesity.

There are many reasons for the uptick in pet obesity, but they stem from the domestication of cats and dogs, Swanson said. Because most pets no longer hunt or compete for their food and do not mate – as a result of having been spayed or neutered, the typical dog or cat of today has a much smaller need for energy than the typical wild dog or cat of yesterday, he said.

When a person or an animal consumes more food than the body needs, the <u>excess energy</u> is converted into fat that is stored in adipose tissue. These fats can then be converted back to an energy source during fasting or times of food scarcity.

Adipose tissue secretes more than 50 substances known as adipokines, cell-signaling molecules that are involved in metabolism, immunity and inflammation, the authors write. Two of these adipokines, <u>leptin</u> and adiponectin, increase or decrease, respectively, within obese or insulin-resistant subjects.

The excess adipose tissue that develops in pets often leads to chronic disease and a shorter lifespan, Swanson said. While a new diet or exercise regime may help relieve some of these symptoms, a better understanding of the molecular underpinnings of pet obesity could further increase the quality of life for household animals.



"There are a lot of issues that contribute to pet obesity, but we're focusing on the animal biology side of it and trying to use some of these tools to learn things we couldn't learn in the past," he said.

New tools that allow the researchers to determine how pet obesity affects gene expression within these animals offer promising new insights. These new approaches mark a huge change from the traditional approach to studying obesity, said Maria de Godoy, a postdoctoral researcher in the Swanson lab.

"What we are trying to do is change the emphasis of how to look at obesity," she said. "Our focus is to manage obesity, but if we can, the ideal situation is to prevent it." De Godoy believes nutrigenomics are the key to unlocking the best ways to treat pet obesity.

"Pet owners see the animals just putting on weight, but metabolically speaking, there's a lot of stress on the animal (that is carrying excess weight). The genomic measures are really interesting because we can understand how they change if the animal becomes obese," de Godoy said. "We want to know at what point we can intervene and hopefully prevent the development of obesity or help the animals so that they don't have the complications that they currently do."

The paper, "Nutrigenomics: Using <u>gene expression</u> and molecular biology data to understand pet obesity," is available <u>online</u>.

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