Research identifies protein that regulates creation of fat cells

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Biological sciences major Adam Reese may have found the key to keep fat cells from forming.

The University of Delaware junior believes he has identified the trigger that turns a stem cell into a fat cell. Located on the surface of cells, the trigger -- a protein called endoglin -- regulates what type of cell an existing stem cell will become.

Working in the UD Department of Biological Sciences' laboratory of cellular signaling and dynamics with assistant professor Anja Nohe, Reese investigates ways to combat osteoporosis. His findings may also have implications for obesity.

Patients afflicted with osteoporosis lose bone mass as they age. Bone is a dynamic tissue, constantly renewed by removal or reabsorption of old bone and formation of new bone. Through this cellular remodeling process, roughly one-fifth of an adult's skeleton is replaced each year. Of the limited treatments developed to reduce bone loss, most have potentially serious side effects, are cost prohibitive, or are difficult to use.

Reese, with the help of graduate student Joyita Dutta, found that the amount of endoglin on a cell's surface indicates whether the cell will become a fat cell or a bone cell.

"What would happen if you could make the cell stop making the protein?" Reese said. "You could affect whether or not it's even a fat cell."

If the amount of endoglin on the cell surface could be decreased, the amount of cells turning into bone would rise, leading to an increase in bone strength, thus ending osteoporosis.

"I didn't really expect it. I expected the data would be the other way around," said Nohe, Reese's undergraduate research adviser. "It's very exciting."

According to Nohe, researchers did not previously know if endoglin was the key controlling the cells' change or if it was just a marker. She believes Reese's data shows endoglin is the driver, and pinpointing that could lead to a cure.

"Now we have a target that we could hit," she said.

The next step is to pinpoint the signaling pathway the cell is using and determine how to block it.

Reese believes the same approach might work with fat cells - decreasing the amount of endoglin on the surface of fat cells could force those cells to transform into other cell types. The resulting treatments could potentially cure obesity.

The American Society for Biochemistry and Molecular Biology selected an abstract of Reese's work for its annual meeting at Experimental Biology 2012 in San Diego, a multidisciplinary scientific meeting expected to draw 14,000 scientifically-minded attendees.

Facts about osteoporosis

• Impacts 50 percent of women and 25 percent of men aged 50 plus.

• Impacts 90 percent of women and 33 percent of men aged 75 plus.

• 300,000 osteoporosis-related fractures occur each year.

• 24 percent of those patients die within one year of the fracture.

• More women die each year from osteoporosis than die from breast and ovarian cancers combined, according to the Centers for Disease Control.

Facts about obesity

• One out of every three American adults is obese.

• An obese person costs $1,429 more in health care costs per year compared to a non-obese adult, according to the National Institutes of Health.

Provided by University of Delaware