Evaluating the emergence of tuberculosis in South Africa.

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Tuberculosis is the leading cause of mortality in South Africa today. While in Europe and North America many cases have received much attention, little is known about the emergence of tuberculosis in southern Africa. Based on observations by early settlers, explorers and missionaries, numerous texts suggest that the disease was imported with European contact. However, these observations are sometimes contradictory to one another and to local oral histories. To date, the contribution of the archaeological record to this question has not been well-evaluated. Here we present preliminary results from a larger project that aims to identify possible cases of tuberculosis in the archaeological record of South Africa, in order to contribute to broader understanding of when and where the disease first emerged and how it spread.

Skeletal collections of historic and earlier Holocene material housed in institutions throughout South Africa were examined. Preliminary evaluation of 665 specimens has revealed five cases of possible tuberculosis infection: three show pathology of the vertebrae, one of the radius and one of the ribs. Three of these specimens are from the late 1800’s and derive from mining and port towns where tuberculosis is known to have been well established by this time. The remaining specimens were unearthed from rural contexts, with at least one specimen dated to the late 1700’s (possibly earlier). This is a particularly interesting observation because European contact with this population was thought to be limited at this time. The presence of tuberculosis in this region possibly indicates declining rural conditions. This study was funded by the Wenner-Gren Foundation Wadsworth African Fellowship.

Phylogenetic relationships of the mangabeys inferred from analyses of multiple independent loci.

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The Old World monkey tribe Papionini includes seven genera: Macaca, Papio, Theropithecus, Mandrillus, Lophocebus, Rungwecebus, and Cercopithecus. Within the Afro-papionins, there are two broad morphological grades: small bodied, short faced ‘mangabeys’ including Cercopithecus, Lophocebus, and Rungwecebus, and large bodied, long faced ‘baboons’ including Mandrillus, Papio, and Theropithecus. However, these morphological grades do not reflect phylogeny, as Afro-papionins form two clades, one containing Cercopithecus and Mandrillus, the other of Lophocebus, Papio, Rungwecebus, and Theropithecus. The relationships among genera within these clades are unclear, and hybridization and genus-level paralogy may be common, possibly reflecting multiple instances of the independent evolution of baboon-like lineages from mangabey-like ancestors.

To test this, we have assembled the largest comparative molecular dataset of the Afro-papionins to date. This consists of data from multiple independent loci, including mitochondrial and Y-chromosomal sequence data and dozens of Alu elements, derived from a large sample set that includes representatives of peripheral species such as C. sanjei and C. galactura. Current analyses of these data reveal strong support for the Cercopithecus/Mandrillus and Lophocebus/Papio Rungwecebus Theropithecus clades identified in previous studies. Also as seen previously, there is incongruence between trees derived from different gene sequences. Preliminary analyses reveal inconsistent support for the paraphyletic placement of Mandrillus within Cercopithecus, and there is no clear resolution of the relationships among Lophocebus, Papio, and Theropithecus clade. Given the conflicting signals from the sequence data, we are generating candidate Alu markers using a novel bioinformatics program to further clarify the phylogenetic relationships within each clade. This grant was funded by grants BCS-0715281 and the Wenner-Gren Foundation for Anthropological Research.

The locomotor repertoire of early Homo: Insights from chimpanzee variation.

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All human societies regularly process their foods by both thermal and non-thermal means. This feature distinguishes us from other species, and may even be compulsory given our evolutionary commitment to a high-quality diet. Yet, our understanding of the functional significance of food processing remains limited, particularly with regards to energy. In this study, we conducted feeding trials in a model animal to investigate the relative effects of cooking and pounding on the energy value of tubers. Adult male CD-1 mice (n = 17) were fed yams in four treatments, based on a within-subjects study design: raw/whole, raw/pounded, cooked/whole, cooked/pounded. Repeated-measures ANOVA revealed that cooking, but not pounding, improved energy gains as indexed by change in body mass. Whereas mice lost weight on raw treatments (whole: 4.3 ± 0.4 g; pounded: 3.8 ± 0.6 g), they gained weight on cooked treatments (whole: 0.1 ± 0.4 g; pounded: 0.2 ± 0.3 g). Post-study preference tests further support the superior effects of cooking. Fasted