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The Bird-Dinosaur Connection

Introduction

Throughout the years paleontologists have been researching the link between modern birds and the dinosaurs. There have been many ideas that support the theory that modern birds have evolved from dinosaurs that lived millions of years ago. But there has been evidence that has gone against that theory. Paleontologists have studied skeleton remains, other dinosaurs, and the time periods in which these dinosaurs may have lived. There are many ways these scientists can prove the theory right, but there is evidence that is problematic.

Background

Relating modern animals to dinosaurs can be a difficult task or an easy one, depending on the remains and the studying of how each lived and



adapted. But relating modern birds to dinosaurs has proved to be a difficult one.

Millions of years ago dinosaurs were dominant creatures that inhabited the Earth.

Now they are extinct and humans and animals roam the Earth. Some of these animals, like birds, have similarities to dinosaurs.

In recent years scientists found a link between birds and dinosaurs. They have found that these two



creatures have similar genome. Also genomes in skeletons have been found linking the reason why birds started to use their wings for flight. This shows the genome of modern birds is inherited from Saurischian dinosaurs. ("Bird ancestors") "So rather than being a characteristic of birds or flying animals, short genome, which is an organism genetic material, should be thought of as a characteristic of dinosaurs (including the killer theropod dinosaurs). Birds just inherit that character like they have inherited other dinosaurian traits, like feathers." (Chris Organ, 2007) So birds have evolved from dinosaurs by this DNA evidence. The researchers based their evidence on cell size and genome size. They discovered the short genome (1.8 billion base pairs) emerged between 230 and 250 million years ago. Which dates before the first fossil of a dinosaur that looked like a bird was found, the Archaeopteryx.

Evolutionary Theories

The evolution of feathers is a debated topic. Scientists theories are different: for flight or for geographic purposes.”

Evolution however is a “blind” process- it doesn’t “know” where it’s going until it gets there”. (Bob Strauss, 2001) One theory is that



feathers were evolved solely for the purpose of flight, while others argue it was for

insulation during cold weather. But there have been contradictions to these theories.

“If feathers were solely to power flight, there’d be no reason, from evolutionary

prospective, for penguins to keep their feathers”. (Bob Strauss, 2001) But no

matter what, feathered dinosaurs first appeared 140 million years ago, and now we

have to figure out how did they use them for flight? Now that dinosaurs have feathers

how do they use them? Scientists have come up with theories of how dinosaurs began

flying. One theory is that “Dinosaurs Took a Running Leap”(Bob Strauss, 2001).

This theory states that the dinosaurs that evolved feathers first were smaller ones

that could reach high running speeds. When these dinosaurs reached these speeds

when chasing prey, they discovered their feathers gave them a “bounce” which helped

them gain a meal. The second theory is that “Dinosaurs fell out of Trees”(Bob

Strauss, 2001). This theory is stating that maybe feathered dinosaurs lived in trees. To get down or to get to other trees, they glided. The feathers slowly adapted to shape. Then evolution occurred and flap ability of wings allowed them to stay in the air. But one problem with this theory is that it's more likely flight developed by the ground-up approach. So both of these theories are neither right or wrong because no clear evidence has been found. "In other words, nature didn't evolve feathers specifically for flight; the ability to fly was an unexpected by product of this adaptation". (Bob Strauss, 2001)

Relating Skeletons



Many skeletons have been found that have been used in studies to relate modern birds to dinosaurs. Figure one is a photo of the oldest skeleton that has been used to relate dinosaurs to modern birds. The name is Archaeopteryx and it is 150 million years old. This skeleton has been

called “the transition form between birds and reptiles”. The remains showed that this animal definitely had feathers.

But some parts of the body provided information that went against the theory that this dinosaur can link the two animals. It had a full set of teeth, flat sternum, bony tail, and “belly ribs”. But also some features besides the feathers provided information to support the theory. The features were wings, wishbone and reduced fingers. Those are characteristics of a modern bird.

A recently found fossil in China shows signs of feathers from head to tail. This 130 million year old fossil looks like a duck they say. The name is Dromaeosaur. It is related to small, fast running dinosaurs, like the Velociraptor. This shows “It makes it indisputable that a body covering similar to feathers was present in non-avian dinosaurs”. (Dr. Norell, American Museum of Natural History in Manhattan) This shows that modern birds may have evolved from dinosaurs. The fossil shows the forelimbs were too short to support wings, but bone structure is similar to modern birds. Also to reinforce this discovery scientists used microscopes to show that the feathers and downy fluff was attached. So this fossil clearly shows many similarities to modern birds.

Another recently found fossil in China was *Sinovenator Changii*. It is a type of theropod. This type shows evolutionary trend towards small body size, like modern birds. *Sinovenator Changii* was less than a meter long. This fossil is also a troodontid. Which is a type of theropod puzzling to scientists. The features are: feathers, air-filled spaces in braincase, small teeth, and large sickle on the foot. With these features it is hard to distinguish which species it actually came from. No matter what this fossil shows clear signs of a link between dinosaur and birds.



Some other dinosaur skeletons that have been found linking dinosaurs and birds are:

Archaeornithomimus: A likely ancestor of *Ornithomimus*

Deinocheirus: Arms

Dromiceiomimus: Fastest dinosaur that ever lived

Gallimimus: "chicken mimic"

Garudimimus: slowpoke

Harpymimus: named after the winged creature of Greek myth

Ornithomimus: "bird mimic" resembled an

ostrich

Pelecanimius: "pelican mimic" had over 200

teeth

Struthiomimus: "ostrich mimic" roamed plains

of North America

Timimus: only ornithomimid discovered in Australia



Conclusion

So clearly evidence shows that modern birds and dinosaurs may have a link between them. Through fossil evidence and research scientists have been able to figure this out. No one understands fully how these creatures lived or what they looked like because no one was there to record it. But still we can research and gather as much information as we can to try and understand these relations. Birds and dinosaurs may have a link that is much deeper than we know or they may not have a link at all. But some evidence is starting to give us ideas of that they could be. Maybe no one will ever find out if there is a clear link between them, but right now we now that this evidence is bringing about new ideas about how they were.

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Strauss, Bob (2001) An analysis of the dinosaur, *Sinosauropteryx*, and an analysis of a link between this dinosaur and flight of modern birds. Retrieved on October 22, 2008, <http://dinosaurs.about.com/od/thedinobirdconnection/a/sinosaur.htm>

RPG (1993). An analysis of one of the first dinosaur skeletons, linking modern birds to the skeleton. Retrieved on October 22, 2008, <http://www.ucmp.berkeley.edu/diapsids/birds/archaeopteryx.html>

Wilford, John Noble (April 25, 2001) An analysis of dinosaur skeletons that are found in China that could link modern birds to dinosaurs. Retrieved on October 22, 2008, <http://www.mrbrklyn.com/resources/dinobird.html>

Strauss, Bob (2001). An analysis of the origin of flight, how modern birds learned to fly. Retrieved on October 22, 2008. <http://dinosaurs.about.com/od/thedinobirdconnection/a/originflight.htm>

Science Daily, (February 14, 2002). An analysis of new technology that helps to confirm the information on the bird-dinosaur link. Retrieved on October 22, 2008, <http://www.sciencedaily.com/releases/2002/02/020214080242.htm>

Strauss, Bob (2001). An analysis of dinosaur skeletons that mimic modern birds. Retrieved on October 22, 2008, <http://dinosaurs.about.com/od/typesofdinosaurs/a/ornithomimids.htm>

Softpedia, (2001-2008). An analysis of modern birds sharing almost the same DNA with dinosaurs. Retrieved on October 22, 2008, <http://news.softpedia.com/news/Dinosaurs-Shared-the-Same-DNA-with-Birds-48875.shtml>