

## Exquisitely preserved embryo found inside fossilized dinosaur egg

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Life reconstruction of a close-to-hatching oviraptorosaur dinosaur embryo, based on the new specimen 'Baby Yingliang.' Credit: Lida Xing.

A 72- to 66-million-year-old embryo found inside a fossilized dinosaur egg sheds new light on the link between the behavior of modern birds and dinosaurs, according to a new study.

The embryo, dubbed Baby Yingliang, was discovered in the Late Cretaceous rocks of Ganzhou, southern China and belongs to a toothless theropod dinosaur, or oviraptorosaur. Among the most complete dinosaur embryos ever found, the fossil suggests that these <u>dinosaurs</u> developed bird-like postures close to hatching.

Scientists found the posture of Baby Yingliang unique among known dinosaur embryos—its head lies below the body, with the feet on either side and the back curled along the blunt end of the egg. Previously unrecognized in dinosaurs, this posture is similar to that of modern bird embryos.

In modern birds, such postures are related to 'tucking'—a behavior controlled by the central nervous system and critical for hatching success. After studying egg and embryo, researchers believe that such pre-hatching behavior, previously considered unique to birds, may have originated among non-avian theropods.

Led by scientists from the University of Birmingham and China University of Geosciences (Beijing), the research team from institutions in China, UK and Canada today published its findings in *iScience*.





Photo of the oviraptorosaur embryo 'Baby Yingliang'. It is one of the bestpreserved dinosaur embryos ever reported. Credit: Ma et al, 2021

The embryo is articulated in its life position without much disruption from fossilization. Estimated to be 27 cm long from head to tail, the creature lies inside a 17-cm-long elongatoolithid egg. The specimen is housed in Yingliang Stone Nature History Museum.

Fion Waisum Ma, joint first author and Ph.D. researcher at the University of Birmingham, said: "Dinosaur embryos are some of the rarest fossils and most of them are incomplete with the bones dislocated. We are very excited about the discovery of Baby Yingliang—it is preserved in a great condition and helps us answer a lot of questions about dinosaur growth and reproduction with it.

"It is interesting to see this dinosaur embryo and a chicken embryo pose in a similar way inside the egg, which possibly indicates similar



prehatching behaviors."

Baby Yingliang was identified as an oviraptorosaur based on its deep, toothless skull. Oviraptorosaurs are a group of feathered theropod dinosaurs, closely related to modern-day birds, known from the Cretaceous of Asia and North America. Their variable beak shapes and body sizes are likely to have allowed them to adopt a wide range of diets, including herbivory, omnivory and carnivory.

Birds are known to develop a series of tucking postures, in which they bend their body and bring their head under their wing, soon before hatching. Embryos that fail to attain such postures have a higher chance of death due to unsuccessful hatching.

By comparing Baby Yingliang with the <u>embryos</u> of other theropods, longnecked sauropod dinosaurs and birds, the team proposed that tucking behavior, which was considered unique to birds, first evolved in theropod dinosaurs many tens or hundreds of millions of years ago. Additional discoveries of embryo fossils would be invaluable to further test this hypothesis.

Professor Lida Xing from China University of Geosciences (Beijing), joint first author of the study, said: "This dinosaur embryo was acquired by the director of Yingliang Group, Mr Liang Liu, as suspected egg fossils around the 2000. During the construction of Yingliang Stone Nature History Museum in 2010s, museum staff sorted through the storage and discovered the specimens.

"These specimens were identified as dinosaur egg fossils. Fossil preparation was conducted and eventually unveiled the embryo hidden inside the egg. This is how Baby Yingliang was brought to light."

Professor Steve Brusatte from the University of Edinburgh, part of the



research team, said: "This dinosaur embryo inside its egg is one of the most beautiful fossils I have ever seen. This little prenatal dinosaur looks just like a baby bird curled in its egg, which is yet more evidence that many features characteristic of today's <u>birds</u> first evolved in their dinosaur ancestors."

**More information:** Waisum Ma et al, An exquisitely preserved in-ovo theropod dinosaur embryo sheds light on avian-like prehatching postures, *iScience* (2021). DOI: 10.1016/j.isci.2021.103516. www.cell.com/iscience/fulltext ... 2589-0042(21)01487-5

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