Little teeth suggest big jump in primate timeline

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Tiny fossilized teeth excavated from an Indian open-pit coal mine could be the oldest Asian remains ever found of anthropoids, the primate lineage of today's monkeys, apes and humans, say researchers from Duke University and the Indian Institute of Technology.

Just 9-thousandths of a square inch in size, the teeth are about 54.5 million years old and suggest these early primates were no larger than modern dwarf lemurs weighing about 2 to 3 ounces. Studies of the shape of the teeth suggest these small animals could live on a fruit and insect diet, according to the researchers.

"It's certainly the oldest anthropoid from Asia and India," said Richard Kay, a Duke professor of evolutionary anthropology who is corresponding author of a report to be published online during the week of Aug. 4-8 in *Proceedings of the National Academy of Sciences (PNAS)*.

Previous fossil evidence shows primates were living in North America, Europe and Asia at least 55 million years ago. But, until now, the fossil record of anthropoid primates has extended back only 45 million years.

"We're going back almost 10 million years before any previously described Asian anthropoid," said co-author Blythe Williams, a Duke visiting associate professor of evolutionary anthropology. "The new fossils from India are exciting because they show that the anthropoid lineage is much more ancient than we realized."

In addition to stretching the primate timeline, the specimens represent a new genus as well as a new species of anthropoid, which the researchers have named Anthrasimias gujaratensis by drawing from the Greek word for "coal," Latin for "monkey" and the Indian State of Gujarat where the teeth were found.

"Anthrasimias may be the oldest anthropoid in the world," the PNAS report said -- "may" reflecting the fact that some scientists think slightly older fossils found in a Moroccan limestone deposit also could have been anthropoid, Kay said.

The report's first author is Sunil Bajpai, an earth scientist at the Indian Institute of Technology who directed excavations at the Vastan lignite coal mine in western India that unearthed the fossils.

Bajpai's Indian team managed to find and remove the tiny Anthrasimias tooth specimens from a strata in the mine while "really gigantic trucks" scooped up coal above them, Kay said. The teeth were dated by identifying microscopic marine plankton fossils of known age in nearby rock layers, he added.

Bajpai's team was funded by India's Department of Science and Technology. Work by Williams and Kay, who are anthropoid experts, was funded the Duke Provost's Research Fund and the National Science Foundation.

Their PNAS report describes tooth structure differences that would separate Anthrasimias from two other ancient lines of primates whose remains have been found at the same level of the Vastan mine. Of the three lines, Williams and Kay believe only Anthrasimias's is part of the anthropoid lineage that evolved into modern monkeys, apes and humans.

"Most of the fossil record of ancient primates is made up of teeth,

because teeth are easy to preserve and hard," Williams said. "Occasionally we get lucky enough to have a skull to work with, but in this case a few teeth is all we have." Their PNAS report described two upper molars and one lower molar.

"From the tooth size and structure we can say something about the animals' body weight and diet, because teeth have crests that are differentially developed depending on whether they ate primarily insects, leaves or fruit," he said. But without more body parts, Kay and Williams declined to deduce what the animals looked like.

Source: Duke University