

New fossils of oldest American primate

November 16 2011

(PhysOrg.com) -- Johns Hopkins researchers have identified the first ankle and toe bone fossils from the earliest North American true primate, which they say suggests that our earliest forerunners may have dwelled or moved primarily in trees, like modern day lemurs and similar mammals.

Previous excavations have yielded pieces of the jaw and teeth of Teilhardina, primates that first appeared just after the beginning of the Eocene Epoch about 55.5 million years ago. In a report on their analysis of the fossils, published in the October issue of the [American Journal of Physical Anthropology](#), the Johns Hopkins team said they identified the latest bones when they went prospecting for evidence of the earliest Eocene mammals in the badlands of the Bighorn Basin, Wyoming, an area rich in fossils. The primate fossils were discovered in strata—bands of stratified earth —dating to the beginning of the Eocene Epoch.

“Living primates have nails on all or most of their toes and fingers, and they don’t occur in any other animal in exactly the same way,” says Ken Rose, Ph.D., professor of anatomy in the Center for Functional Anatomy and Evolution at the Johns Hopkins University School of Medicine.

“The fossil toes we found have morphology [shape and form] indicating the presence of nails rather than claws, making our discovery the oldest evidence of nails found in primitive primates so far. “

The researchers noticed the ankle bone fossils were elongated, which is a characteristic of present-day prosimian (non-monkey or ape) primates that do a lot of jumping. The neck of the talus — one of the ankle bones

— is relatively longer in *Teilhardina* than it is in present day lemurs, which move about by leaping from tree to tree, says Rose. Unfortunately the talus specimen was damaged and a total measurement can't be taken for exact comparisons. However, another ankle bone, the navicular, is also elongated and the researchers were able to quantify its measurements.

Prior excavations in the same region revealed fossils of early relatives of horses, carnivores and rodents, as well as *Teilhardina*. The researchers screened through hundreds of pounds of sedimentary rock, reducing it to fine-grained concentrate, which was transported back to the lab for examination under the microscope. Some early primate teeth specimens are known to be many times smaller than a grain of rice and only appear as specks to the human eye. Under the microscope, the researchers discovered not only teeth and jawbones from *Teilhardina* as before, but also three fossilized toe bones and three ankle bones, which Rose says are the first found in North America. The bones were relatively free of attached sediment and appeared smooth and dark — due to the type of minerals accumulated during fossilization — against the gray, fine-grained sediment. Although toe bones are quite variable among species, Rose says, these particular primate specimens are highly distinctive to a trained anatomist.

Close examination of the tips of the toe bones revealed a widened, expanded arrow-shaped region characteristic of flat finger or toe nails, rather than claws. One of the toe bones was larger than the other two proportionally, and the research team proposed that this one was from the big toe or thumb.

Ancestors of *Teilhardina* originally had claws—hooked, narrow nail beds found on many land animals like cats or birds. One of the distinguishing factors of primates was that they evolved finger and toe nails, with wide nail beds, like those found in humans and apes.

Analysis of the intact navicular ankle bone involved a calculation known as the navicular index that takes into account the proportion of the length to the width of the bone. Teilhardina has a relatively elongated navicular bone with an index of 165 units, similar to those of lemurs which are less than 162 units. But the Teilhardina navicular [bone](#) is significantly shorter than those found in bush babies (between 300 to 500 units) and tarsiers (between 400 to 600 units). The modern lemurs are known leapers, while the bush babies and tarsiers are exceptional leapers that can jump up to six and a half feet. The numbers suggest that Teilhardina moved actively through the trees and was capable of some leaping, says Rose.

The leaping capabilities make Teilhardina most likely a tree-dweller too, says Rose, which is an incredibly different habitat than the badlands of Wyoming today, which are dry and rocky with little vegetation. These creatures lived during a period of global warming, when subtropical climates and vegetation stretched all the way to the Arctic Circle, explains Rose.

Rose says Teilhardina was most likely similar in appearance to modern-day bush babies — small primates with big eyes, strong back legs and long tails. But he estimates that the Teilhardina were smaller, only weighing about three or four ounces — about the size of the smallest living primates, mouse [lemurs](#).

“Research on early [primates](#) gives us more evidence of our origins and our place in nature, with this particular study highlighting the oldest known member of our group from North America,” says Rose.

More information: Good Luck Indeed: 53 Million-Year-Old Rabbit's Foot Bones Found: www.physorg.com/news125164897.html

Provided by Johns Hopkins University

Citation: New fossils of oldest American primate (2011, November 16) retrieved 20 March 2024 from <https://phys.org/news/2011-11-fossils-oldest-american-primate.html>

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