influenced CRL, we found marked effects of both sex and obesity status on all parameters of growth in BW. For both traits, growth parameters were highly and significantly heritable, with sex as a significant covariate (e.g., BW: θ_1, $h^2 = 0.78$, $p < 0.0001$; θ_2, $h^2 = 0.39$, $p < 0.0001$; θ_3, $h^2 = 0.10$, $p < 0.01$). These results suggest that adult obesity is, in part, the outcome of developmental processes driven by heritable obesogenic trajectories, with faster and longer growth leading to larger adult size.

Funding provided by the National Institutes of Health: RR019963/OD010965 (MJJ, JRK), RR016300 (NBF, AJJ, and CAS), 2T32NS048004-06A1 (CAS).

Limb anatomy influences swing duration and angular velocity: Implications for understanding primate locomotor adaptations

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To understand the functional correlates of diversity in limb length, mass, and weight distribution among mammals, most biomechanical studies have focused on stance phase mechanics, while swing phase has remained relatively understudied. Previous studies have shown that as animals move faster the stance period shortens while the swing period stays relatively constant. This suggests that mechanical qualities, such as limb length and mass distribution, constrain swing timing and can influence animal velocity and energetic costs. Primates–with relatively more distal weight distribution associated with prehensile hands and feet–may experience longer swing periods compared to other mammals. We tested this hypothesis by calculating swing period from videorecords for a wide range of mammals, including humans, dogs, cats, kinkajous, coatis, lemurs, squirrel monkeys and callitrichids. In every species in our sample stance duration decreases with increasing speed and swing duration remains nearly constant. When absolute swing durations are compared, most species were identical, although dogs and marmosets showed significantly shorter absolute swing durations than other mammals. This similarity in swing period (in spite of differences in limb length) leads to differences in angular velocity, and thus, muscular effort needed to accelerate and decelerate the limb. Although relatively longer limbs and grasping cheiridia may provide benefits for increasing stride length and stability, such anatomy may also constrain speed, influence speeds at which gait transitions occur, and increase costs of locomotion. Understanding the relative costs and benefits of different limb anatomies allows a better understanding of selective pressures driving morphological evolution in primates.

Using a white light confocal profiler for cut mark analysis

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The current study employs a white light confocal profiler (WLCP) to analyze cut marks on a prehistoric bone to determine if they were made with stone (i.e., ancient) or steel (i.e., modern) tools. The unknown in this case is a 5,300-year-old, 5 cm cranial fragment with cuts consistent with scalping but which came from a site damaged by a modern auger. The cranial fragment cuts were compared to experimental cuts made on cow bone with a bifacial chert knife, unworked chert flake, unworked slate, sharpened slate, a bifacial steel knife, a serrate steak knife, and a trowel. Experimental cuts were made perpendicular to the long axis of the bone holding the implement vertically; for this study force was deliberately not standardized. Data collection commenced at 20X magnification; we generated three profiles for each cut using SolarMap® software. Steel tools created deep, narrow cuts ranging from ~10 to 100 microns in width and had starkly flat kerf floors. The exception was the trowel, which made wide scratches around 200 microns across, but their floors were flat. The stone tools created shallow, wide cuts that measured between 110-250 microns wide with rounded kerf floors. The cranial fragment cuts were wide and shallow, were ~230 microns wide, and had distinctly rounded floors. Thus, they appear to be ancient. Although preliminary because quantification and standardization need to be developed, it is clear that a WLCP can ably assist with cut mark study.

Assessing diet specialization of Hadza microbiota through activity and composition

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In this study we used the TNO in-vitro intestinal model (TIM-2) to replicate fermentation of wild African tubers consumed by the Hadza hunter-gatherers of Tanzania to learn about microbial activity and metabolite production that may play a role in host health and nutrition. The TIM-2 replicates the large intestine through a tightly regulated computer-controlled environment in which fermentation takes place. This enables non-invasive techniques for studying human physiology as a dynamic and living environment. The TIM-2 was inoculated with microbiota derived directly from two human fecal sample sources: Hadza and European adults. Test compounds (food) included three Hadza tubers, sweet potato, resistant starch and an in-house carbohydrate solution. Tubers were tested both raw and briefly roasted. Lumen and dialysate were sampled every 24-hours for microbiota and metabolite production respectively. Metabolites measured included short chain fatty acids (SCFAs), branched chain fatty acids (BCFAs), lactate, and ammonia. The activity of the microbial communities displayed unique qualities both between test compounds and between communities. The test compounds containing starch and carbohydrates were characterized by high production of acids, an indication of fermentation, lowering of pH, and low production of other metabolites. In contrast, where acid production did not occur, ammonia production denoted a shift in microbial metabolism. We present the findings for each trial and discuss how they relate to microbial adaptations to different diets. This work is important for understanding how microbiota can confer advantages for the host absent macroscopic adaptations.

Inferences about prefrontal cortex size in humans from motor and premotor area scaling relationships

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Disproportionate increased size of particular areas of the human brain, as assessed relative to trends found among primates, suggests that behaviors mediated in those areas have been particularly important during human evolution. One area that has been the focus of several studies is the prefrontal cortex. Early data by Brodmann suggested that it was approximately twice as large as would be predicted for a primate neocortex as large as ours. These data have been called into question recently partly because they do not fit expectations reported from more recent studies. The entire frontal lobe, which includes primary motor (Brodmann area 4) and premotor (Brodmann area 6) areas in addition to the prefrontal cortex, is apparently as large as would be predicted for a brain as large as ours. However, if the prefrontal lobe is in fact disproportionately large, then areas 4 and 6 would therefore necessarily have to be disproportionately small. Data from the literature on the sizes of areas 4 and 6 in a small sample of primates (Glezer 1958) was used to assess this question. The results show that these areas are indeed disproportionately small: area 4 is only ~32% as large as predicted, and area 6 is only ~72% as large as predicted. However, the prediction intervals do not exclude the human data, possibly because sample size is so small (N=7 including humans). It is argued that a consideration of all published studies relevant to prefrontal size suggests that it is indeed particularly large in humans.

Infanticides during a socially stable period in wild white-faced capuchin monkeys (*Cebus capucinus*)

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Infanticide occurs in a range of primate species, usually in the context of intergroup encounters, group takeovers, or following changes to the male dominance hierarchy. Here