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Surprising Origin of Brown Fat Could Have Implications for Treating Obesity

Brown fat and muscle cells come from one lineage; white fat cells come from another.

White fat cells produce and liberate fatty acids as a source of energy when nutritional intake is low. Brown fat cells, in contrast, play an important role in oxidizing fatty acids to produce heat. Stated more simply, white fat cells produce fat, and brown fat cells burn fat. In principle, increasing the ratio of brown fat cells to white fat cells could increase energy expenditure and help to reduce obesity.

White fat cells can turn into brown fat cells, but whether this is the primary way that brown fat cells are created has been unclear. In a new study from Harvard Medical School, researchers found that the primary source of brown fat cells is precursor cells that can turn into either brown fat cells or skeletal muscle cells. These precursor cells express a particular gene (*Myf5*, which was thought to be expressed only in muscle precursors); whether the precursor cell becomes a brown fat or a muscle cell is determined by whether a single molecule (PRDM16) is present. Indeed, PRDM16 can even transform muscle cells into brown fat cells by binding to another oft-studied molecule, peroxisome-proliferator-activated receptor (PPAR)-γ.

Comment: This basic research identifies key molecules that could be used to amplify the number of brown fat cells. At present, the clinical implications of these new biological discoveries are unclear, but they could lead to a novel approach to treating obese patients someday.

— ***Anthony L. Komaroff, MD***

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Seale P et al. PRDM16 controls a brown fat/skeletal muscle switch. *Nature* 2008 Aug 21; 454:961.

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