# New statistical model moves human evolution back 3 million years

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Evolutionary divergence of humans from chimpanzees likely occurred some 8 million years ago rather than the 5 million year estimate widely accepted by scientists, a new statistical model suggests.

The revised estimate of when the human species parted ways from its closest primate relatives should enable scientists to better interpret the history of human evolution, said Robert D. Martin, curator of biological anthropology at the Field Museum, and a co-author of the new study appearing in the journal *Systematic Biology*.

Working with mathematicians, anthropologists and molecular biologists, Martin has long sought to integrate evolutionary information derived from genetic material in various species with the fossil record to get a more complete picture.

Comparing DNA among related animals can provide a clear picture of how their shared genes evolved over time, giving rise to new and separate species, Martin said. But such molecular information doesn't yield a timetable showing when the genetic divergence occurred.

Fossil evidence is the only direct source of information about long-extinct species and their evolution, Martin and his colleagues said, but large gaps in the fossil record can make such information difficult to interpret. For a generation, paleontologists have estimated human origins at 5 million to 6 million years ago.

But that estimate rests on a thin fossil record. By looking at all of today's primate species, all of the known fossil primates and using DNA evidence, computer models suggest a longer evolutionary timetable. The new analysis described in the Systematic Biology paper takes into account gaps in the fossil record and fills in those gaps statistically.

Such modeling techniques, which are widely used in science and commerce, take into account more overall information than earlier processes used to estimate evolutionary history using just a few individual fossil dates, Martin said. It can give scientists a broader perspective for interpreting data.

One example is a skull fossil discovered in Chad (central Africa) earlier in this decade. The fossil, named Sahelanthropus tchadensis and nicknamed Toumaï (which means "hope of life" in the local Goran language), raised great interest because it has many human characteristics. But consensus on how to classify the discovery has been elusive particularly because the fossil is about 7 million years old, well beyond the accepted time frame for human evolution.

Under the new estimate, Toumaï would fall within the period after the human lineage split from chimpanzees, Martin said.

The new approach to dating evolutionary history builds on earlier work by Martin and colleagues. In 2002, they published a paper in Nature that argues the last common ancestor of today's primates lived some 85 million years ago.

This implies that for 20 million years before dinosaurs became extinct, early versions of primates also lived and evolved. It challenged the accepted theory that primates and other mammals didn't really thrive on the planet until dinosaurs were gone.

After that paper was published, Martin said he expected someone would apply the new statistical techniques to the question of human evolution, but when no one did, "We decided to do it ourselves."

**More information:** Here is a link to the article: http://sysbio.oxfordjournals.org/content/early/2010/11/04/sysbio.syq054.full.html?ijkey=CaQif1LgTAd7xOD&keytype=ref

Provided by Field Museum