Dinos breathed like birds?

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In July 2005, headlines indicated to the layperson that it has now been proven beyond doubt that dinosaurs 'breathed like birds'. This concerned a new study on the fossil remains of a beautifully preserved theropod dinosaur, *Majungatholus atopusi*, published in *Nature*.[1] The fact that theropod dinosaurs have pneumatization (special hollow air spaces) in some of their bones is not new, nor that birds do, too. In particular, the lungs of birds interact with a system of air sacs which 'invade' sections of the skeleton, particularly the vertebral bodies.

The vertebral bodies present in this dinosaur show pneumatizations in remarkable detail (see fig. 1). These are so strongly analogous with ones in a modern bird that even though the sacs themselves are not preserved, it can be reasonably *inferred* that the dinosaur possessed the following features:

1. a cervical air sac similar to modern birds;
2. a lung which itself invaded some of the thoracic vertebrae, pneumatizing them in the same way as modern bird lungs do;
3. an abdominal air sac similar to modern birds. This is the aspect of the study that appears to be most encouraging to evolutionists; being 'caudal'[2] to the lung, it allows for the possibility of a 'flow-through' lung as in birds (see later).

Stretching the point

The article features another diagram showing the dinosaur skeleton with not just the above three features but also with (4) a clavicular air sac and (5) a thoracic air sac as modern birds have. However, there appears to be *no fossil evidence of* (4) and (5). The caption calls these 'tertiary-level inferences emphasizing the uncertainty surrounding the reconstruction of soft tissues not constrained by osteological evidence'. I.e., there is no evidence from fossil bones from which we can even infer the existence of these additional soft tissue air sacs. Rather, they are believed to be present by way of 'tertiary inference'—presumably as follows: If (1)–(3), all known to be features of bird respiration, are (secondarily) inferred to be present, then it's an educated guess that probably (4)–(5) are present as well. However, this guess is heavily influenced by the presumption that theropods are the evolutionary ancestors of birds. But this is hotly disputed by some evolutionist experts themselves, and it is just as reasonable to presume that theropods did *not* have those last two sacs.

Further, even if it were to turn out that theropods did have all five 'pneumatic features', it is again very much a 'tertiary inference' that this theropod therefore had the same flow-through ventilation system as birds. It is this flow-through aspect, where the air keeps moving in the same direction, that makes the avian lung so special, and so far unique, compared to the 'bellows' (in and out) lung of mammals or reptiles.

At present, all one can say is that the presence of a flow-through lung in this theropod *may* have been the case (mildly supported by certain aspects of spine and ribcage anatomy), but theropods may in fact have had a unique combination of a bellows lung (unlike birds) and a system of at least some air sacs and pneumatized

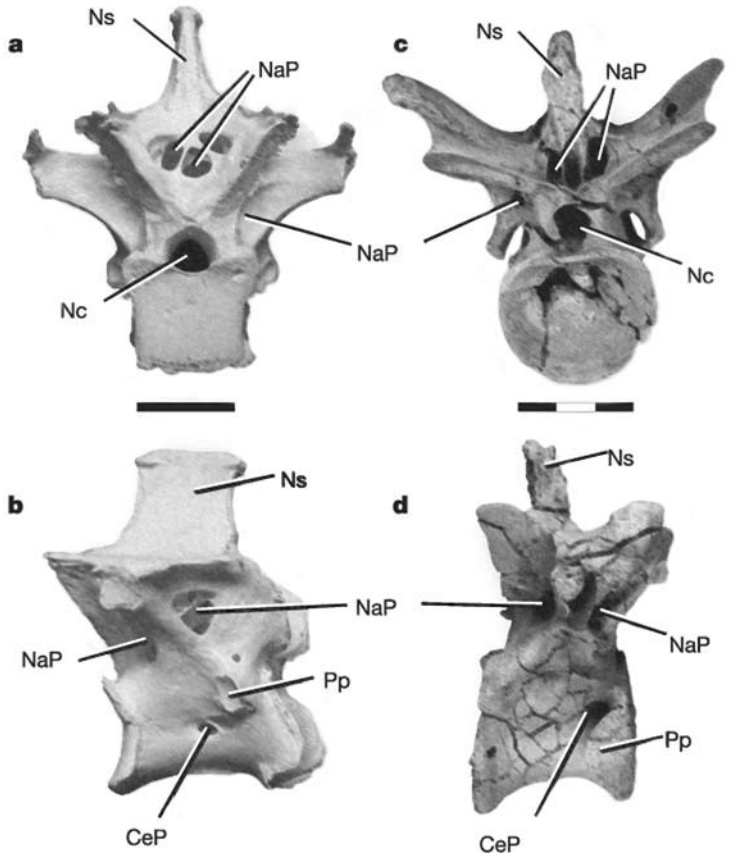

Figure 1. *Comparisons between a bird (**a**, **b**) and a theropod dinosaur (**c**, **d**) in caudal (**a**, **c**) and right lateral (**b**, **d**) views, illustrating the topological similarity of pneumatic features. **a**, **b**, Cranial thoracic vertebra of a sarus crane (*Grus antigone*, SBU AV104063). **c**, **d**, Mid-cervical (**c**) and cervicothoracic (**d**) vertebra of an abelisauroid theropod (*Majungatholus atopus*, UA 8678). Scale bar, 1 cm (**a**, **b**) and 3 cm in (**c**, **d**). CeP, central pneumatic foramen; NaP, neural arch pneumatic foramen; Nc, neural canal; Ns, neural spine; Pp, parapophysis. (Figure and caption after O'Connor and Claessens).*[1]

vertebrae (like birds). The air sacs may have served to enhance oxygen efficiency during running. Note that while an abdominal (caudal) air sac is necessary for a flow-through lung, it does not therefore follow that having such a sac means one has a flow-through lung.

Lightening the load

In fact, pneumatizations of bone are already known to have existed in non-theropod dinosaurs, such as the large sauropods, and in the flying reptiles (pterosaurs; Figure 2)—neither believed to be the ancestors of birds. Thus, evolutionists have been much more circumspect when speculating about the function of pneumatizations in these groups—they relate them much more straightforwardly to their obvious design function of lightening the bones.

Such lightening is important not just for flight, but obviously also to make locomotion easier for the big lumbering sauropod earth-shakers. Theropods, or at least the smaller ones, are believed to have been speedy runners, so lighter bones would seem to be an important design feature for them, too. There is no reason, though, why they may not also have shared with birds all or some of the same design features for efficient use of oxygen, as already stated.

What if they really *did* breathe like birds?

Finally, let's assume for the sake of argument that theropod dinosaurs indeed had the same flow-through lung type as birds. It would bring evolutionists not a single step closer to being able to conceive of the inconceivable—how such a lung could have evolved step by step from the bellows lung of its assumed evolutionary forebears. It would only shift the name of the problem from 'the origin of the avian lung' to 'the origin of the lung of theropods and avians'.

How could any creature breathe while the inbetween stages were evolving, while air was not yet flowing through but no longer going in and out? What conceivable selection pressure could act on an already efficient system of breathing, especially one that would have had to get worse before it got better in efficiency terms? The *Nature* article doesn't touch upon these logistic, 'in principle' barriers. It restricts itself to cautious but lame speculation about how the development of an air sac behind the lung might somehow facilitate the evolution of flow-through ventilation.[3]

Figure 2. *Flying reptiles, i.e. pterosaurs, are known to have had pneumatization in some of their bones similar to that of birds. However, this does not make them avian ancestors, and even evolutionists believe that this is simply a design function for lightening the bones.*

Those evolutionists in the faction that believes dinosaurs (specifically theropods) gave rise to birds would be understandably encouraged by this *Nature* paper, but it has not even begun to address the huge difficulties (including embryonic development paradoxes) pointed out by the opposing evolutionary faction. In reality, our discussion here has really been excessively kind to evolutionists. We need to remember the discovery of the theropod *Scipionyx samniticus*,[4] with traces of internal organs suggesting to several researchers that it did not breathe like birds, but rather more like the 'liver-pump' system in crocodiles. Then there is the evidence from ostrich embryos that the thumb development in theropods is all wrong for them to have been the ancestors of birds.[5]

Conclusion

In short, this discovery does not show that dinosaurs evolved into birds and it does not even necessarily imply that dinosaurs had an avian lung—despite the 'dinos breathed like birds' hype. If it should turn out (via some remarkable soft-tissue preservation) that they did, it would certainly encourage the 'dino to bird' faction, but it would still fit very comfortably within a creation framework. And evolutionists would still be stuck with exactly the same massive problem of explaining the seemingly impossible transition from bellows to flow-through ventilation.

References

1. O'Connor, P. and Claessens, L., Basic avian pulmonary design and flow-through ventilation in non-avian theropod dinosaurs, *Nature* **436**:253–256, 14 July 2005.
2. I.e. closer to the tail of the skeleton, the opposite side to where air enters.
3. For this and still more problems with bird evolution, see Sarfati, J., *Refuting Evolution*, Chapter 4, 1999; <www.answersingenesis.org/home/area/re1/chapter4.asp>.
4. Dal Sasso, C. and Signore, M., Exceptional soft-tissue preservation in a theropod dinosaur from Italy, *Nature* **392**(6674):383–387, 26 March, 1998.
5. Sarfati, J., Ostrich eggs break dino-to-bird theory, *Creation* **25**(1):34–35, 2002; <www.answersingenesis.org/docs2002/0822_ostrich_dino.asp>; see also Sarfati, J., Which came first—the dino or the bird? <www.answersingenesis.org/docs2/4417news12-21-2000.asp>.