

ABSTRACTS

Africa after the fall of Meroe. This gives credit to the Aksumite involvement in the fall of Meroe, although their presence in Nubia appears to have lasted for only a few centuries.

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HLA evolutionary trends in admixed Native American populations

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The highly polymorphic classical human leukocyte antigen (HLA) genes play a central role in adaptive immunity. Their extensive population polymorphism has been often regarded as a hallmark of past and ongoing pathogen-mediated selection. Owing to their central role in fighting pathogen invasion, HLA genes are also considered prime candidates for studying adaptive admixture. After admixture, specific HLA variants may be beneficial in the recipient population, and thus favored by selection. While various studies have shown signatures of natural selection on the HLA regions in admixed populations, the link between the signal and its functional consequences remain unsolved. In this regard, precise intragenic haplotypes analysis of HLA genes in admixed populations is of great interest for understanding their role in human adaptation to pathogens. Integrating currently available HLA data from different studies and databases we characterize the landscape of haplotypic diversity in various contemporary American admixed populations. We thus depict the HLA evolutionary trends, resulting from both the demographic and selection process, further showing how past admixture has contributed to the actual patterns of genetic diversity, heterozygosity, and haplotypic divergence observed in modern American admixed individuals.

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Phenotypic plasticity of the *Macaca fascicularis* mandible: a geometric biomechanical analysis of wild and biomedical populations

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While the biomechanical effects of varying primate diets have been studied with respect to mandibular shape, the limits of the phenotypic plasticity of the non-human primate jaw are not necessarily well understood. This study examines the resulting morphological variation between the differing diets of two sample populations of crab-eating macaques (wild and biomedical), focusing on medical interventions in the second population. Given that wild individuals consume more biomechanically demanding diets than biomedical individuals, and that biomedical specimens have different mastication patterns after having canines extracted or filed, we expect to find these patterns to result in distinct mandibular morphologies. To test this, landmarks ($n=31$) were collected from 3D scans of mandibles from three populations of adult male *M. fascicularis*: 15 wild specimens and 32 biomedical specimens -16 with altered dentition (e.g., removed or filed canines), and 16 without altered dentition. Landmark configurations were subjected to a Principal Component Analysis (PCA), a Canonical Variates Analysis (CVA), and a Discriminant Function Analysis (DFA). The PCA and CVA highlighted differences in the height of the mandibular ramus, the slope of the gonial angle, and the length of the tooth rows, particularly between the biomedical and wild samples. The altered biomedical sample also displayed a unique morphology potentially related to the resorption of alveolar bone. The DFA results found similar rates of misclassification across all three samples, with the lowest rates of misclassification occurring between wild and altered biomedical populations, highlighting their differing morphologies.

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Do people use long-distance relationships to respond to climate variability?

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At least since the emergence of *Homo*, social relationships spanning distance have been a characteristic feature of human social life. Such long-distance relationships have often been used to manage the risk of resource shortfalls posed by climate variability. However, given these relationships are costly to maintain, we should expect individuals to invest more in them when shortfalls are chronic, temporally positively autocorrelated, and not rare – that is, when shortfalls happen at least occasionally and are somewhat predictable. We evaluate these hypotheses in two communities of Bolivian horticulturalists ($n=119$) where

cash crop production is negatively impacted by precipitation variability but access to long-distance connections is improving. To assess whether precipitation exposure predicts long-distance relationships, we drew on participants' migration histories, social relationships, and demographic data; we also used precipitation data from the US National Center for Atmospheric Research to estimate participants' exposure to unusually dry or wet months. Exposure duration, the temporal proximity of exposures, and exposure frequency was not associated with an individual's number of long-distance relationships. However, males, extraverted individuals, and those who had traveled more had more long-distance relationships. In the human lineage, another function of long-distance relationships is to access patchy resources that are never locally available; ethnographic data suggest that this is their primary function in rural Bolivia, not risk management. We close by refining our predictions about when individuals are likely to use long-distance relationships to manage climate variability and to explain how this can be better studied going forward.

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External Energy Exploitation and the Shared Evolutionary Roots of Climate Change and Chronic Disease

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Modernization and industrialization have given rise to two global crises, climate change and non-communicable disease (NCD), which have surpassed infectious disease as the leading global causes of mortality. Here, I examine the shared root cause of climate change and NCD: humans' exploitation of and dependence on external (non-metabolic) energy expenditure (e.g., fire, fossil fuels). The human lineage has been reliant on external energy since the Lower Paleolithic with the use of fire for cooking and other tasks. Dependence on external energy has grown with the advent of agriculture and use of draft animals, the development of wind and water power, and most recently with the exploitation of fossil fuels. Fossil fuel powered mechanization has led to the reduction of physical activity, increased centralization and processing in food production, and greater air pollution (including greenhouse gasses). These changes have, in turn, led to climate change and NCD, which are thus connected to one another and to the hominin lineage's evolved reliance on external energy. Yet despite these connections, solving one crisis is unlikely to meaningfully improve the other. Changes in food production and the built environment needed to address NCD will have minimal effect on global fossil fuel consumption. Moving