Activity – Therapeutic potential of brown adipose tissue

This activity is a bit different from the rest. Now that you know about white and brown adipose tissue, it's time to think about how this knowledge could be applied to **treat human disease**.

Exploiting brown adipose tissue therapeutically

This review explains a bit more about human BAT and how it could be used to treat human disease: http://www.sciencedirect.com/science/article/pii/S1550413110000781

Here are some facts about the human condition of **obesity.**

- Patients who are obese are massively overweight. They have **a huge amount of extra energy stored in their white adipose tissue** that they will likely never use up.
- Patients who are obese are at a **greater risk** of developing the following problems:
    - **Type 2 diabetes**: the inability to control blood sugar levels, resulting in abnormally high levels of sugar in the blood.
    - **Hyperlipidaemia**: abnormally high levels of fat in the blood.
    - **High blood pressure:** can be caused by **atherosclerosis**, the accumulation of fat on the inside walls of arteries. This decreases the diameter of the artery and forces the heart to pump harder to force blood through the narrower space.

1. Can you think of some ways that increasing brown adipose tissue activity and heat production in obese patients could help them get healthier?

2. Knowing what you know about how the brain regulates brown adipose tissue thermogenesis, how could you "switch on" an obese patient's brown adipose tissue? If you were to design a drug that could do this, what would you want this drug to do? How could a drug mimic some aspects of the normal response to feeling cold?

3. Are there any problems with your strategies to "switch on" an obese patient's brown adipose tissue?

See what this article says about the relationship between how active a person's brown adipose tissue is, and their age and their weight:
http://circ.ahajournals.org/content/125/22/2782.long