

Selection Spurred Recent Evolution, Researchers Say

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Researchers analyzing variation in the human genome have concluded that human evolution accelerated enormously in the last 40,000 years under the force of natural selection.

The finding contradicts a widely held assumption that human evolution came to a halt 10,000 years ago or even 50,000 years ago. Some evolutionary psychologists, for example, assume that the mind has not evolved since the Ice Age ended 10,000 years ago.

But other experts expressed reservations about the new report, saying it is interesting but more work needs to be done.

The new survey — led by Robert K. Moyzis of the University of California, Irvine, and Henry C. Harpending of the University of Utah — developed a method of spotting human genes that have become more common through being favored by natural selection. They say that some 7 percent of human genes bear the signature of natural selection.

By dating the time that each of the genes came under selection, they have found that the rate of human evolution was fairly steady until about 50,000 years ago and then accelerated up until 10,000 years ago, they report in the current issue of *The Proceedings of the National Academy of Sciences*. The high rate of selection has probably continued to the present day, Dr. Moyzis said, but current data are not adequate to pick up recent selection.

The brisk rate of human selection occurred for two reasons, Dr. Moyzis' team says. One was that the population started to grow, first in Africa and then in the rest of the world after the first modern humans left Africa. The larger size of the population meant that there were more mutations for natural selection to work on. The second reason for the accelerated evolution was that the expanding human populations in Africa and Eurasia were encountering climates and diseases to which they had to adapt genetically. The extra mutations in their growing populations allowed them to do so.

Dr. Moyzis said it was widely assumed that once people developed culture, they protected themselves from the environment and from the forces of natural selection. But people also had to adapt to the environments that their culture created, and the new analysis shows that evolution continued even faster than before.

The researchers took their data from the HapMap project, a survey designed by the National Institutes of Health to look at sites of common variation in the human genome and to help identify the genes responsible for common diseases. The HapMap data, generated by analyzing the genomes of people from Africa, East Asia and Europe, has also been a trove for people studying human evolutionary history.

David Reich, a population geneticist at the Harvard Medical School, said the new report was “a very interesting and exciting hypothesis” but that the authors had not ruled out other

explanations of the data. The power of their test for selected genes falls off in looking both at more ancient and more recent events, he said, so the overall picture might not be correct.

Similar reservations were expressed by Jonathan Pritchard, a population geneticist at the University of Chicago.

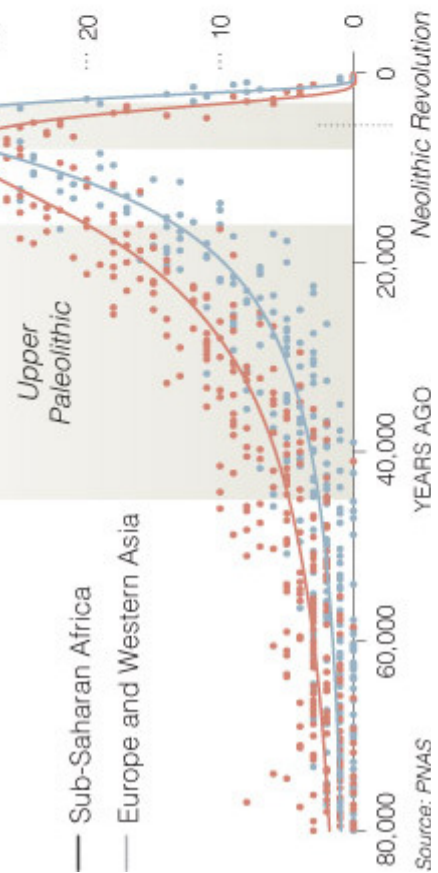
“My feeling is that they haven’t been cautious enough,” he said. “This paper will probably stimulate others to study this question.”

A Speedier Timeline

Researchers analyzing the human genome concluded that the rate of human evolution began to accelerate about 40,000 years ago, and continued to rise until at least 10,000 years ago.

Strongly selected genes

Below, each dot represents the number of genes under strong selective pressure over 10 human generations (250 years). The rate of selection might continue to the present day, but current data are not adequate to pick up recent selection.



Population growth

One possible explanation is that with the growth of the human population, particularly after the transition to agriculture during the Neolithic Revolution, there have been many more mutations for natural selection to work on.

