688
10 years after the spotted owl

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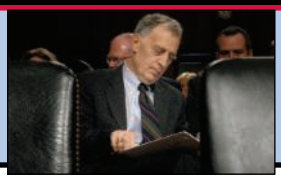
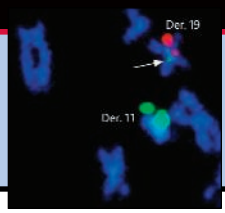
Academy chief in the spotlight





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A new genome project

with Fanconi's anemia, for example, had a single menstrual period and then entered menopause at age 12. After receiving a bone marrow transplant from a sibling, Tilly says, her periods resumed, and she later gave birth to two children.

Although genetic tests of patients and their children might answer the question, Tilly says, they would be ethically problematic. And such cases wouldn't necessarily be easy to detect, he says, because bone marrow donors are often siblings.

Even if the new oocytes can't be fertilized, Tilly says, they may nevertheless enhance a woman's fertility. He speculates that they may function as "drone oocytes" that keep the ovary functioning to support the original "queen" oocytes set aside for procreation. If so, he says, the results open new possibilities for preserving or restoring the fertility of young cancer patients and might even provide a way to postpone menopause.

But until the team produces mice that can be traced without a doubt to a bone marrow donor, scientists are likely to remain wary. "The experiments will have a stimulating effect on the field," says Hans Schöler of the Max Planck Institute for Molecular Biomedicine in Münster, Germany, "even if they stir quite some controversy." **–Gretchen Vogel**

PALEONTOLOGY

Dinosaur Embryos Hint at Evolution of Giants

Paleontologists have long assumed that giant dinosaurs called sauropods, like all other dinosaurs, evolved from smallish bipedal ancestors and dropped down on all fours only as their bodies grew too large to be carried on two feet. But when they examined a pair of embryos dug up about 30 years ago—the oldest fossilized dinosaur embryos so far discovered—they got a surprise. As described on page 761 by Robert Reisz of the University of Toronto's Mississauga campus in Canada and colleagues, the embryos suggest that sauropods were already quadrupedal even as smaller creatures. "This would be significant because it means we might have to re-evaluate the origin of many features in sauropod skeletons we assumed had to do with weight support," says Matthew Bonnan of Western Illinois University in Macomb.

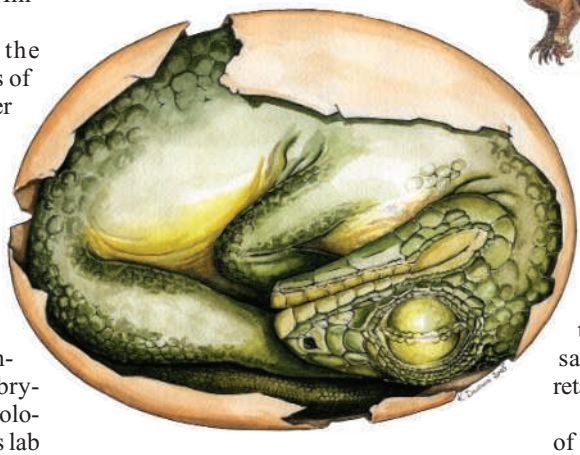
The clues are indirect, because the embryos are not sauropods but members of their closest kin, a group of much smaller herbivores called the prosauropods. Paleontologists found them inside remarkably well-preserved eggs of a 5-meter-long animal called *Massosponodylus*, which 190 million years ago roamed the floodplains of what is now South Africa. "It's a really cool discovery," says Kristi Curry Rogers of the Science Museum of Minnesota. The eggs clearly contained embryonic bones, but only recently did paleontologists dare to prepare them. It took Reisz's lab technician Diane Scott more than a year of full-time work to expose the delicate bones of the 6-centimeter-long eggs. As Reisz studied the specimens with colleagues from the Smithsonian Institution and the University of the Witwatersrand in Johannesburg, South Africa, he identified the largish skull as that of *Massospondylus*.

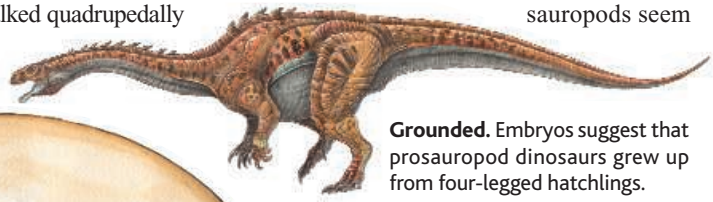
What was unusual was the rest of the body. "The proportions are just ridiculous," Reisz says. The neck was long, the tail short, and the hind and forelimbs were all roughly the same length. "It was an awkward little animal," he concludes. Because of the lack of developed teeth, huge head, and tiny pelvis (where leg muscles attach), the group proposes that *Massospondylus* hatchlings would have required parental care. "This is certainly suggestive but very difficult to test," says Martin Sander of the University of Bonn, Germany.

To Reisz, the horizontal neck, heavy head, and limb proportions all suggest that the embryo would have walked quadrupedally after hatching. That's strange, because it means that as the *Massospondylus* hatchlings developed, they had to become bipedal—a pattern of development almost unheard of among vertebrates. To figure out how the hatchlings changed as they matured, the researchers measured nine other *Massospondylus* fossils of various sizes. They found that the neck grew much more rapidly, relative to the femur, than the rest of the body did, while the forelimbs and skull grew more slowly.

If the earliest sauropods also developed from embryos with quadrupedal proportions, Reisz and his colleagues propose, sauropods may have become quadrupedal adults by retaining their juvenile state into adulthood, a phenomenon called pedomorphosis. "It sheds some light in the evolutionary pathways through which the peculiar adaptations of giant dinosaurs were attained," says Eric Buffetaut of France's major basic research agency, CNRS, in Paris.

Bonnan notes that other traits of adult sauropods seem to fit the same pattern. For example, the rough ends of sauropod limb bones indicate that the animals sported lots of cartilage in their joints. Paleontologists had assumed that the joints evolved because they helped sauropods support their weight. But cartilage-rich joints are more typical of young vertebrates, so adult sauropods might have acquired them by retaining a youthful trait.





Grounded. Embryos suggest that prosauropod dinosaurs grew up from four-legged hatchlings.

Some paleontologists, however, are wary of trying to read too much of the history of sauropod evolution from two embryos. So little is known about dinosaur embryology, they say, that it's dicey to reconstruct the locomotion of hatchlings and extrapolate to other taxonomic groups. "It's a stunning find," says Anusuya Chinsamy-Turan of the University of Cape Town, South Africa, but "I have all these questions." **–Erik Stokstad**

ILLUSTRATIONS (TOP TO BOTTOM): GABRIEL LIO/COURTESY OF UNIVERSITY OF TORONTO AT MISSISSAUGA; KEVIN DUPUIS

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