

### Extensive convergence between giant panda and hominoid vertebral formulae.

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The vertebral column plays central roles in posture, stability, and locomotion. Its numerical composition is somewhat conserved across phylogenetic groups, which may result from developmental constraints and/or stabilizing selection. Deciphering the role of selection versus constraint in this complex anatomical system is therefore of interest in functional and evolutionary studies.

Compared to other vertebrates, mammals are relatively conserved in pre-caudal vertebral formulae. Hominoids are intra- and inter-specifically quite variable in vertebral counts, and because their vertebral formulae are derived relative to non-hominoid primates and many other mammals, an understanding of the forces that drove their evolutionary history may be aided by a comparative study. Using ARLEQUIN, we analyze a dataset of 5735 mammals from 648 species (435 genera), representing all major divisions of Mammalia. Following Pilbeam, we use a morphological analog of Nei's genetic identity index to quantify interspecific variation in vertebral formulae by creating a ratio of shared vertebral patterns between two populations to the total amount of variation in both populations.

Results demonstrate a significant case of convergence between giant pandas (*Ailuropoda melanoleuca*) and hominoids; in turn, giant pandas generate no similarity with other bears. Like hominoids, giant pandas demonstrate reduced trunks and numerically long sacra. Although more detailed analyses on the evolutionary morphology of ursid and hominoid vertebral columns are required, the observation that both groups demonstrate complex manual manipulation during upright feeding postures is intriguing. Whether or not this behavior played a selective role in their extensive convergence is a hypothesis that will require further testing.

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### On the ecology of leprosy: Tails from phylogenomics.

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The origin and ecology of leprosy, an ancient human scourge, remain poorly understood. *Mycobacterium leprae*, the causative agent of leprosy, exhibits a parasitic lifestyle based on extensive genome decay that happened millions of years ago, suggesting *M. leprae* may have been present in primates long before modern humans. In contrast, very limited genetic

variation among strains of distant geographic locations suggests a recent jump to humans. To explore the evolutionary history of leprosy, we sequenced the genome of an *M. leprae* isolated from a West African mangabey. Further, to assess whether other non-human primates are also affected by leprosy, we surveyed wild chimpanzees and ringtail lemurs using qPCR of DNA extracted from cheek swabs or wadges.

Our analyses show that the mangabey strain is closely related to human strains. Human West African and the mangabey strains are ancestral to Eurasian strains, supporting an Africa origin of leprosy. To determine the timeframe of disease spread, we calculated *M. leprae*'s substitution rate from the estimated divergence time between *M. leprae* and *M. tuberculosis*. The latter was obtained using 101 homologous proteins across 27 bacterial taxa and a Bayesian relaxed-clock framework calibrated with biogeochemical events. Our findings support the spread of leprosy from Africa to Europe and Asia around 10,000 years ago. The role primates play in the ecology of human leprosy remains unknown. New World nine banded armadillos that are infected with leprosy in their entire range, however, have been implicated as possible zoonotic source for human leprosy more recently.

### The depositional patterning of avian scavenged remains.

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Black Vultures (*Coragyps atratus*) and Turkey Vultures (*Cathartes aura*) are large diurnal birds that primarily feed on carrion such as road kill, but recent evidence has revealed that vultures will also feed on human remains. As scavengers of carrion and humans, vultures can play a critical role in the deposition of skeletal remains from both past and modern settings. Despite the importance of avian scavengers in an anthropological context, the depositional patterning of skeletal elements scatted by vultures and other birds remains under investigated. Knowledge on the depositional patterning of avian scavenged remains can benefit anthropologists during both archaeological and forensic investigations by aiding and promoting an awareness of where to search for remains that may have otherwise been overlooked. The goal of this study is to provide new knowledge on the depositional patterning of avian scavenged remains through the use of Global Positioning Systems (GPS), Geographical Information Systems (GIS), and Nearest Neighbor Analysis (NNA). This study used 16 deceased piglets in the fresh stage of decay to investigate vulture scavenging patterns in six different Central Texas locations. Spatial point data on pig skeletal elements scavenged by birds were analyzed using NNA to test the hypothesis that birds will scatter and deposit remains in a pattern that is random rather than in a pattern that is either clustered or more dispersed than by chance alone. Results reveal that avian scavengers, especially vultures, display a non-

random scavenging behavior that is reflected in the final deposition of the skeletal remains.

### Serum prolactin and social behavior of Kindas and other baboons.

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Prolactin, the "maternal hormone", is now understood to be more generally related to nurturing behavior, in males as well as females. We examined prolactin levels in male baboons (*Papio*) of three species: *P. anubis*, *P. hamadryas* and *P. kindae*. We predicted a difference in prolactin profiles, paralleling their distinct social behavior. Samples came from baboons captured in the Awash National Park (anubis and hamadryas) and in Kafue National Park (kindas). Mean adult male prolactin in kindas ( $X=10.6$ ) did not differ significantly from hamadryas ( $X=7.94$ ), but each was higher than anubis ( $X=5.74$ ;  $p=0.002$ ). In each species, prolactin levels increase from early sexual maturity (about 6 years) to young adulthood, but the trajectories differ. In anubis, mean prolactin concentration rises gradually, leveling at about 13 years. In hamadryas, prolactin concentration shows a marked, high peak between 8 and 11 years, when, as young adult bachelors, males often assume a mother-like role in carrying and caring for a female infant, as a first step toward One Male Unit formation. In kindas, prolactin levels rise until c 9 years, and remain high. We suggest that this may be related to the uniquely high frequency of male-female grooming interactions in which the male is the groomer (70%, vs. 13% in anubis), behavior reminiscent of the prolonged grooming of infant baboons by their mothers. Thus elevated prolactin levels in both hamadryas and kindas baboons when compared with anubis, may reflect species variation in behaviors that can be described as 'pseudo-maternal'.

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### Postmarital residence in Neolithic Anatolia.

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The Neolithic site of Çatalhöyük, Turkey (7400 – 5600 cal BC) is well-known for the female symbolic imagery discovered there, including the so-called goddess figurines. The