

# BONES, STONES, AND GENES THE ORIGIN OF MODERN HUMANS

Three leading researchers of human evolution reveal the fossil and genetic evidence chronicling the origin of our species.

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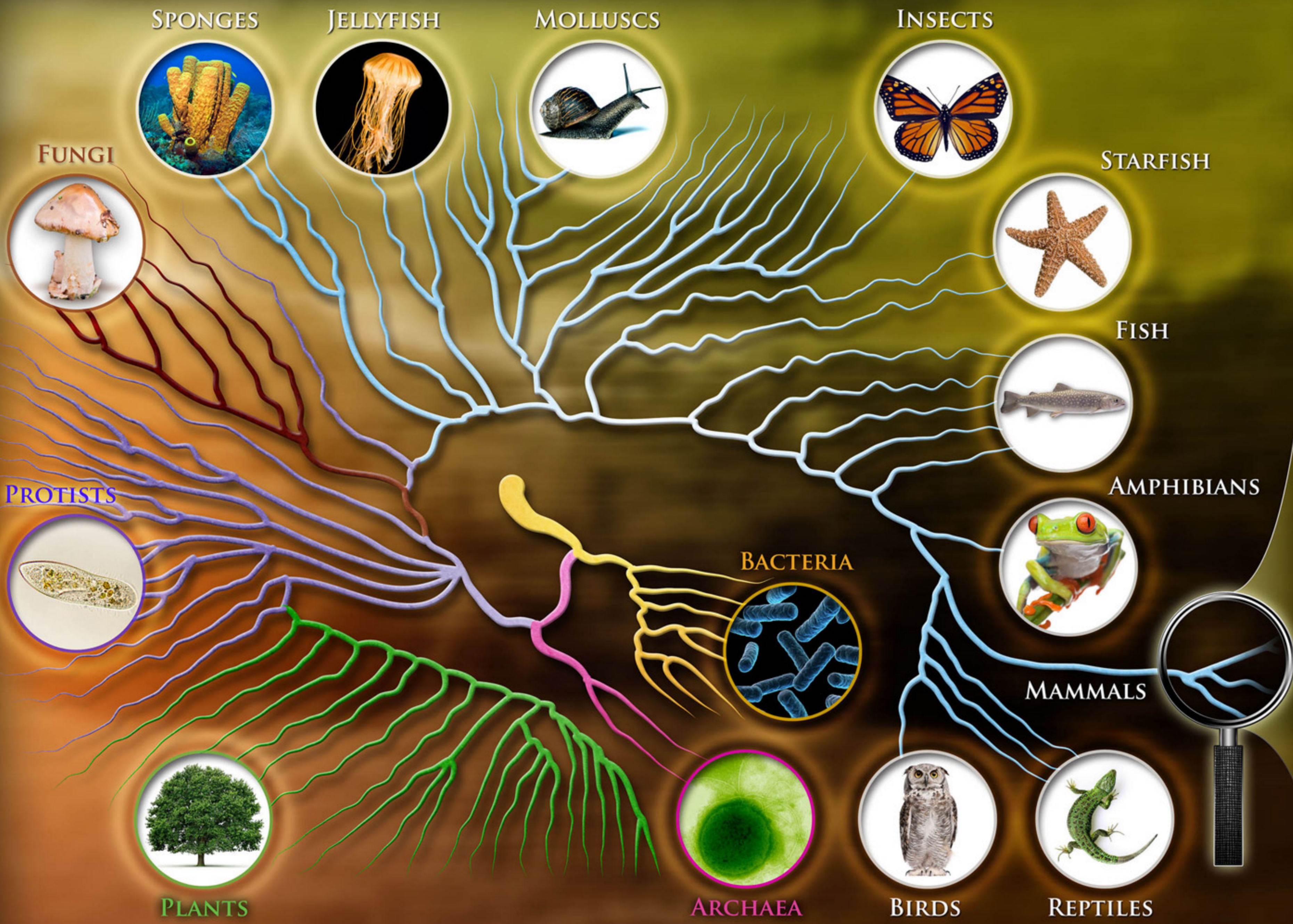
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# HUMAN EVOLUTION WITHIN THE TREE OF LIFE



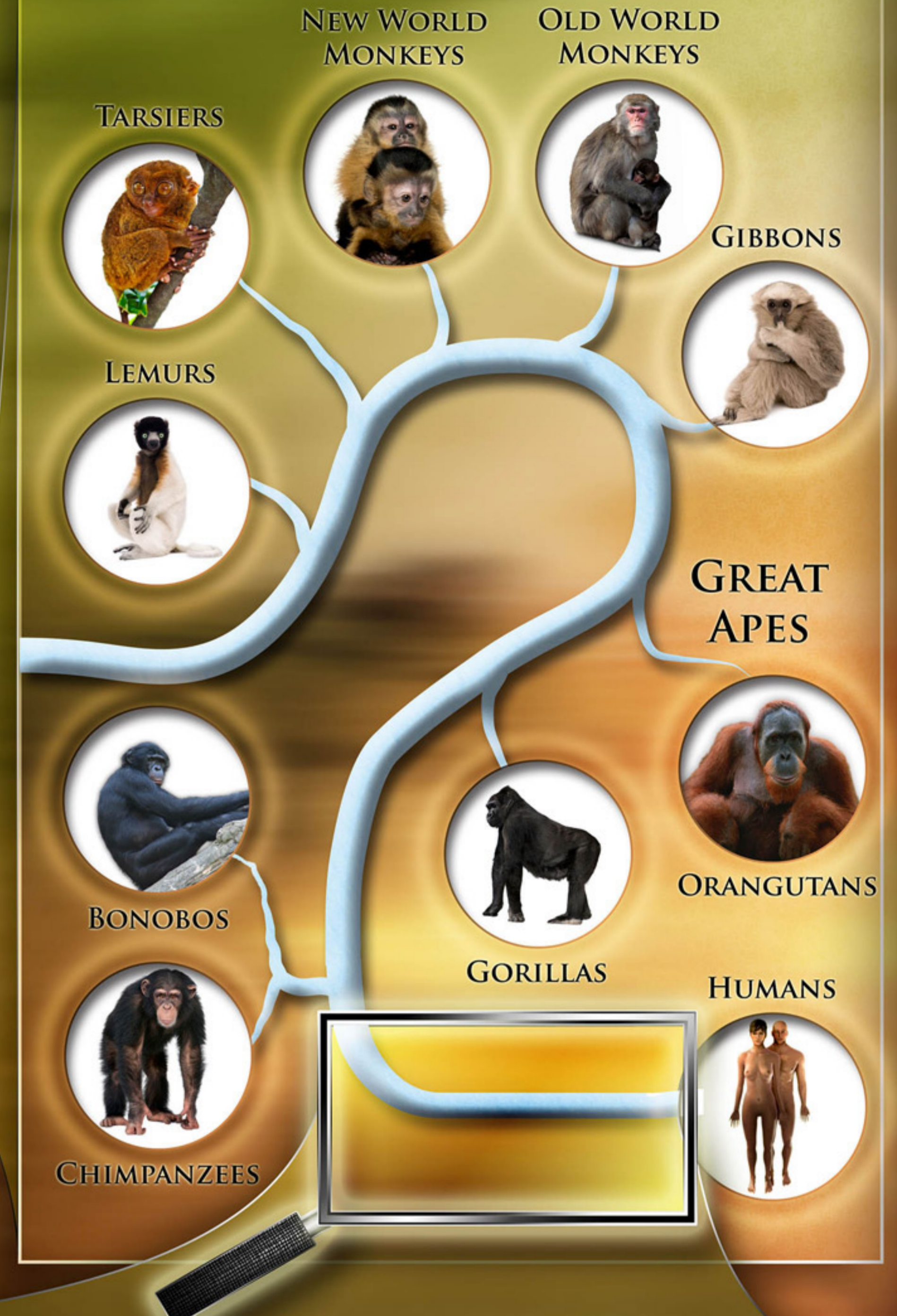
## TREE OF LIFE

Human evolution, like the evolution of any plant, animal, or single-celled organism, occurred within a branching tree of life in which all organisms are related to one another. Our understanding of the shape of the tree is informed by fossil evidence as well as by comparing DNA sequences of diverse living organisms.

## MAMMALS



## PRIMATES



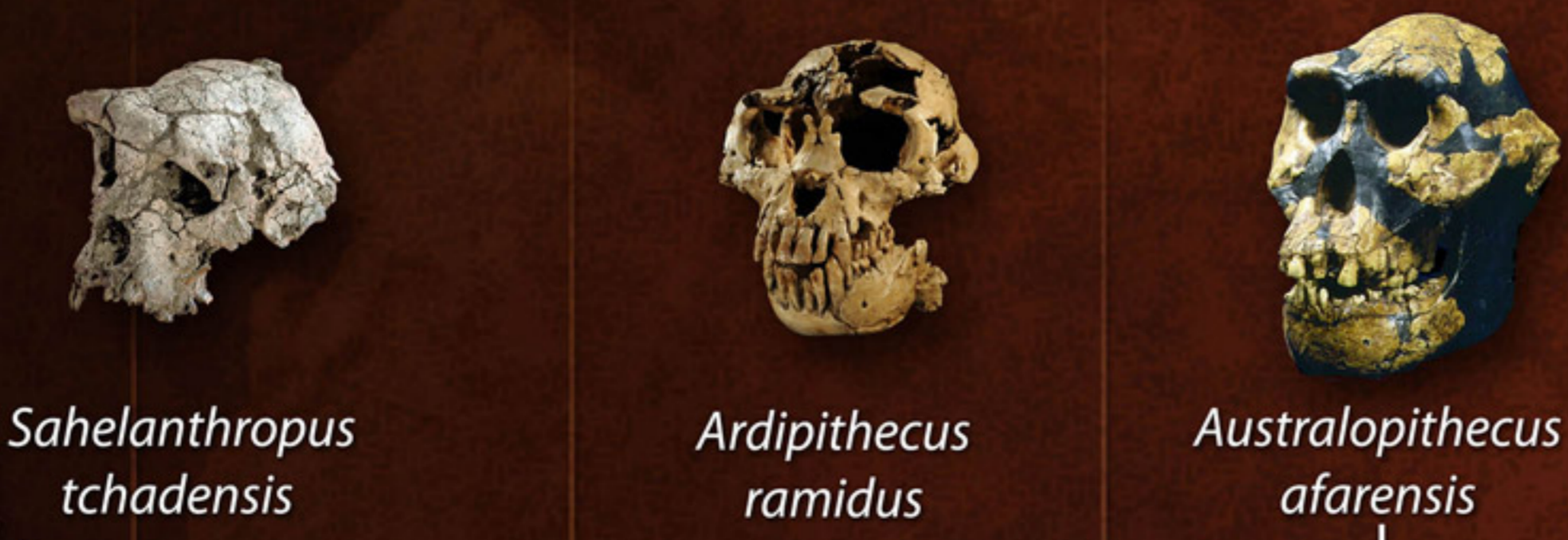
## ONGOING HUMAN EVOLUTION

Although milk is essential nutrition for human infants, most people lose the ability to digest the lactose in milk after weaning, due to a reduction in the level of the enzyme lactase. Genetic evidence is consistent with the hypothesis that adult milk intolerance is the ancestral human trait. As the cultural practices of livestock herding developed in Europe and Africa, new mutations that caused lactase levels to remain high into adulthood arose independently in these populations. This adaptation allowed people to take advantage of a novel food source—the milk of newly-domesticated mammals. The descendants of these pastoralists are concentrated in East Africa and Europe and have spread worldwide in more recent migrations.

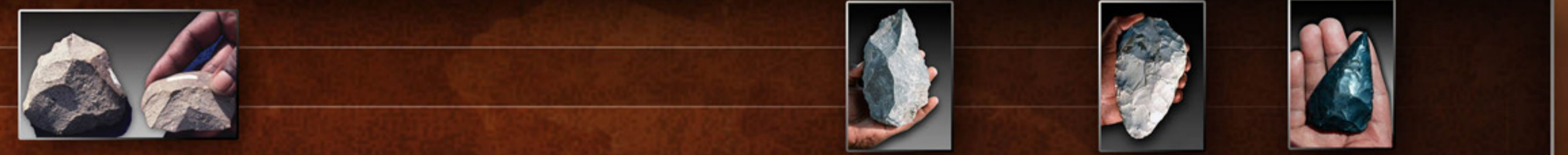


Sahelanthropus tchadensis photo courtesy Michel Brunet; Ardipithecus ramidus photo by and © 2010 Tim D. White; Australopithecus afarensis photo courtesy W. Kimbel/HHMI. All other photos of fossils, skulls, and stone tools by and © Tim D. White; Bonobos: Tisha Shears; Walnut cow: Flickr/Just chaos; Archos: Archivos Angela Tapia; y Fabrice Confortoni; Orangutan: Anup Shriv/PhotoDisc/Thinkstock; All other images from Thinkstock Images, Hemera/Thinkstock, Comstock Images/Thinkstock, iStockphoto/Thinkstock, Hemera Technologies/Photos.com/Thinkstock, Hemera Technologies/PhotoObjects.net/Thinkstock, Digital Vision/Thinkstock, Hemera/Thinkstock

## HOMINIDS



## STONE TOOLS



## HUMAN EVOLUTION

Important fossils of numerous human ancestors have been discovered during the last century, and there are now thousands of fossils documenting human evolution after our lineage split from the lineage that led to chimpanzees. These fossils can be placed on a timeline that reveals the basic course of our evolution, even though details are still being worked out. Shown here are some key hominid skulls chosen to illustrate phases in this evolution, along with examples of contemporaneous stone tools that provide glimpses into how these hominids behaved. Blue bars represent species lineages for humans and their closest, but now extinct, relatives. Our evolution continues today, as selection and other forces act on the genetic variation in the world's human population.

