Dino rib yields evidence of oldest soft tissue remains

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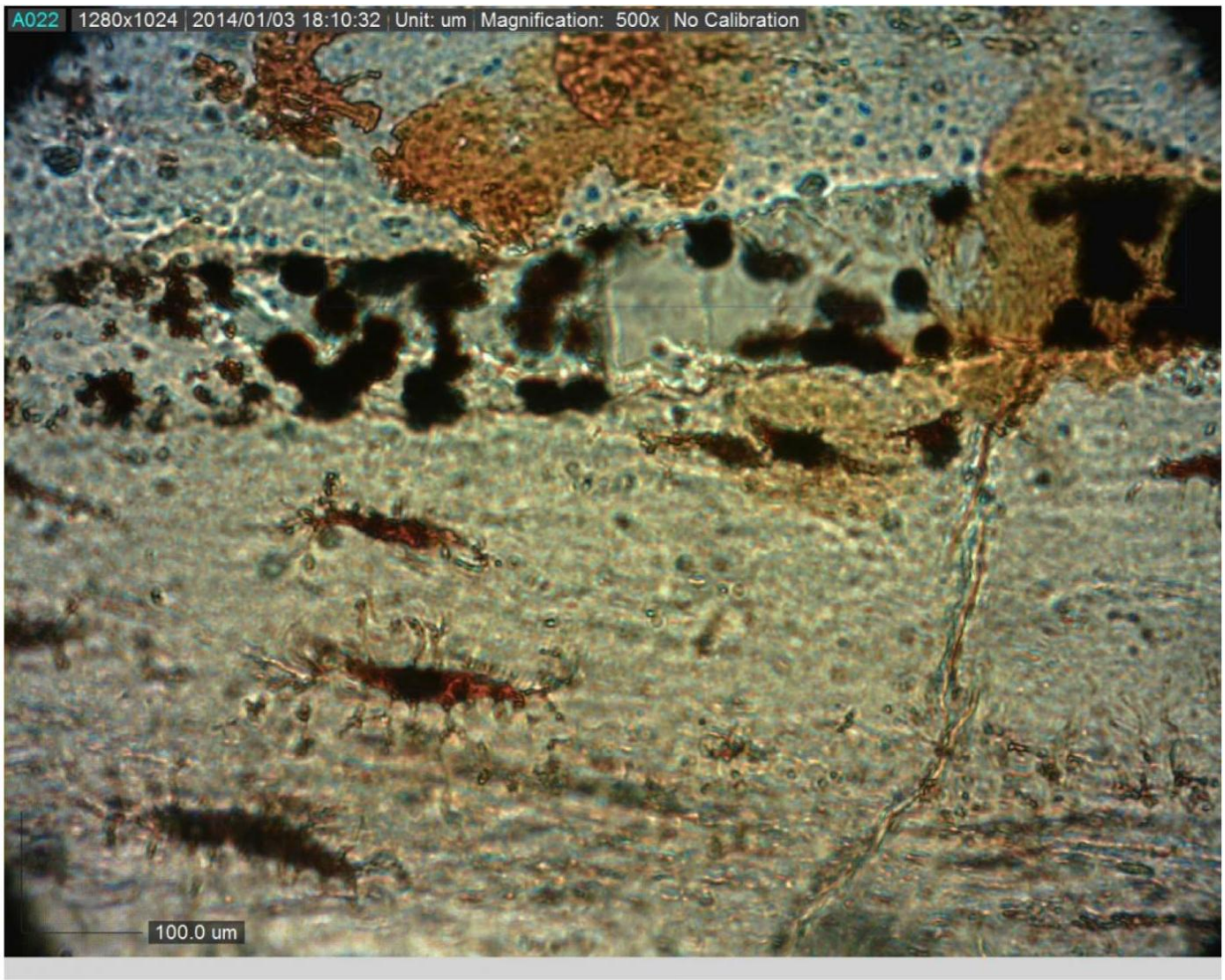


A thin section of the rib of the 195 million year old dinosaur Lufengosaurus, cut along the length of the rib showing a vascular canal with dark hematite particles. These were probably derived from the iron rich blood cells of the living dinosaur, and would have provided the internal environment for the preservation of collagen. Lacunae, where adult bone cells would reside, are also preserved

with dark hematite particles inside them. Credit: Robert Reisz

The rib of a long-necked, plant-eating dinosaur that lived 195 million years ago has yielded what may be the oldest remains of soft tissue ever recovered, scientists said Tuesday.

The find promises a chance to extract rare clues about the biology and evolution of long-extinct animals, a team wrote in the journal *Nature Communications*.

Such information is mostly missing from preserved hard skeletons, which form the bulk of the fossil record.

"We have shown the presence of protein preserved in a 195 million-year-old dinosaur, at least 120 million years older than any other similar discovery," study co-author Robert Reisz of the University of Toronto Mississauga, told AFP.

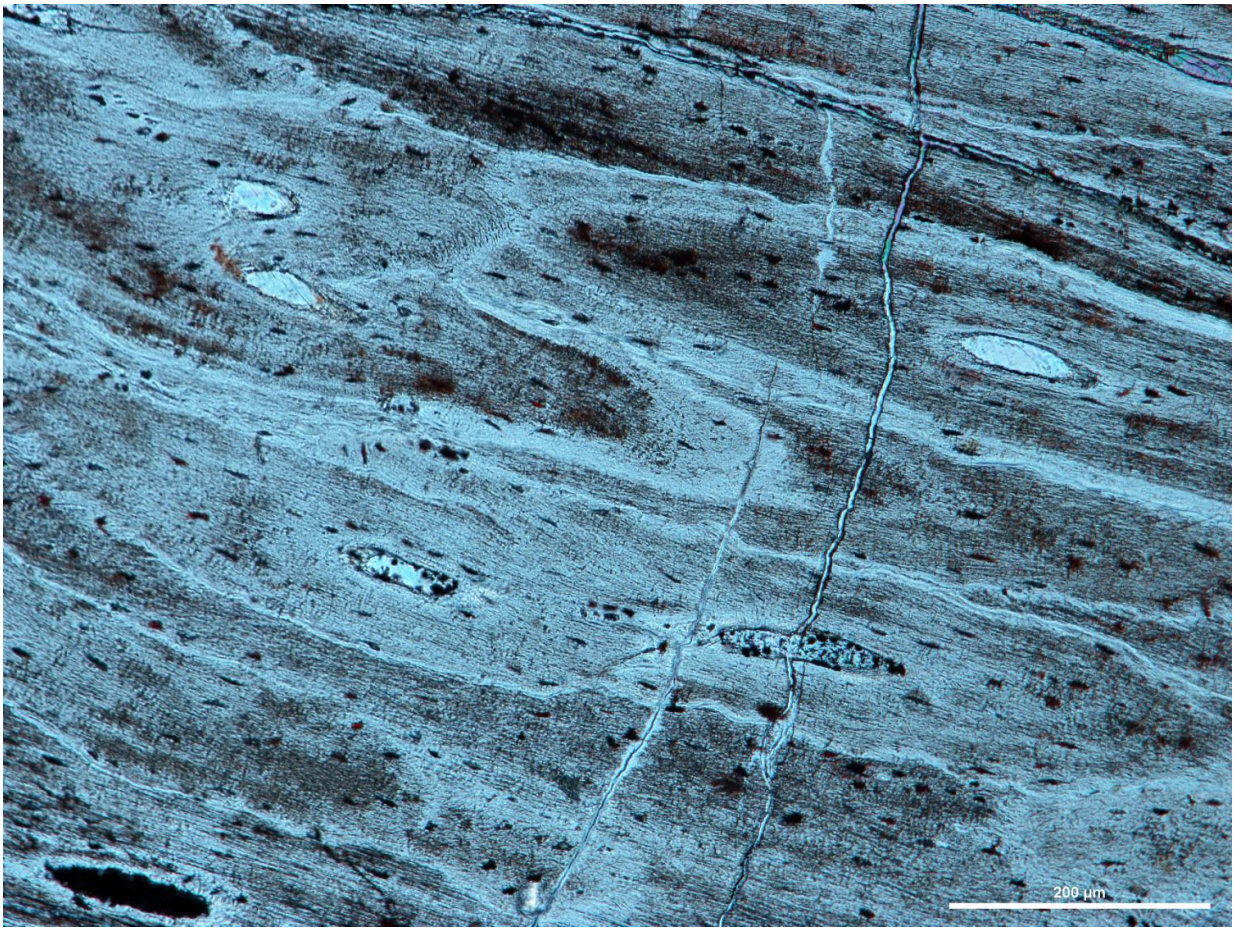
"These proteins are the building blocks of animal soft tissues, and it's exciting to understand how they have been preserved," he added.

Reisz and a team scanned a rib bone of Lufengosaurus, a common dinosaur in the Early Jurassic period. Fully grown, these lizards measured about eight metres (26 feet).

The researchers used a photon beam at the National Synchrotron Radiation Research Center in Taiwan to examine the insides of the bone, specifically its chemical contents.

They found evidence of collagen proteins within tiny canals in the rib and concluded they were "probably remnants of the blood vessels that

supplied blood to the bone cells in the living dinosaur."



Close up of oblique cut of rib of 195 Million year old Lufengosaurus, showing how the bone was organized around vascular canals that contained blood vessels in the living dinosaur, and ran along the length of the rib. Some of the vascular canals are partially filled by dark hematite particles, likely derived from the blood of the dinosaur, and would have helped preserve the proteins within these canals. Small dark areas within the bone, around the vascular canals are lacunae, or spaces where the adult bone cells would have lived in the dinosaur. Credit: Robert Reisz

Most previous studies had extracted organic remains by dissolving away other parts of the fossil, the team said.

With the synchrotron method, this is not necessary, and even older remains may be uncovered without damaging dinosaur bones in future.

Does it bring us any closer to recovering DNA from which dinosaurs may one day be cloned?

"No, that is still fantasy," said Reisz.

The previous oldest find of suspected red blood cells and collagen fibres was reported in 2013, in dinosaurs that lived about 75 million years ago.

Proteins and other organic remains usually decay soon after an animal dies. During fossilisation, the space they occupied within bone is filled by mineral deposits carried by groundwater.

Finding fossilised soft tissue is very rare indeed.

More information: Yao-Chang Lee et al. Evidence of preserved collagen in an Early Jurassic sauropodomorph dinosaur revealed by synchrotron FTIR microspectroscopy, *Nature Communications* (2017). DOI: 10.1038/ncomms14220