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EDITORIAL

Will climate change alter human body shape?

Judging by the weather over the past few years, and the now constant chorus from experts, there seems little doubt that climate change is underway.

This trend of course raises many major concerns, and the hope (tenuous at best) is that it is not too late to avert catastrophic rises in sea levels, and wild swings in weather behaviour that will impact on all our lives, in ways that are hard to imagine.

A side-issue, of possible interest, has emerged from research over the past few decades, showing how human body characteristics have been strongly affected by past climatic influences.

- It was Ruff (1991) who described how the colder the climate, the wider the body structure appeared to be. He explained that: "The very broad pelvis of small early hominids has previously been interpreted in obstetrical and biomechanical terms. However, neither of these considerations can explain the subsequent decrease in maximum pelvic breadth relative to stature in larger more recent hominids. [This] increase in relative linearity of the body, with an increase in body size, is consistent with basic thermoregulatory principles. Specifically, to maintain a constant surface area/body mass ratio, absolute body breadth should remain constant despite differences in body height. Variation among modern humans supports the prediction: populations living in the tropics vary greatly in stature, but show little variation in body breadth. In contrast, populations living in colder climates have absolutely wider bodies, and thus lower surface area/body mass, regardless of stature."
- Additionally Stock (2004) has demonstrated that the relative strength of distal limb bones, such as the tibia, show a stronger correlation with habitual activity patterns, than does the relative strength of proximal limb bones, such as the femur, which show a stronger correlation with climate.
- Ruff et al. (2006) points out that another way to explain these same features is that the structure of proximal limb bones is influenced by body shape, which itself is in part climatically determined (Ruff, 1994). In contrast it seems that the structure of distal limb bones is probably more influenced by activity, rather than climate (or general body type).
- Ruff (1991) also suggests that thermoregulatory constraints on absolute body breadth, together with obstetric and biomechanical factors, may have contributed to the evolution of the rotational birth process and secondary altriciality [relative underdevelopment of the human newborn infant compared to other primates], associated with increased body and brain size in Homo erectus.
- Ruff (1991) further points out that thermoregulatory considerations also suggest that African H. erectus would most likely have been limited to relatively open/dry environments, while australopithecines could have inhabited either open/dry or closed/wet environments.

While it is certain that in the short term climate change will not modify the physical shape of humans, it seems likely, based on the evidence that Ruff and others have presented, that over time (many thousands of years), marked climatic changes are likely to present evolutionary demands that may well do so, assuming the human race survives that is.

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