

## 'Good fat' most prevalent in thin children

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Researchers at Joslin Diabetes Center and Children's Hospital Boston have shown that a type of "good" fat known as brown fat occurs in varying amounts in children – increasing until puberty and then declining - and is most active in leaner children.

The study used PET imaging data to document children's amounts and activity of [brown fat](#), which, unlike white fat, burns energy instead of storing it. Results were published in *The Journal of Pediatrics*.

"Increasing the amount of brown fat in children may be an effective approach at combating the ever increasing rate of obesity and [diabetes](#) in children," said Aaron Cypess, MD, PhD, an assistant investigator and staff physician at Joslin and senior author of the paper.

In 2009, Cypess' team demonstrated in *The New England Journal of Medicine* for the first time that brown fat is metabolically active in adult humans. Previously, it was thought that brown fat was present only in babies and children. Their study showed it was found in between 3 and 7.5 percent of adults, with higher rates among women.

In this new study, the researchers reviewed PET scans that had been conducted on 172 children ages 5 to 21 at Children's Hospital Boston. Active brown fat was detected in 44 percent of the children, with the rate about the same for girls and boys. Children aged 13 to 15 had the highest percentage of detectable brown fat and the highest brown fat activity. But in addition, body mass index (BMI) was correlated inversely with brown fat activity, meaning that the thinnest children had the

highest brown fat activity.

While the 2009 study of adults showed brown fat was more active in cold weather, in keeping with its role of burning energy to generate heat, the new study in children showed outdoor temperature had no effect on brown fat activity.

The increase in brown fat activity from childhood to adolescence and its inverse correlation with obesity suggest brown fat may play a prominent role in pediatric metabolism, energy balance and weight regulation, the authors said.

"We believe that the ability to non-invasively evaluate brown fat activity in vivo with PET imaging provides a better understanding of its prominent role in pediatric physiology, and may possibly provide insights into the treatment of childhood obesity," said first author Laura Drubach, MD, of Children's Hospital program in Nuclear Medicine and Molecular Imaging.

Cypess said the goal is to first search for nonpharmacological ways to increase brown fat activity, perhaps by setting indoor temperatures colder in homes where obese children live. Perhaps certain foods could also play a role in increasing brown fat levels, he said. If not, the development of new drugs might be the answer, he added.

A 2010 Joslin study identified cells in mice that can be triggered to transform into brown fat.

"We might be able to combat the obesity and diabetes epidemics if we find safe ways of increasing brown fat activity," Cypess said. "This might be an additional tool in the fight."

However, he said there are still many questions to be answered. For

example, it is not known whether the relationship between BMI and brown fat is that children have more brown fat because they are thin or if having more brown fat causes [children](#) to be thin.

"That's the billion dollar question," he said. "But we do know that brown fat is a core component of pediatric and likely adult metabolism."

Provided by Joslin Diabetes Center

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