New beast usurps *T. rex* as king carnivore

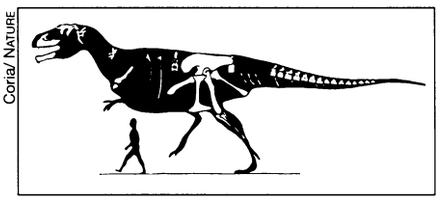
In the wilds of northwestern Patagonia, they grow their dinosaurs big. Six years ago, Argentine paleontologists discovered remains of what may be the largest dinosaur ever known, a plant-eating behemoth named, appropriately, *Argentinosaurus.* Now, they have found the perfect counterpart: the world's largest meat-eating dinosaur.

Rodolfo A. Coria of the Carmen Funes Museum in Plaza Huincul and Leonardo Salgado of the National University of Comahue in Neuquén have named the toothy beast *Giganotosaurus carolinii.* The bipedal animal reached a length of roughly 13 meters and tipped the scales at an estimated 9 tons, edging out the infamous *Tyrannosaurus rex* by a meter in length and some 3 tons in weight, says Coria.

"We compared it to the biggest *T. rex* known, a specimen known as Sue. I think it was much heavier and ran slower than *T. rex,*" Coria told SCIENCE NEWS. He and Salgado describe the animal in the Sept. 21 NATURE.

The 100-million-year-old *Giganotosaurus* was not closely related to *T. rex,* which lived 65 million years ago in North America. During the Cretaceous period, South America had no land connection to North America and had started to split off from Africa, circumstances that allowed its dinosaurs to evolve independently.

Whereas *T. rex* had developed a specialized skull, forelimbs, and pelvis, *Giganotosaurus* retained the more generalized features of its forebears, says Coria. It may have resembled an oversized version of the well-known North American genus *Allosaurus.*



Reconstruction of giant Argentine dinosaur, based on known skeletal fragments (white).

"The new find is adding information to our understanding of the late Cretaceous dinosaur faunas, and we have had a very North-America-centric view of what dinosaur life was like in the Cretaceous," says paleontologist Paul C. Sereno of the University of Chicago.

Giganotosaurus is one of a string of newfound carnivorous dinosaurs, or theropods. Last year, Sereno described an 8.2-meter-long early Cretaceous theropod from the Sahara Desert of Niger (SN: 10/15/94, p.245). This year, he discovered two late-Cretaceous theropods from the Moroccan Sahara. The larger one approached *T. rex* in size but probably did not equal *Giganotosaurus.*

The emerging theropods are forcing paleontologists to revise theories about how dinosaurs evolved in the separated Cretaceous lands. "These discoveries in South America, Africa, and other places are showing us there was quite a diversity of things happening on these continents. Now we have completely independent, huge predators that are competing with *T. rex* as the largest theropods," says Sereno. *— R. Monastersky*

How vitamin K helps prevent hemorrhaging

Vitamin K, the blood-clotting vitamin, bears that nickname for good reason. A deficiency of this naturally occurring nutrient, though rare in well-fed societies, can cause hemorrhaging.

This observation prompts pediatricians to give newborns a healthy shot of vitamin K to lower the 1 percent risk of spontaneous bleeding they would otherwise face.

How does vitamin K work?

Until recently, no one has been quite certain. Now, researchers explain how the nutrient helps blood clot normally.

Paul Dowd, a chemist at the University of Pittsburgh, and his colleagues describe how an energy transfer mechanism in vitamin K enables it to trigger coagulation. In the Sept. 22 SCIENCE, Dowd's group details the vitamin's use of oxygen and carbon dioxide to liberate energy that, in turn, affects clot-inducing proteins, setting in motion a "blood-clotting cascade."

"Since vitamin K lies at the heart of blood coagulation, which heals injuries but also causes heart attacks and strokes," Dowd says, "the key question is: How can someone preserve the blood's injury-healing abilities yet stop unwanted internal clots?

"That question drives most of the research into vitamin K's biochemistry."

Since the discovery of vitamin K in 1929, researchers have sought a deeper understanding of its chemical mechanisms in order to further its clinical use, says Robert E. Olson, a biochemist at the University of South Florida in Tampa. Vitamin K, one of four fat-soluble vitamins, is essential to human health.

"We knew that oxygen combined with vitamin K, but we weren't sure exactly how," Olson says. "That's what Dowd has now clarified." *— R. Lipkin*

Meteorite hints at pounding of planets

Nearly 4 billion years ago, a fusillade of debris clobbered the moon. Samples from the heavily cratered lunar highlands attest to an intense battering at that time, perhaps by stray fragments of an asteroid. Planetary scientists have assumed that this bombardment represented a solar-system-wide event, not a strictly local sideshow. But they lacked convincing proof.

Now, a detailed analysis of argon in the oldest identified meteorite of Martian origin suggests that the Red Planet suffered a similar pounding. Moreover, much of the solar system probably took a hit, says Grenville Turner of the University of Manchester in England. He and his Manchester colleagues Richard A. Ash and Stephen F. Knott presented their findings last week at the annual meeting of the Meteoritical Society in Washington, D.C.

The researchers measured the ratio of two isotopes, argon-39 and argon-40, in the meteorite ALH84001, recently shown to have come from ancient Martian crust (SN: 3/25/95, p.180). Argon, an inert gas, does not bind chemically to material in the meteorite and would have escaped easily if the rock grew hot during a catastrophic impact. The team's measurements show that a significant amount of argon left the meteorite 4 billion years ago, when it was still part of Mars—around the same time that debris pelted the moon.

The finding, Turner says, "provides the earliest evidence from Mars in support of the view that the... bombardment was a widespread event." But he notes that the final answer will require scientists to date the cratered Martian highlands.

Robert N. Clayton of the University of Chicago notes that argon might have leaked out of the meteorite slowly rather than all at once, as it would have done during a collision. But by measuring both argon isotopes, the team appears to have ruled out this possibility, he says.

Clayton adds that another meteorite, identified earlier this year as Martian, may shed further light on the bombardment. Keizo Yanai of Iwate University in Morioka, Japan, reported last week that the meteorite, Y-793605, ranks as the only known Martian fragment consisting of an amalgam of broken bits of different rocks. This object could have formed when debris struck Mars, heating and fusing the pieces.

No one knows the age of Y-793605 yet. But if it turns out to be as old as ALH84001, its structure could support the notion that Mars, as well as the moon, took a beating soon after the solar system formed, Clayton says. *— R. Cowen*