

? and Answers

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Q: What colour were dinosaurs?

A: Up until last year the only honest answer to this question was ‘Nobody knows.’ But recent discoveries and new techniques have opened an unexpected window into the world of dinosaur colour.

The first clues came from the province of Liaoning, China, in the 1990’s. Small theropods (two-legged meat-eating dinosaurs) were discovered with remains of their integument preserved. These confirmed that many small theropods were covered either with feathers or else fuzzy ‘protofeathers’ in life.

In 2010 Jakob Vinther and his colleagues at Yale University examined some of these Liaoning specimens under the microscope and discovered that their fossil feathers included **melanosomes** -- tiny packets of pigment that give modern bird feathers many of their colours. Vinther and his team found that there is a correlation between the shape of a melanosome and the colour of pigment it contains.

Round melanosomes, for example, contain red and brown pigments, while sausage-shaped melanosomes contain black. By carefully examining the distribution of the different shapes of melanosomes on the fossils they were able to map out the colour pattern of two different dinosaurs, *Anchiornis* and *Sinosauropteryx* – and more will undoubtedly follow.

The body of tiny *Anchiornis* was covered with grey protofeathers– even the toes. Long feathers with bold patterns of black and white lined the arms and legs. On top of the head was a crest of red, and there was a greyish-red patch on each cheek.

The other dinosaur the Yale team examined was *Sinosauropteryx*. This one-kilogram predator was a fox-like reddish brown colour. Its long tail was decorated with alternating stripes of reddish-brown and white.

There *are* limitations to this technique. The colours of blue and green feathers, for example, are not due to melanosomes, but instead are created by the microstructure of the feathers themselves, something that we are unable to detect in the fossils (yet!). And, of course, there are still hundreds of other dinosaur species that are known only from their bones. So don’t worry, young artists – there’s still plenty of room for creativity!



The tiny Chinese theropod *Anchiornis* – depicted with its actual life colouration.