



The recovery of ancient DNA from *Dasypus bellus* provides new possibilities for investigating late Pleistocene mammal response to climate change

Brandon Letts and Beth Shapiro

The Pennsylvania State University, Department of Biology, State College, Pennsylvania 16802, USA (bcl147@psu.edu)

Dasypus bellus, the 'beautiful armadillo,' is well known as a casualty of the Pleistocene megafaunal mass extinction event. Appearing in the fossil record about 2.5 Mya, *D. bellus* was widespread throughout the mid to southern United States and Mexico until it went extinct by about 10 kya. It was replaced by *D. novemcinctus*, the nine-banded armadillo, which is morphologically identical but smaller. The exact taxonomic status of *D. bellus* and its phylogenetic relationship with *D. novemcinctus* has been a subject of debate. In particular, it remains unresolved whether *D. bellus* was more closely related to North American than South American *D. novemcinctus*. To address this, we extracted and sequenced fragments of ancient mitochondrial DNA from surprisingly well-preserved remains of *D. bellus* recovered from Mefford Cave in Florida. Our results reveal a surprisingly close relationship between the extinct *D. bellus* and North American *D. novemcinctus*. Although southern climates have been considered inhospitable for the preservation of ancient DNA, thousands of bones per individual and the propensity of the armadillo to seek out shelter in caves makes preservation more likely than for other organisms. The armadillo may therefore make an excellent proxy organism for investigating the influence of climate change on animal populations south of the cold permafrost regions.