CAN NASAL TURBINATES BE USED TO DIAGNOSE PALEOMETABOLICS?

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The recent hypothesis that water conserving, complex respiratory turbinates (RT) are the first reliable morphological indicators of high metabolic rates in the fossil record is falsified by A) the absence of RT in cetaceans and some birds (including birds with closed external nares), and the small and poorly developed RT of some other birds and primates, including large snouted baboons that live in arid climates, B) the high rates of respiratory water conservation in birds and mammals with little or no RT, C) the important brain cooling function of RT in-big-brained animals, D) the lack of a strong correlation or a direct causal link between RT and metabolic power production, and E) the low rate of preservation and poor identifiability of RT in fossils, most especially when nasal regions differ from those of mammals. The complete function of RT remains poorly understood. RT development may be more positively correlated with brain size than with metabolic rates, especially in mammals (except very large-brained primates which have alternate cooling systems). In small-brained, tachyaerobic tetrapods, RT are predicted to range from absent to well developed. Uncrushed dinosaur nasal cavities have room for RT that are better developed than those of reptiles, and ossified RT are preserved in ankylosaurs.