



ScienceWatch – The Lighter Side of *T. Rex*

A new fossil find from about a 135 million years ago, consisting of an almost complete skeleton and parts of two others, provides further support for the hypothesis, favored by most, but not all scientists, that modern birds evolved from small, fast running dinosaurs. The fossil, dubbed *Dilong paradoxus*, was found in China and is described in the October 7, 2004 issue of *Science* by Xing Xu and his colleagues at the Chinese Academy of Sciences in Beijing and Mark Norell of the American Museum of Natural History in New York.

Dilong means emperor dragon in Chinese and *paradoxus* refers to a surprising characteristic. While features of the skull clearly place it in the tyrannosaurid group, which led to the huge *Tyrannosaurus rex* 65 million years later, this five-foot long tyrannosaur has small filaments seen emanating from its tail and lower jaw, which the authors say are protofeathers. Similar filaments associated with another theropod fossil, *Sinornithosaurus* discovered in 1999, have been interpreted as precursors to modern feathers. Several other dinosaur fossils have been found with feathery coats. However, this is the first evidence of feathers being present in the tyrannosaurid group. Evidence of the so-called protofeathers is hard to find because feathers quickly decay in oxygen. These specimens were apparently quickly covered by fine volcanic ash, which helped to preserve the delicate filaments.

Several theories seek to explain the origin of feathers. Since the earliest feathers couldn't be functional for flight, scientists have suggested several possible early uses. Among these are: insulation, mating displays, camouflage and species recognition. In an interview, Norell and Xu suggested that *Dilong paradoxus* was entirely covered with the filaments and said this supported the idea that early feathers were used in smaller animals that needed them for heat insulation. Once they achieved greater size, like *T. rex*, they lost that need and the feathers disappeared, akin to modern elephants losing their mammalian hair.

Could even larger tyrannosaur fossils with protofeathers be discovered? Unlikely, but the authors speculated that at some early stage in their life larger tyrannosaurs could have had a downy coat of protofeathers, which they shed in adulthood. And besides, you do remember Dumbo the flying elephant.

Saul Scheinbach