Brown Fat

White adipose tissue (WAT) is what is referred to as "body fat"--when total energy intake exceeds total energy expended (Fenzl & Kiefer, 2014). Brown adipose tissue (BAT or "brown fat") thermogenic metabolism (also referred to as non-shivering thermogenesis, NST) involves uncoupled respiration aided by the presence of a special protein called uncoupling protein-1 (UCP1 or Thermogenin) to produce heat and increased fatty acid oxidation (Fenzl & Kiefer, 2014; Heuberger, 2014; Virtue & Vidal-Puig, 2013).

WAT is an insulator and protector of organs, but excessive expansion of WAT is linked to inflammation, insulin resistance, and type 2 diabetes (Fenzl & Kiefer, 2014). BAT aids in core temperature maintenance (Fenzl & Kiefer, 2014).

BAT was first discovered in hibernating mammals and human infants, but recently was also found in human adults via fluor-deoxy-glucose positron emission tomography (Fenzl & Kiefer, 2014). BAT can also "emerge" (called "beiging" or "browning") from WAT depots as a response to prolonged exposure to cold (and cold weather exercise) (Fenzl & Kiefer, 2014).

BAT has the highest metabolic rate, and understanding BAT could potentially help in better understanding the obesity problem (Virtue & Vidal-Puig, 2013). The study by Yakushkin et al. (2014) tried to stimulate BAT via "beiging", but their results were inconclusive. The study and understanding of BAT is still in its infancy, but the potential is there to further our understanding and to win the battle against obesity.

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