

Researchers find dinosaur clues in fat

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A team of researchers at New York Medical College has discovered why birds, unlike mammals, lack a tissue that is specialized to generate heat. A paper published April 21, 2008 in the online peer-reviewed journal *BMC Biology* contains the surprising implication that the same lack of heat-generating tissue may have contributed to the extinction of dinosaurs.

Source: New York Medical College

The paper, "The brown adipocyte differentiation pathway in birds: an evolutionary road not taken," was written by Stuart A. Newman, Ph.D., professor of cell biology and anatomy, Nadejda Mezentseva, a Ph.D. candidate at New York Medical College, and Jaliya Kumaratilake, Ph.D., University of Adelaide, Australia.

Humans, like all mammals, have two kinds of adipose tissue, white fat and brown fat. White fat is used for storing energy-rich fuels, while brown fat generates heat. Hibernating bears have a lot of brown fat, as do human infants, who have much more than adults, relative to their body size. Infants' brown fat protects them from hypothermia. Clinicians would like to find ways of making adult white fat behave more like brown fat so that we could burn, rather than store, energy.

While most mammals have a key gene called UCP1, which is responsible for the heat-generation function of brown fat, birds do not. The researchers found they could induce a specific type of stem cell in chicken embryos to produce differentiated cells that are structured and behave like brown fat. These chicken cells can even activate a UCP1 gene if presented with one from a mouse.

The ability to produce brown fat evolved in a common ancestor of birds and mammals, but the ability to generate heat was lost in the group that gave rise to birds and lizards after it separated from the mammalian lineage (the researchers found the lizard genome similarly lacks a UCP1 gene). This strongly implies that dinosaurs, which diverged from birds even later than lizards, also lacked brown fat.

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