THE ADSTOCK SCIENCE CLUB

Gunpowder, waistlines and Richard III: the adventures of mitochondria

Talk by Prof. John Clapham – University of Buckingham

Energy is something we all need, some of us more than others. We all know that we get that energy by eating food, unless you're into Red Bull in a big way. But have you ever wondered how that energy is stored and utilised in your body and what effect it can have if you get too much of it. In our first talk of 2016, "Gunpowder, waistlines and Richard III: the adventures of mitochondria", Professor John Clapham, of Buckingham University explained how specialised structures, called mitochondria, within every cell of your body are able to convert energy contained in the food you eat into a chemical called Adenosine triphosphate, ATP. ATP is used for storing, transporting and delivering energy, in the form of chemical bonds, to where it is needed within the cell. ATP is created within an amazing molecular machine called ATP Synthase which can be thought of as a microscopic water wheel, but instead of water being used to turn the wheel, a source of protons are used to spin this wheel at a rate that would make you quite dizzy, over one million times a second, creating over ten million molecules of ATP every second for every molecule of ATP Synthase in your body. It's mind blowing.

John then went on to explain how this mechanism is involved with your metabolism, diabetes, dieting and how some weight loss drugs used can cause serious damage to mitochondria, making cells within the body burn sugar at uncontrollable rates causing serious damage.

During WW1 a chemical contained in certain types of explosives was found to cause munitions workers to lose a lot of weight rather quickly, and this was later synthesised and used to make a weight loss drug called DNP or dinitrophenol. This has been used by slimmers, body builders, and athletes and in a number of high profile cases has proved fatal. Even though it was made illegal to sell for human consumption it is still available over the Internet. Although the government has classified DNP as "unsafe", and advised the public that it cannot be used in food or safely consumed, the Home Office has said it cannot be classified as a class C drug, which would make its possession a criminal offence.

Lastly, John explained how it is possible that the recent discovery of a deformed skeleton under a car park in Leicester may not in fact be the body of Richard III, as is currently believed. The physical evidence seems to point to it being so, although not 100% conclusively. However, if mitochondrial DNA evidence were able to be taken into consideration this may conceivably overturn current thinking. Unfortunately this would require the exhumation of a few previous members of our royalty. Just think of the mayhem this would cause. Probably never going to happen!

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