

TP04 Dinosaurs are endotherms

2022/09/22



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阅读材料

Endotherms are animals such as modern birds and mammals that keep their body temperatures constant. For instance, humans are endotherms and maintain an internal temperature of 37°C, no matter whether the environment is warm or cold. Because dinosaurs were reptiles, and modern reptiles are not endotherms, it was long assumed that dinosaurs were not endotherms. However, dinosaurs differ in many ways from modern reptiles, and there is now considerable evidence that dinosaurs were, in fact, endotherms.

Polar dinosaurs

One reason for believing that dinosaurs were endotherms is that dinosaur fossils have been discovered in Polar Regions. Only animals that can maintain a temperature well above that of the surrounding environment could be active in such cold climates.

Leg position and movement

There is a connection between endotherms and the position and movement of the legs. The physiology of endotherms allows sustained physical activity, such as running. But running is efficient only if an animal's legs are positioned underneath its body, not at the body's side, as they are for crocodiles and many lizards. The legs of all modern endotherms are underneath the body, and so were the legs of dinosaurs. This strongly suggests that dinosaurs were endotherms.

Haversian canals

There is also a connection between endotherms and bone structure. The bones of endotherms usually include structures called Haversian canals. These canals house nerves and blood vessels that allow the living animal to grow quickly, and rapid body growth is in fact a characteristic of endotherms. The presence of Haversian canals in bone is a strong indicator that the animal is an endotherm, and fossilized bones of dinosaurs are usually dense with Haversian canals.

听力材料

Now listen to part of a lecture on the topic you just read about.

Many scientists have problems with the arguments you read in the passage. They don't think those arguments prove that dinosaurs were endotherms EN-duh-therms.

Take the polar dinosaur argument. When dinosaurs lived, even the polar regions where dinosaur fossils have been found were much warmer than today—warm enough during part of the year for animals that were not endotherms to live. And during the months when the polar regions were cold, the so-called polar dinosaurs could have migrated to warmer areas or hibernated like many modern reptiles do. So the presence of dinosaur fossils in polar regions doesn't prove the dinosaurs were endotherms.

Well, what about the fact that dinosaurs had their legs placed under their bodies, not out to the side, like a crocodile's? That doesn't necessarily mean dinosaurs were high-energy endotherms built for running. There's another explanation for having legs under the body: this body structure supports

more weight. So with the legs under their bodies, dinosaurs could grow to a very large size. Being large had advantages for dinosaurs, so we don't need the idea of endothermy and running to explain why dinosaurs evolved to have their legs under their bodies.

OK, so how about bone structure? Many dinosaur bones do have Haversian huh-VER-zhun canals, that's true, but dinosaur bones also have growth rings. Growth rings are a thickening of the bone that indicates periods of time when the dinosaurs weren't rapidly growing. These growth rings are evidence that dinosaurs stopped growing or grew more slowly during cooler periods. This pattern of periodic growth—ya know, rapid growth followed by no growth or slow growth and then rapid growth again—is characteristic of animals that are not endotherms. Animals that maintain a constant body temperature year round, as true endotherms do, grow rapidly even when the environment becomes cool.

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