

New source of fat tissue stem cells discovered

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Researchers have found a new source of stem cells that produce fat tissue, findings presented today at the European Congress of Endocrinology in Wrocław, Poland, show. This unique in vitro human stem cell model of brown fat tissue could aid studies into how fat tissue develops and the development of new anti-obesity drugs.

There are two types of [fat tissue](#) found in humans: [white adipose tissue](#) (WAT) that accumulates lipids, and [brown adipose tissue](#) (BAT) that can burn lipids to produce heat. BAT is mainly found in babies, although recent studies show that adults may retain a small amount of BAT. BAT is considered important in obesity research as it represents a potential pathway by which the body can control metabolism by burning excess lipids to produce heat. Previously there have been no in vitro human models to aid research into BAT [tissue development](#).

A team from the University of Florence in Italy studied patients with a rare tumour called pheochromocytoma. This tumour is found in the adrenal glands and causes the release of excess levels of the hormones adrenaline and noradrenaline. The team removed tumours from eight patients and examined the fat tissue that surrounded them. They found that, in addition to the WAT present in healthy people, pheochromocytoma patients also had some tissue with molecular markers for BAT cells present.

From this tissue, the team isolated and characterized brown adipose [stem cells](#) and compared their properties to precursor WAT cells from the same patient. Using gene expression analysis, immunophenotyping and

differentiation tools, they found the two cell types had different properties, in particular in their potential to differentiate into BAT cells, thus indicating a different developmental pathway for the two types of fat cell.

"This is an exciting discovery," said Professor Michaela Luconi, who led the research. "Obesity is now a huge, worldwide health issue and we urgently need new treatment strategies to tackle it. Brown [adipose tissue](#) has long been seen as a potential target for new anti-obesity treatments as it is able to control metabolic rate and burn excess fat molecules."

"Our research has characterized the first in vitro human model for brown adipose stem cells from a novel source. Our theory is that the excess adrenaline produced by this rare tumour may have induced the expansion of the brown adipose stem cell component present in this depot of white adipose tissue. We now need to carry out further work to see if this theory is correct and whether the process can be reproduced in the lab."

The team are currently unable to produce mature BAT cells from the brown adipose stem cells, but now plan to study how they can improve this differentiation process. "This model has huge potential to allow us to learn more about how different types of fat cell develop", said Professor Luconi. "Greater understanding of this process will aid us in designing and testing specific anti-obesity drugs targeting white to brown cells conversion."

Provided by European Society of Endocrinology

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