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Newly found species reveals how *T. rex* became king of dinosaurs

The remains of a new species of horse-sized dinosaur reveal how *Tyrannosaurus rex* became one of Earth's top predators, a study suggests.

The discovery unearthed in Uzbekistan provides key insights into how a family of small-bodied dinosaurs evolved over millions of years to become fearsome giants.

The study shows that the dinosaurs – known as tyrannosaurs – developed huge body sizes rapidly right at the end of the age of dinosaurs, and that their keen senses, which evolved earlier in much smaller species, enabled them to climb to the top of the prehistoric food chain.

Until now, little was known about how tyrannosaurs became the giant, intelligent predators that dominated the landscape around 66 million years ago.

The newly discovered species – named *Timurlengia euotica* – lived about 90 million years ago, the team says. It fills a 20 million year gap in the fossil record of tyrannosaurs, and provides key insights into how the family evolved.

A team of palaeontologists, led by researchers at the University of Edinburgh, studied a collection of tyrannosaur fossils found in the Kyzylkum Desert, northern Uzbekistan.

The species' skull was much smaller than that of *T. rex*, indicating that it did not grow to the same enormous size. However, key features of *Timurlengia*'s skull reveal that its brain and senses were already highly developed, the team says.

Timurlengia was about the size of a horse, and could weigh up to 250kg. It had long legs and a skull studded with sharp teeth, and was likely a fast runner, researchers say.

The first tyrannosaurs lived around 170 million years ago and were only slightly larger than a human. However, by the late Cretaceous Period – around 100 million years later – tyrannosaurs had evolved into animals like *T. rex* and *Albertosaurus*, which could weigh more than 7 tonnes.

The fact that the new species was still small some 80 million years after tyrannosaurs first appeared indicates that huge size developed only at the very end of the group's evolutionary history, the team says.

The study, published in the journal *Proceedings of the National Academy of Sciences*, was funded by the European Commission, National Science Foundation, National Geographic Society and the Russian Scientific Fund Project. The work was carried out in collaboration with researchers at the Russian Academy of Sciences, Saint Petersburg State University and the National Museum of Natural History, Smithsonian Institution, US.

Dr Steve Brusatte, of the University of Edinburgh's School of GeoSciences, who led the study, said: "The ancestors of *T. rex* would have looked a whole lot like *Timurlengia*, a horse-sized hunter with a big brain and keen hearing that would put us to shame. Only after these ancestral tyrannosaurs evolved their clever brains and sharp senses did they grow into the colossal sizes of *T. rex*. Tyrannosaurs had to get smart before they got big."

Professor Hans Sues, of the National Museum of Natural History, Smithsonian Institution, said: "Timurlengia was a nimble pursuit hunter with slender, blade-like teeth suitable for slicing through meat. It probably preyed on the various large plant-eaters, especially early duck-billed dinosaurs, which shared its world."

Professor Alexander Averianov, of Saint Petersburg State University, said: "The middle Cretaceous is a mysterious time in evolution because fossils of land-living animals from this time are known from very few places. Uzbekistan is one of these places. The early evolution of many groups like tyrannosaurs took place in the coastal plains of central Asia in the mid Cretaceous."

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