DISTINCT ORIGINS OF BROWN AND WHITE ADIPOSE TISSUES

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The apparent similarity of all adipose tissues in the body has classically led to the opinion that they were all of the same origin and that it was mainly external factors that influenced their appearance, most conspicuously to becoming either white or brown adipose tissue. Recent developments have, however, led to the new contention that there are at least two (or three) basic cell types that constitute adipose tissues, and that even more subdivisions may exist; it would e.g. seem that even classical white adipose tissue displays different properties related to its location in the body (subcutaneously or visceral, e.g.).

However, it is mainly in relation to the distinction between the metabolically rather passive white adipose tissue and the thermogenic brown adipose tissue that clearcut alterations in our views have occurred. It is now generally accepted that classical brown-fat cells (as found e.g. in the interscapular area) derive from stem cells that also give rise to dermis cells and particularly to muscle cells - but not to white-fat cells. Different markers, both coding mRNAs and microRNAs, and experimental manipulations support this; these cells may considered to be adipomyocytes. The origin of white-fat cells is more enigmatic, and particularly unsolved is the question whether the white adipose tissue depots contain two types of cells: some that can display a multilocular brown-fat-cell-like appearance (and thus be thermogenic) and some that cannot display this phenotype. The former cells do not derive from the same stem cells as do the classical brown-fat cells. It may even be that the brown adipose tissue depots are composed of two types of cells that both have the ability to express UCP1.

The unexpected muscular-like origin of the bona fide brown-fat cells may be said to make their acquisition of a thermogenic potential more understandable.