

Ecogeography, genetics, and the
evolution of human body form

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Human population structure and history may exert substantial influence the observed variation in phenotypic traits generally thought to be shaped by natural selection. This leads to problems in the interpretation of evolution in the fossil record when we use modern human variation as a referential model. In this talk, I examine the effects of population history and natural selection on postcranial traits that reflect body size and shape, with application to the more general issue of how climate (using latitude as a proxy) has influenced hominin morphological variation. Models of the effects of population structure, ascertained from globally distributed microsatellite genotype data, and latitude are fit to postcranial phenotypes derived from skeletal dimensions taken from a large global sample of modern humans. Results of the model comparisons show stronger support for genetic drift & gene flow to have shaped human variation than natural selection alone. A model that includes both latitude and population structure terms is a good fit to distal limb element lengths and body breadth, indicating that population structure and natural selection both shaped these morphologies. In contrast, some morphologies are best explained by a model that included only a population structure term. The results demonstrate that population structure cannot be ignored, and that clinally distributed natural selection is neither the sole nor the primary driver of among-group differentiation. The distribution of human body form is strongly influenced by the contingencies of modern human origins, which must be taken into account before it may be used as a referential model for problems in the fossil record.

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