Scientist cites enlarged skeletal muscles as reason birds exist

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A developmental biologist at New York Medical College is proposing a new theory of the origin of birds, which traditionally has been thought to be driven by the evolution of flight. Instead, Stuart A. Newman, Ph.D., credits the emergence of enlarged skeletal muscles as the basis for their upright two-leggedness, which led to the opportunity for other adaptive changes like flying or swimming. And it is all based on the loss of a gene that is critical to the ability of other warm-blooded animals to generate heat for survival.

Dr. Newman, a professor of cell biology and anatomy, studies the diversity of life and how it got that way. His research has always centered on bird development, though this current study, "Thermogenesis, muscle hyperplasia, and the origin of birds," also draws from paleontology, genetics, and the physiology of fat.

Dr. Newman draws on earlier work from his laboratory (Mezentseva et al. *BMC Biology* 6:17; 2008) which provided evidence for the loss, in the common dinosaur ancestors of birds and lizards, of the gene for uncoupling protein-1 (UCP1). The product of this gene is essential for the ability of "brown fat," tissue that protects newborns of mammals from hypothermia, to generate heat. In birds, heat generation is mainly a function of skeletal muscles.

"Unlike the scenario in which the evolution of flight is the driving force for the origin of birds, the muscle expansion theory does not require functionally operative intermediates in the transition to flight,

swimming, or winglessness, nor does it require that all modern flightless birds, such as ostriches and penguins, had flying ancestors. It does suggest that the extinction of non-avian dinosaurs may have been related to a failure to evolve compensatory heat-generating mechanisms in face of the loss of UCP1," says the scientist.

Provided by New York Medical College