

The human genome is a mosaic with respect to its evolutionary history. Based on a phylogenetic analysis of 23,210 DNA sequence alignments from human, chimpanzee, gorilla, orangutan, and rhesus, we present a map of human genetic ancestry. For about 23% of our genome, we share no immediate genetic ancestry with our closest living relative, the chimpanzee. This encompasses genes and exons to the same extent as intergenic regions. We conclude that about 1/3 of our genes started to evolve as human-specific lineages before the differentiation of human, chimps, and gorillas took place. This explains recurrent findings of very old human-specific morphological traits in the fossils record, which predate the recent emergence of the human species about 5-6 MYA. Furthermore, the sorting of such ancestral phenotypic polymorphisms in subsequent speciation events provides a parsimonious explanation why evolutionary derived characteristics are shared among species that are not each other's closest relatives.