

## Dinosaur Found in Mammal's Belly

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for [National Geographic News](#)

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Early mammals were not only bigger than previously thought—some were carnivores and hunted small dinosaurs for dinner.

Scientists in China have uncovered the fossil remains of two mammals that lived around 130 million years ago. The finds will revolutionize current thinking about life during the Mesozoic era (248 million to 65 million years ago), a time when both dinosaurs and mammals arose.

One incredibly well-preserved fossil—of an early mammal known as *Repenomamus robustus*—had the remains of a small dinosaur in its belly. It is the first evidence that mammals dined on dinosaurs.

The second fossil find, named *Repenomamus giganticus*, is 50 percent larger than *R. robustus*. Until now *R. robustus* was the largest known mammal of the Mesozoic era.

The discoveries, uncovered in the rich dinosaur fossil beds of China's Liaoning Province, provide the first hard evidence that Mesozoic mammals were more than the rat-size plant- and insect-eating creatures that they have long been portrayed to be.

"The size of *R. giganticus* challenges the conventional idea that mammals during the Mesozoic were very small, probably nocturnal, and living in the shadow of the dinosaurs and other reptiles," said Yaoming Hu. Hu is a researcher affiliated with the Institute of Vertebrate Paleontology and Paleoanthropology in Beijing, China, and the American Museum of Natural History in New York City.

"This new evidence of larger size and predatory, carnivorous behavior in early mammals is giving us a drastically new picture of many of the animals that lived in the age of dinosaurs," said Jin Meng, associate curator in the division of paleontology at the American Museum of Natural History.

Hu, Meng, and colleagues published their findings in the January 13 issue of the journal *Nature*.

### Bigger, Badder Carnivorous Mammals

The *R. giganticus* fossil is that of a young adult that weighed about 30 pounds (14 kilograms) and was more than 3 feet (1 meter) long. It had a chunky body, relatively short legs, front teeth that were both large and sharp, and a long tail.

At roughly the size and shape of a small- to medium-size modern-day dog, this early mammal might not sound terribly big or threatening.

"That's because people have a skewed view of what size a mammal is because we're bigger than most living mammals," said Anne Weil, a paleontologist at Duke University. "At 30 pounds, *R. giganticus* was larger than most species of living mammals."

Of the approximately 4,600 living mammal species currently identified, more than a third are rodents, and more than 23 percent are bats.

"*R. giganticus* was a squat, powerful mammal with large fangy front teeth," Weil said. "And believe me, it's not something you'd like to have hold of your leg."

The two early mammal species were probably predators, not scavengers, say the scientists. Their teeth were large and pointy, and their jaw musculature was strong. This suggests that they were capable of capturing, holding, and ripping apart their prey. The juvenile *Psittacosaurus* dinosaur found in the stomach of the *R. robustus* fossil looked to have been dismembered and swallowed in chunks, rather than chewed.

The *Psittacosaurus* dinosaur was a two-legged plant eater with a beak like a parrot's and four grasping fingers. *R. robustus* almost certainly preyed on only the young, injured, or old *Psittacosauruses*. That's because *Psittacosauruses* grew to be as tall as six feet (two meters).

Whether small dinosaurs were a special treat, a ready snack, or a mainstay of the *R. robustus*'s diet is unknown.

"There's no evidence to indicate whether these larger mammals were occasional hunters or habitual hunters," said Hu, who is the lead author of the study.

The fossil of the mammal that ate the dinosaur is so well preserved that scientists were able to examine the teeth of the *Psittacosaurus* found in the mammal's belly. The fact that there were teeth, and that they showed wear, indicated that the dinosaur was not eaten as an embryo in the egg. Measurements suggest the dinosaur was about one-third the size of the *R. robustus* that ate it.

"One presumes the larger species [*R. giganticus*] could eat larger, although still not huge animals," said Weil, who wrote a commentary on the findings in this week's *Nature*. "Modern mammals that weigh that amount prey on animals about half their size."

### **Rethinking the Mesozoic**

As little as two decades ago, schools taught that the dinosaurs ruled the Earth from 248 million years ago until some still-unknown catastrophic event caused their extinction around 65 million years ago. Mammals also evolved during this period. But since they were unable to compete for food or territory, they stayed tiny.

A catastrophe—such as an asteroid collision—is widely believed to have wiped out the supersize dinosaurs and ushered in the "age of the mammals." Mammals were not thought to have grown much bigger than rats until after the dinosaurs were gone.

Over the past several years, though, sketchy evidence has emerged that suggests that some mammal species may have grown larger during the dinosaur age.

"Up until now the evidence was extremely fragmentary; a tooth here, part of a skull there," Weil said. "Of course you can tell by a tooth that the animal was larger than a rat, but you can't really estimate body weight, which is the more important factor."

The finds in the geological strata known as the Yixian formation in Liaoning provide the first clear-cut confirmation that some mammal species grew larger than their cousins elsewhere. *Why* is another question.

"People have speculated as to why mammals in this locality are so much larger," Hu said. "Some people say it is probably because the dinosaurs here are relatively small. In any particular ecological system, there is competition for food and territory between some members of the system. If the dinosaurs are not so large, the mammals might have a chance to evolve and become larger. It's all just speculation at this point."

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