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Meat-adaptive genes and the evolution of slower aging in humans.

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Abstract

The chimpanzee life span is shorter than that of humans, which is consistent with a faster schedule of aging. We consider aspects of diet that may have selected for genes that allowed the evolution of longer human life spans with slower aging. Diet has changed remarkably during human evolution. All direct human ancestors are believed to have been largely herbivorous. Chimpanzees eat more meat than other great apes, but in captivity are sensitive to hypercholesterolemia and vascular disease. We argue that this dietary shift to increased regular consumption of fatty animal tissues in the course of hominid evolution was mediated by selection for "meat-adaptive" genes. This selection conferred resistance to disease risks associated with meat eating also increased life expectancy. One candidate gene is apolipoprotein E (apoE), with the E3 allele evolved in the genus Homo that reduces the risks for Alzheimer's and vascular disease, as well as influencing inflammation, infection, and neuronal growth. Other evolved genes mediate lipid metabolism and host defense. The timing of the evolution of apoE and other candidates for meat-adaptive genes is discussed in relation to key events in human evolution.

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