

Reap what you sow? When it comes to exercise, benefits may differ

EurekaAlert!

ANN ARBOR—Researchers at the University of Michigan School of Kinesiology have received a \$1 million grant to study how exercise and other therapies might work differently in lean and obese individuals.

Greg Cartee, U-M professor of movement science, and his colleagues at the Muscle Biology Laboratory hope to clarify the link between insulin, exercise and sugar uptake by studying how lean and obese rats respond to exercise.

The grant comes from the National Institute of Diabetes and Digestive Kidney and Health, which has funded Cartee's research since 2006.

Exercise and insulin help our bodies sop up glucose, the main type of sugar in the blood, so muscles can use it for energy. Insulin resistance, the inability to efficiently remove sugar from the blood, can contribute to diabetes, obesity and other health problems. Efficiently clearing blood sugar after meals, a process called glucose, or sugar uptake, is critical to improving the health of obese people.

Previous research from Cartee's lab found that during a sedentary state, fibers from obese rates couldn't take up as much sugar as fibers from lean rats. With the latest grant, Cartee's team will compare responses of lean and obese rats to exercise, probing deeper into why this discrepancy in sugar uptake exists.

They hope to learn if exercise can correct the low sugar uptake in the obese group. In turn, the findings could lead to pharmaceutical interventions, and better exercise strategies and therapies to help both lean and obese people become healthier.

"We believe that even though obese and lean individuals can benefit from exercise, the precise way in which they attain these benefits may not be identical," said Cartee, who directs the Muscle Biology Laboratory. "If we can understand the differences, it will allow us to provide more effective treatments—whether exercise, diet or drug therapy—for everyone."

Most research on insulin resistance and muscle glucose uptake uses average values for glucose uptake by the entire muscle—think of a mechanic trying to understand how a car works without looking under the hood.

Cartee's novel method differs in that he and U-M doctoral student Jim MacKrell developed a way to determine sugar uptake in single cells, called fibers. The team can also classify types of fibers and measure and identify proteins that regulate uptake and metabolism of sugar.

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"It's a much better view because we expect that not every kind of fiber will respond the same way to exercise or diet, or even aging," Cartee said.

In this way, they can determine if exercise impacts lean and obese groups equally for each fiber type.

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