Culture skews human evolution

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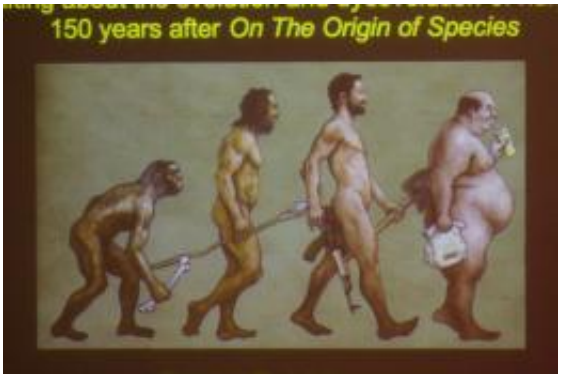

‘Our bodies are not that well-designed for the world we have created,’ said anthropology professor Daniel Lieberman. He illustrated it with this drawing. Photograph by Kris Snibbe/Harvard News Office

(PhysOrg.com) -- The rise of agriculture 10,000 years ago meant the end of the hunter-gatherer lifestyle for which human beings had been optimized by millions of years of evolution and the beginning of an era where culture encourages habits unhealthy for us and for the world around, with uncertain evolutionary outcomes.

“Our bodies are not that well designed for the world we have created,” said anthropology professor Daniel Lieberman.

Lieberman spoke March 5 in the third of the Harvard Museum of Natural History’s (HMNH) “Evolution Matters” lecture series. His talk, called “Survival of the Fleetest, Smartest or Fattest?” reviewed the

evolutionary trends that led to modern humans and discussed the cultural reasons for some of today's major health ills, such as obesity and diabetes.

Lieberman, who was introduced by HMNH Executive Director Elisabeth Werby, said the four most significant events in human history were our separation from apes; the evolutionary development of the genus Homo, shared by modern humans, Neanderthals, and Homo erectus; and the separation of our species, Homo sapiens, from our common ancestor with other Homo species.

The final event, Lieberman said, was a cultural one, not an evolutionary one. The beginnings of agriculture 10,000 years ago created lasting change that led to modern society and our modern way of life.

Farming culture allowed human women to give birth more frequently, spurring population growth. It also led to the spread of disease, as humans were in close contact with a variety of animal species, such as chickens, pigs, and cows, providing an environment in which animal viruses could pass into humans. It also led to the protection of people who physically might not survive in a hunter-gatherer society, and the rise of conditions and ailments such as myopia and diabetes.

The result, Lieberman said, is a cultural buffering of evolution's harsh rule of "survival of the fittest" that may be leading to the "dysevolution" of Homo sapiens.

Though scientific opinion varies on whether evolution is still acting on humans, Lieberman said it probably is, pointing to relatively recent developments of lactose tolerance in adults — allowing them to consume dairy products long after weaning — and of pale skins in those from northern climates.

To understand the roots of “dysevolution,” one must understand where humans came from, Lieberman said. Descended from a common ancestor with chimpanzees between 6 million and 8 million years ago, early primitive humans like Sahelanthropus and Ardipithecus were very chimplike but walked upright. Lieberman traced this adaptation to climate change, namely a planetary cooling that transformed large tracts of thick jungle to open woodlands where walking would be a more efficient form of locomotion than either the climbing or knuckle-walking at which chimps excel.

The next change, Lieberman said, was driven by an additional cooling, which led to further thinning of the forests and the rise of savannah. From these changes arose the genus Homo between 2 million and 3 million years ago. Early human ancestors evolved different adaptations to survive on the savannah, with an Australopithecus species becoming adapted to large amounts of low-quality food, as evidenced by their large teeth.

The Homo genus evolved a different way of life, adapting for high-quality, high-energy foods, and becoming good at running in the heat of the day to engage in “persistence hunting” to run down exhausted prey species.

The first Homo sapiens appeared about 200,000 years ago and may have evolved from Homo heidelbergensis, Lieberman said, and continued to invent new tools and technology, spreading out of Africa to Europe, Asia, and other parts of the world. We were smart, inventive, highly mobile endurance athletes who cooked our food to get more energy from it. We were also relatively fast breeders when compared with other apes, with a baby every three years.

These evolutionary solutions were successful, Lieberman said, but energy intensive. The problem today, Lieberman said, is that humanity’s

“gas guzzling” strategies, which enabled them to survive on the African savannah and expand around the world, aren’t always helpful in an era with ready fast food, sugar-rich snacks, and steadily decreasing demand for physical exertion.

“Obviously, they stood us in good stead until the very recent past,” Lieberman said.

Since we can’t will ourselves to evolve so that we don’t crave high-energy foods, Lieberman said we should instead encourage our inner hunter-gatherer by requiring more physical activity of our kids in schools, raising gasoline taxes to discourage driving, outlawing fast food, and restricting access to elevators, escalators, and moving sidewalks to force us to walk more.

“We need to think more like Darwin and act more like hunter-gatherers,” Lieberman said.

Provided by Harvard University (news : web)