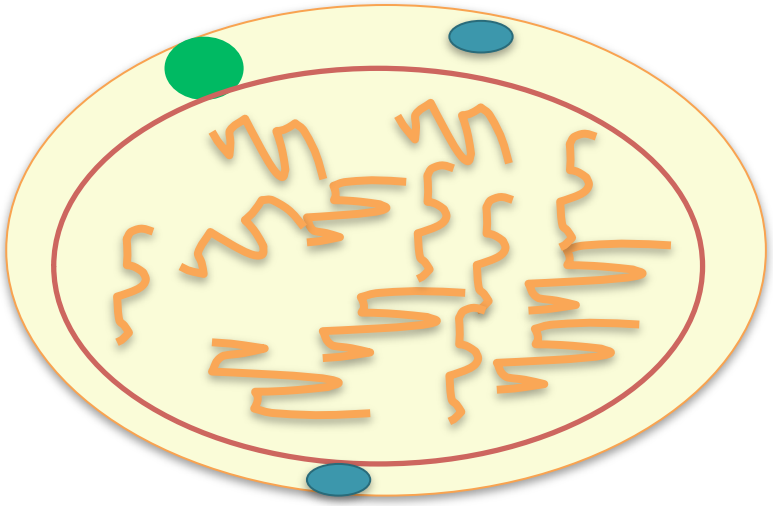
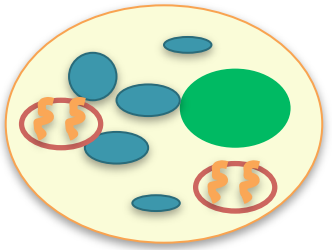
White Fat

Brown Fat





Cell

Mitochondria

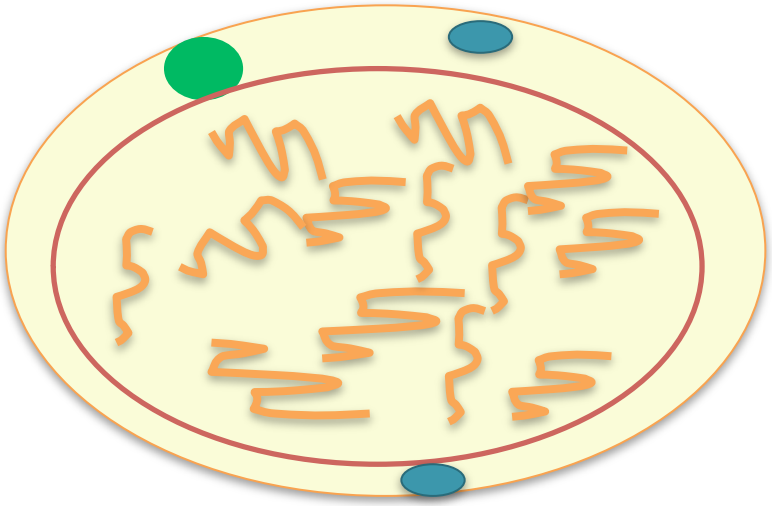
lipid vacuole

Cholesterol/
triglyceride

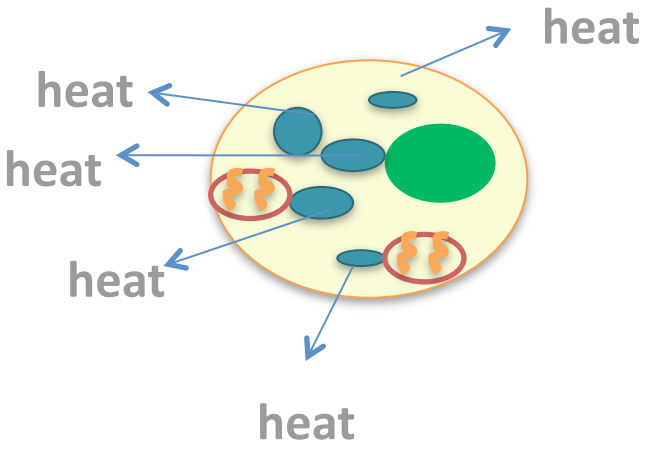
Nucleus

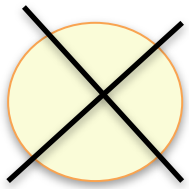
Cold<50°F

White Fat



Brown Fat





Cell

Cholesterol/ triglyceride

Freezes in large lipid vacuole

Leads to cell death

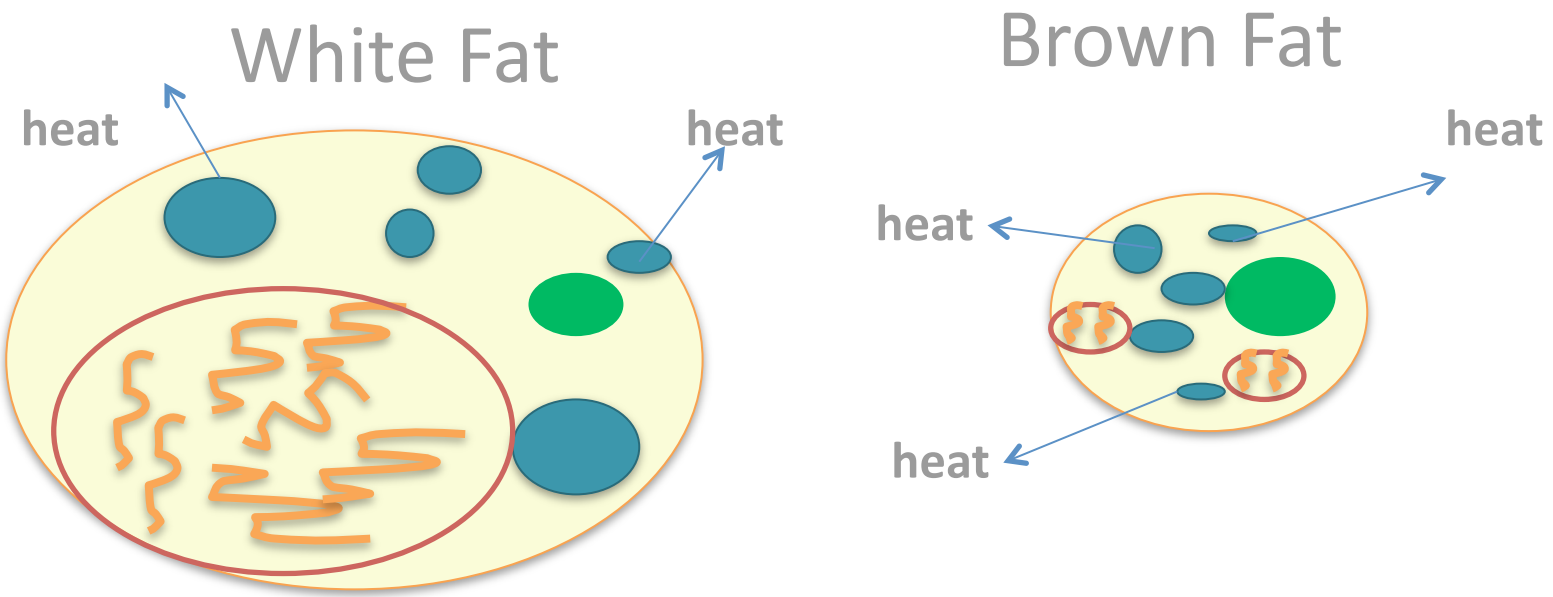
Mitochondria

activated

Burn lots of Calories

Nucleus

Transdifferentiation *(temperature threshold unknown)*



If some population of white fat cells don't die either because there is not enough cholesterol to freeze the cell or thermal accumulation of sufficiently cold temperatures are not reached then some of these cells have the capacity to transdifferentiate to brown fat cells. *(In other words – the white fat cells closer to the skin will get colder and die— the ones deeper into the skin might not get as cold — but as some of them have the capacity to transdifferentiate into brown fat (i.e. become more like brown fat and gain more mitochondria). Brown fat burns more calories and is SMALLER!)*

- The lipid droplets in adipose tissue can be **unilocular and/or multilocular**. Unilocular cells contain a single large lipid droplet which pushes the cell nucleus against the plasma membrane, giving the cell a signet-ring shape
- **Unilocular cells →** white adipose tissue, range in size from 25 to 200 microns.
  - Approximately 60 to 85% of the weight of white adipose tissue is lipid, with 90-99% being triglyceride. Small amounts of free fatty acids, diglyceride, cholesterol, phospholipid and minute quantities of cholesterol ester and monoglyceride are also present.
- **Multilocular cells**- → brown adipose tissue, contain many smaller lipid droplets. These cell are smaller in diameter, approximatlly 60 microns.
  - The brown color of this tissue is derived from the cells' rich vascularization and densely packed mitochondria.