

Adipose tissue produces cells involved in immune response

November 26 2010

French researchers from CNRS and the Universite Paul Sabatier have demonstrated the existence, in adipose tissue, of stem cells similar to those found in bone marrow. These cells are capable of differentiating into mast cells, i.e. immune cells involved, in particular, in allergic and inflammatory responses. It was previously thought that mast cells were only produced in bone marrow. This study, published in the journal *Stem Cells*, paves the way for an as yet unexplored field of investigation on the role of adipose tissue in immune response and could lead to new therapeutic applications.

Far from being a mere reservoir of fat, adipose tissue plays an important role in the <u>metabolism</u>. Numerous studies have shown that white adipose tissue harbors cells that are present in the blood, such as macrophages or lymphocytes. These cells, known as hematopoietic cells, account for 20% of the cells in white adipose tissue. Until now, it was believed that they were produced in bone marrow, where they differentiated from <u>stem cells</u>.

A team from the Laboratoire Metabolisme, Plasticite et Mitochondries has now shown that some of these cells, namely mast cells, whose role appears increasingly important in <u>immune response</u>, are produced in adipose tissue in mice. The Toulouse-based research team isolated a population of hematopoietic stem cells in adipose tissue capable of differentiating into mast cells. The researchers then re-injected these hematopoietic stem cells into the blood of mice models, along with stem cells derived from bone marrow, thereby placing them in competition.



The result was that mast cells from tissues such as the intestine or the skin thereafter mostly derived from <u>hematopoietic stem cells</u> from adipose tissue. The biologists found that adipose tissue-derived stem cells are capable of colonizing peripheral organs (tissues other than <u>bone marrow</u>) and differentiating within such organs into mature and functional mast cells.

If these results are reproduced in humans, they will open new therapeutic avenues for treating immune diseases such as obesity, diabetes, atherosclerosis, osteoarthritis, etc., as well as allergic diseases. In fact, mast cells are omnipresent in immune response. It is now known that they play a much more extensive role than was previously thought. They are involved both in the innate immune response (triggered by an inflammation caused by a virus or a bacterium) and in what is termed adaptive immune response (i.e. they are capable of presenting antigens to T lymphocytes, which then produce antibodies). Adipose tissue, which constitutes between 10 and 50% of an adult individual's weight, could be an important source of mast cells in humans and could thus become an interesting target for the treatment of hematopoietic and immune diseases involving <u>mast cells</u>.

More information: Adipose Tissue as a Dedicated Reservoir of Functional Mast Cell Progenitors, Sandrine Poglio, et al. *Stem Cel*l, Volume 28, Issue 11 (November issue, published on the 22 November 2010).

Provided by CNRS

Citation: Adipose tissue produces cells involved in immune response (2010, November 26) retrieved 28 April 2024 from https://phys.org/news/2010-11-adipose-tissue-cells-involved-immune.html



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