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THE STORY OF 220-MILLION-YEAR-OLD RAT-LIKE CREATURES VIA MICROFOSSILS

Relevant for: Environment | Topic: Biodiversity, Ecology, and Wildlife Related Issues

Lively ancestor: Artist's impression of a cynodont, a group that ultimately gave rise to the present-day mammals. | Photo Credit: Julio Lacerda

The Tiki Formation in Madhya Pradesh, a treasure trove of vertebrate fossils, has now yielded a new species and two genera of cynodonts, small rat-like animals that lived about 220 million years ago.

The researchers from the Indian Institute of Technology Kharagpur, used scanning electron microscopy to study about 10 teeth samples collected from the village of Tihki in Shahdol District, Madhya Pradesh.

The teeth were studied for size, crown shape, structure of the cusps and compared with previously reported cynodonts. The results showed that they had found a new species, and they named it *Rewaconodon indicus,* indicating India, the country it was discovered from.

The team also identified two new genera from the area. The first was named *Inditherium floris,* after India and the Latin word *therium* meaning beast. As the teeth had a flower-shaped crown, it earned the species name *floris.* The second was named *Tikiodon cromptoni,* after Tiki Formation and Greek word *odon* meaning tooth. The species name is after paleontologist A.W. Crompton.

Sanghamitra Ray, the corresponding author of the work, explains: “Cynodonts are important in evolutionary studies as this group ultimately gave rise to the present-day mammals. By studying their molar and premolar teeth, we see how they slowly evolved and modified. Their crown shape shows that these animals are actually intermediate forms that are very near to the mammalian line of evolution.” She is from the Department of Geology and Geophysics at the Indian Institute of Technology, Kharagpur.

Advait M. Jukar from the Department of Paleobiology at the National Museum of Natural History, Smithsonian Institution, who was not involved in the work explains some more: “Cynodonts and living mammals both belong to a group of egg-laying vertebrates (amniotes) called synapsids. The close relationship of cynodonts with living mammals is seen in their bones. They also have differentiated teeth (for example, different teeth in the front of mouths compared with the back), a secondary palate in their mouths, which, like humans, allowed them to breathe and eat at the same time. Some cynodonts show evidence for the inferred presence of whiskers and fur.”

When asked if DNA studies can be done on these teeth Dr. Ray explained that as the samples are extremely old, the organic matter would have completely degraded making it impossible to look at DNA.

About eighty cynodont genera have been reported from around the world. The ones similar to the newly discovered ones were previously found in Laurasia which includes North America, England, Germany, Switzerland, France, and Belgium. “This possibly suggests abiotic interchange between India and Laurasian regions and/or similarity in paleoclimatic conditions, but this requires further study,” according to the paper, which is recently published in the *Journal of Paleontology.*

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The new study suggests interbreeding was more common than previously known for the first Homo sapiens in Europe.

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