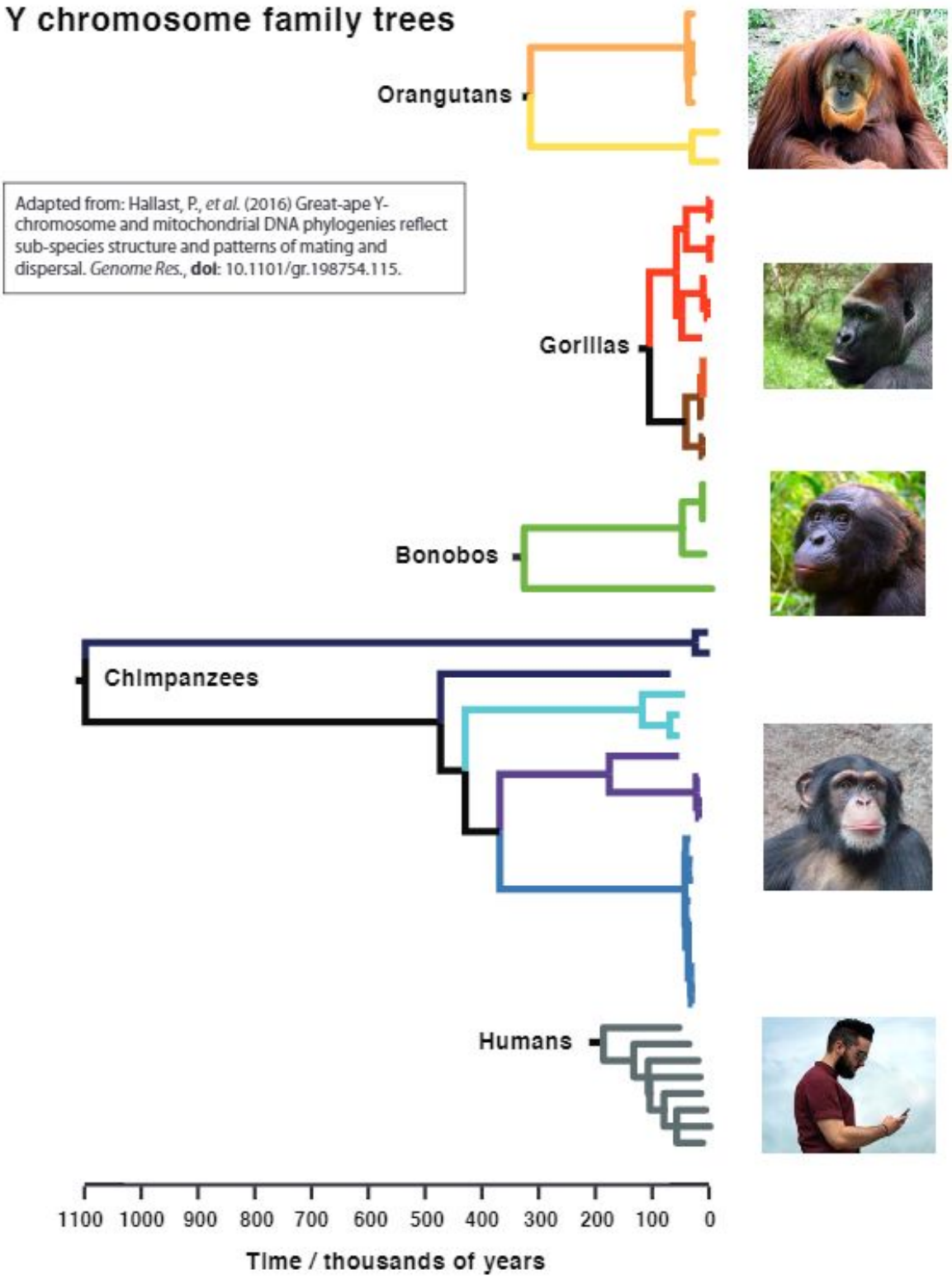
Ancient chimpanzee 'Adam' lived over one million years ago, research reveals

February 25 2016



Credit: University of Leicester

Chimpanzees have an ancient common ancestor—or genetic 'Adam'—that lived over one million years ago, according to University of Leicester geneticists.

In a study, which was funded by the Wellcome Trust and published in the journal *Genome Research*, the research team led by Professor Mark Jobling from the University of Leicester's Department of Genetics determined the DNA sequences of a large part of the Y chromosome, passed exclusively from fathers to sons, in a set of chimpanzees, bonobos, gorillas and orangutans.

The study also looked at mitochondrial DNA (mtDNA), passed from mothers to offspring, in the same set of animals.

This allowed the construction of genealogical trees that could be compared between species and subspecies – and helped the researchers to discover that the genetic 'Adam' for chimpanzees lived a remarkable one million years ago.

Dr Pille Hallast from the Department of Genetics, lead author on the paper, explained: "The ancestor of a Y-chromosome family tree is sometimes called 'Y-chromosomal Adam'. We can compare the ages of 'Adams' between the species. For humans the age is about 200 thousand years, while for gorillas it's only about 100 thousand years. Thanks to two chimps in our sample, Tommy and Moritz, chimpanzees have an amazingly ancient 'Adam', who lived over 1 million years ago.

"The Y chromosome tree for gorillas is very shallow, which fits with the idea that very few male gorillas (alpha males) father the offspring within groups. By contrast, the trees in chimpanzees and bonobos are very deep, which fits with the idea that males and females mate with each other

more indiscriminately."

The project's leader, Professor Mark Jobling from the University of Leicester's Department of Genetics, added: "It's interesting to compare the shapes of the trees between humans and our great-ape relatives. Considering both Y chromosome and mitochondrial DNA trees, humans look much more like gorillas than chimps.

"This suggests that over the long period of human evolution our choice of partners has not been a free-for-all, and that it's likely that humans have practiced a polygynous system – where a few men have access to most of the women, and many men don't have access - over our evolutionary history as a species. This is more like the gorilla system than the chimpanzee 'multimale-multifemale' mating system."

More information: Pille Hallast et al. Great-ape Y-Chromosome and mitochondrial DNA phylogenies reflect sub-species structure and patterns of mating and dispersal, *Genome Research* (2016). DOI: 10.1101/gr.198754.115

Provided by University of Leicester