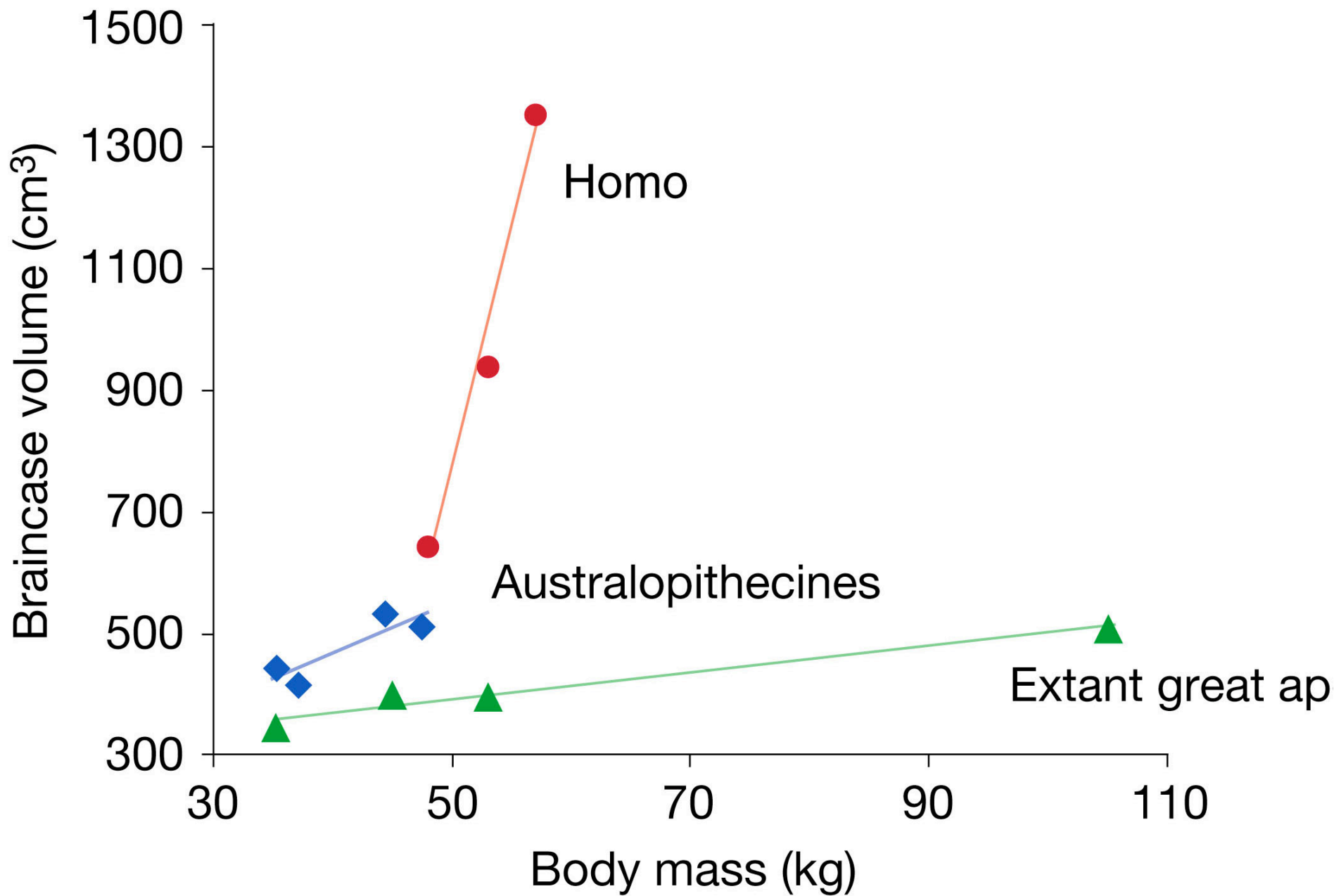


# The evolution of humans remains highly emotional, not scientifically questionable

- Creation “Science” cannot agree that evolution produced our species
- How can a consensus be achieved that allows religious dignity?

# Major Questions in Human Evolution

- 1. What caused evolution of upright posture?
- 2. What is relationship of climate and human evolution?
- 3. What is correct phylogeny of hominids?
- 4. What caused evolution of dramatic brain size increase?
- 5. What was origin of language and music?
- 6. How did modern humans disperse around globe?
- 7. What is the origin of human races, and what are human races genetically?



# Brain size through time

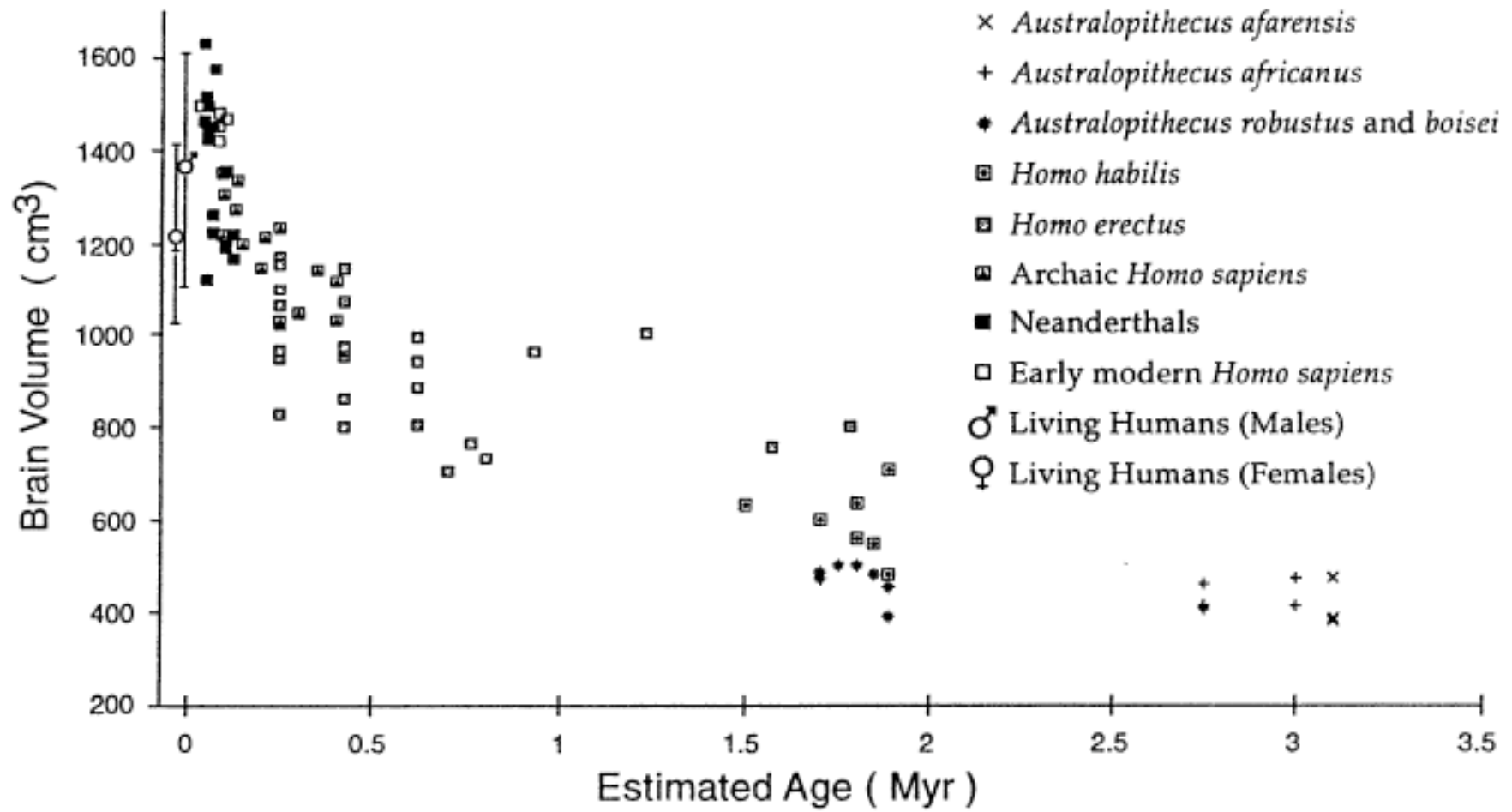
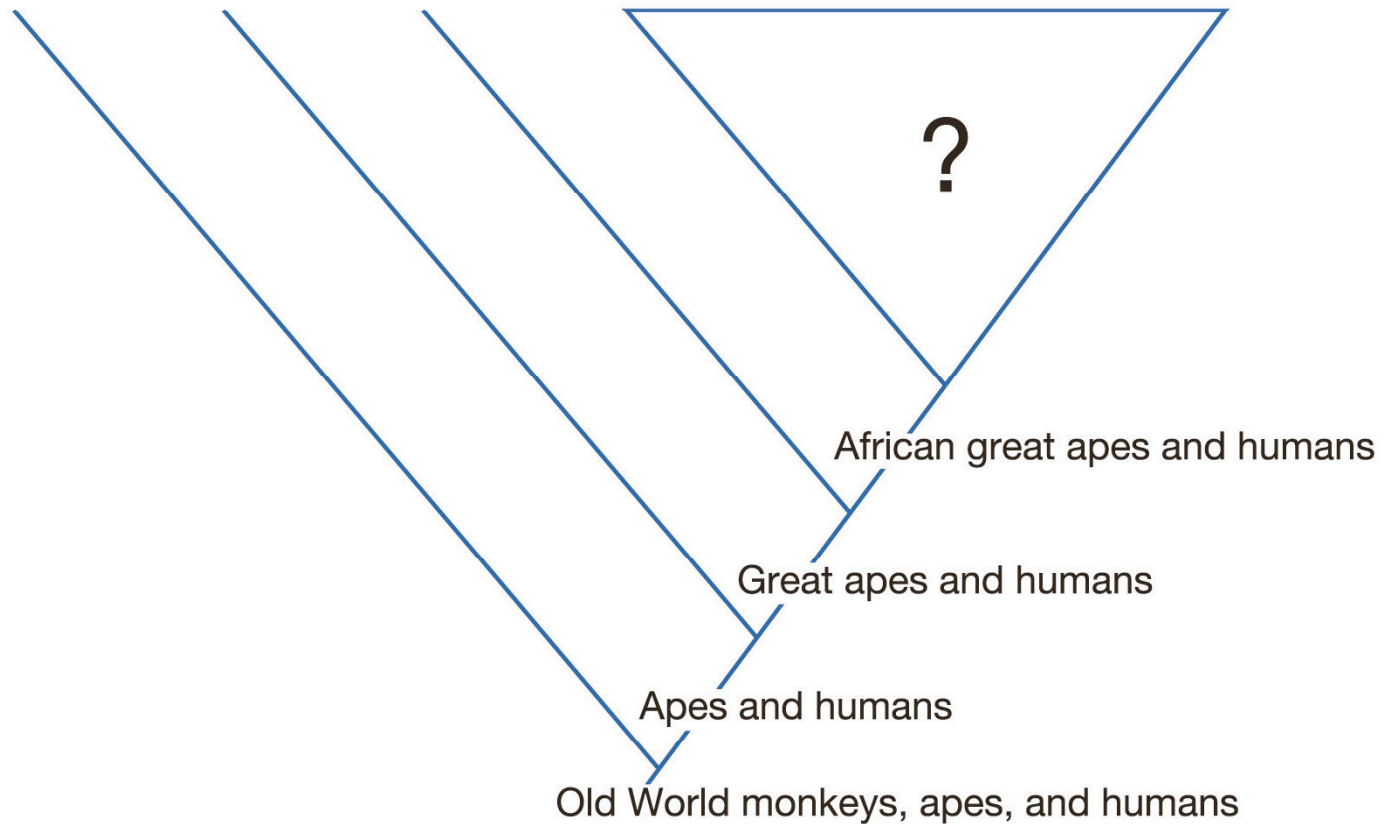
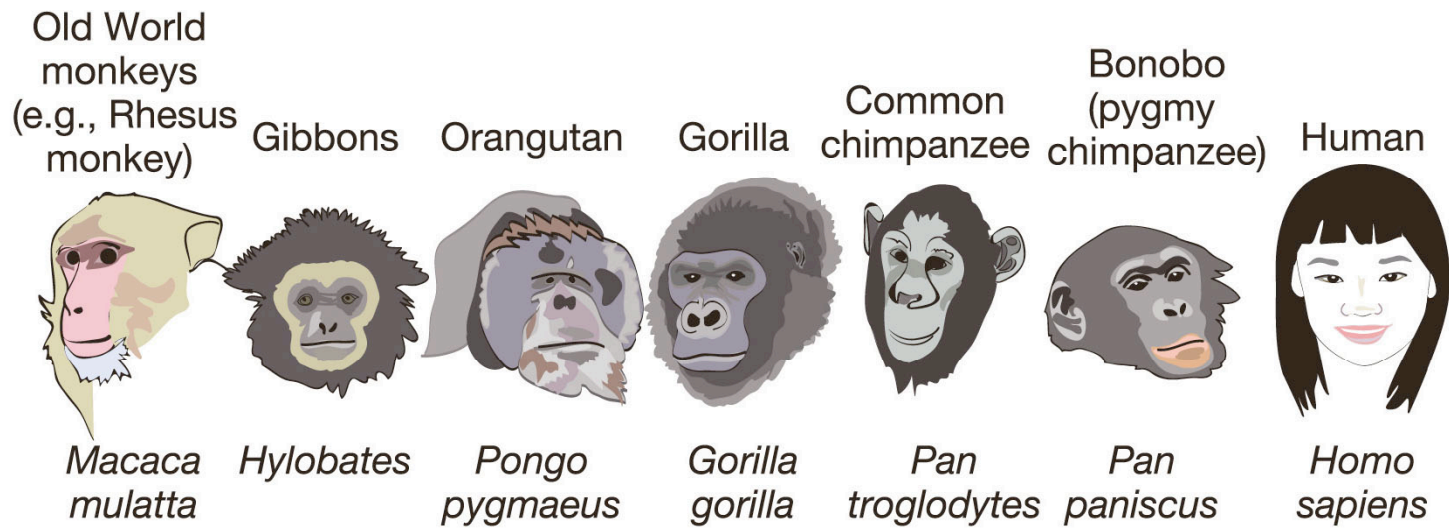
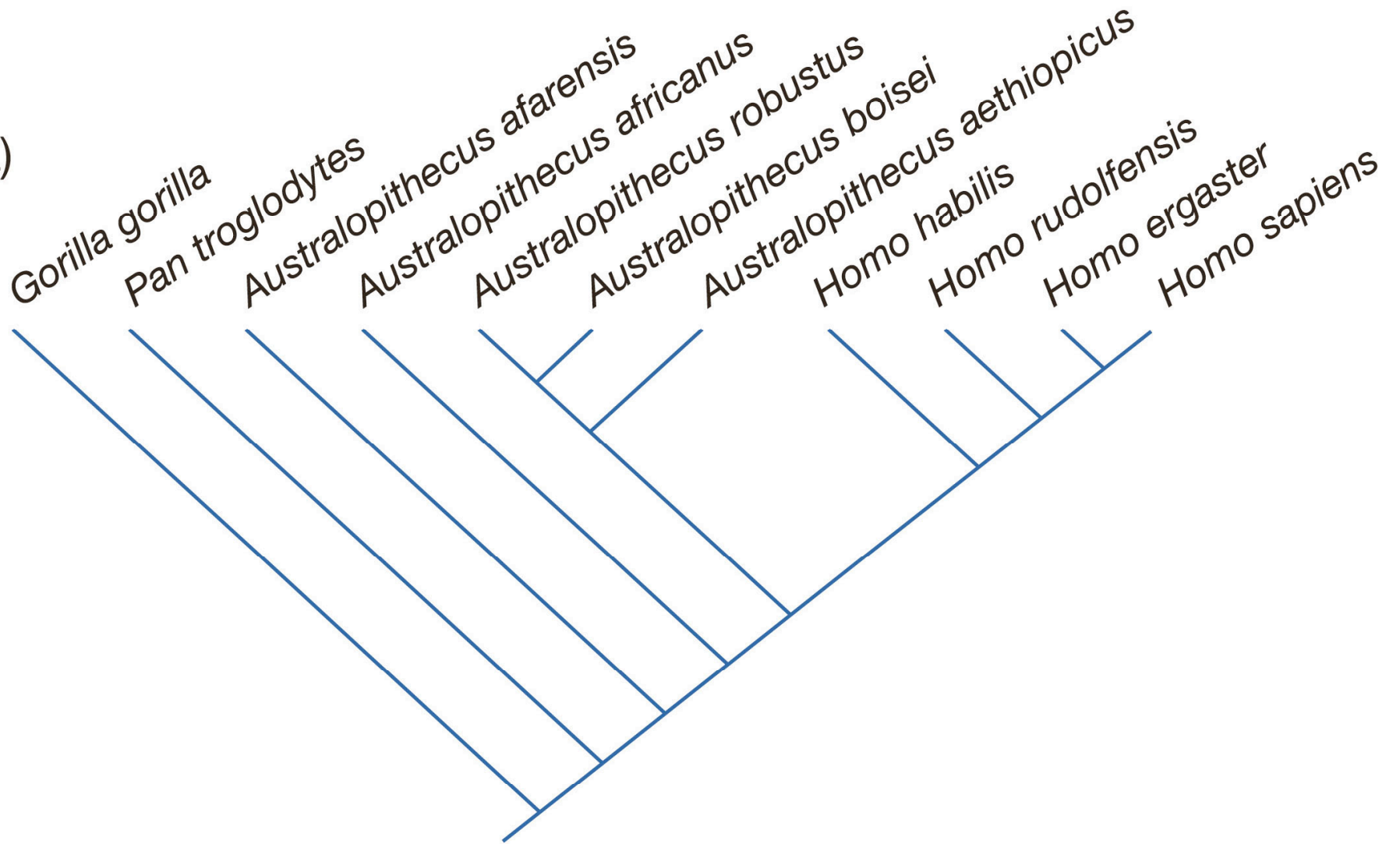
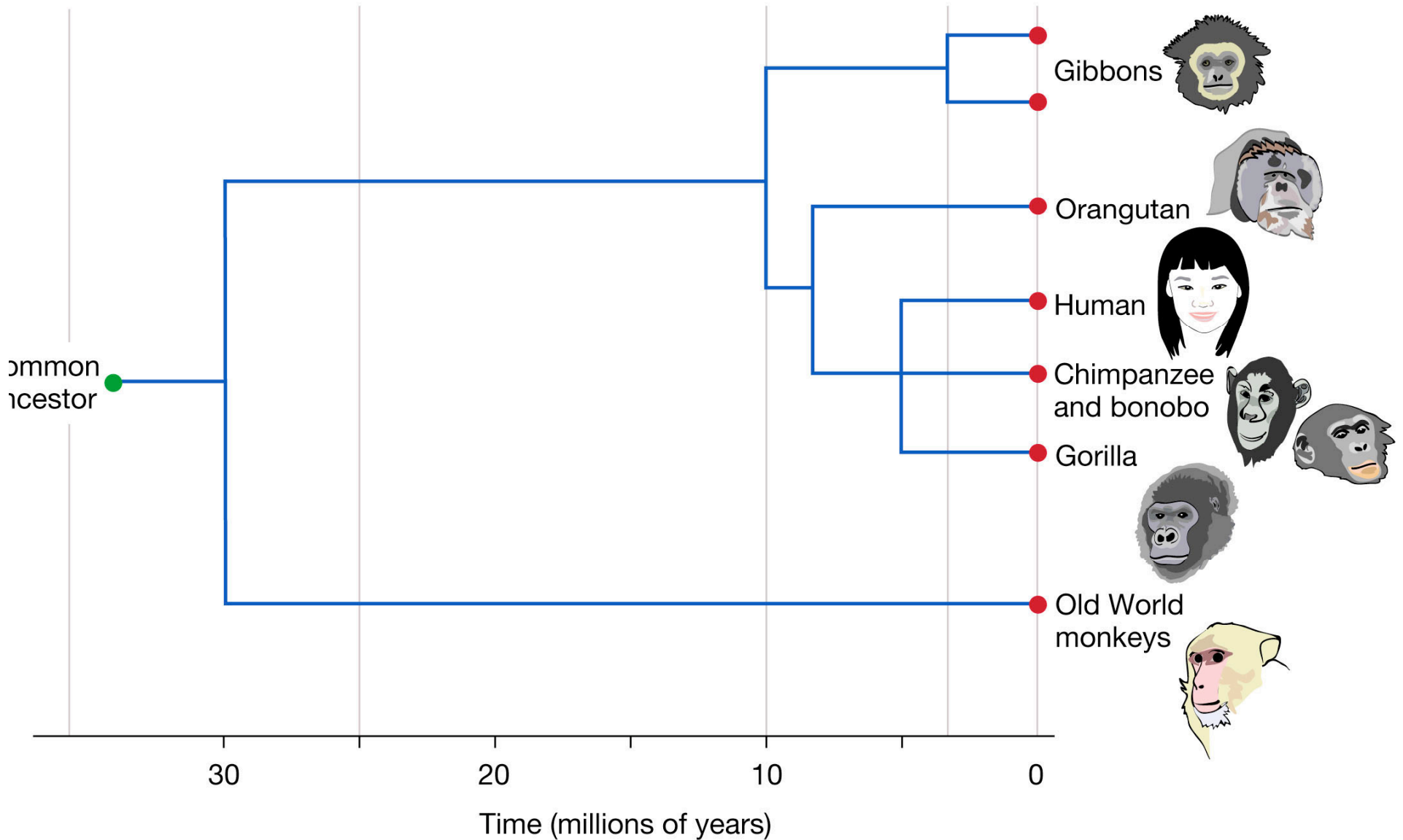


FIG. 4. Brain size (in cm<sup>3</sup>) plotted against time (Myr) for specimens attributed to Hominidae.

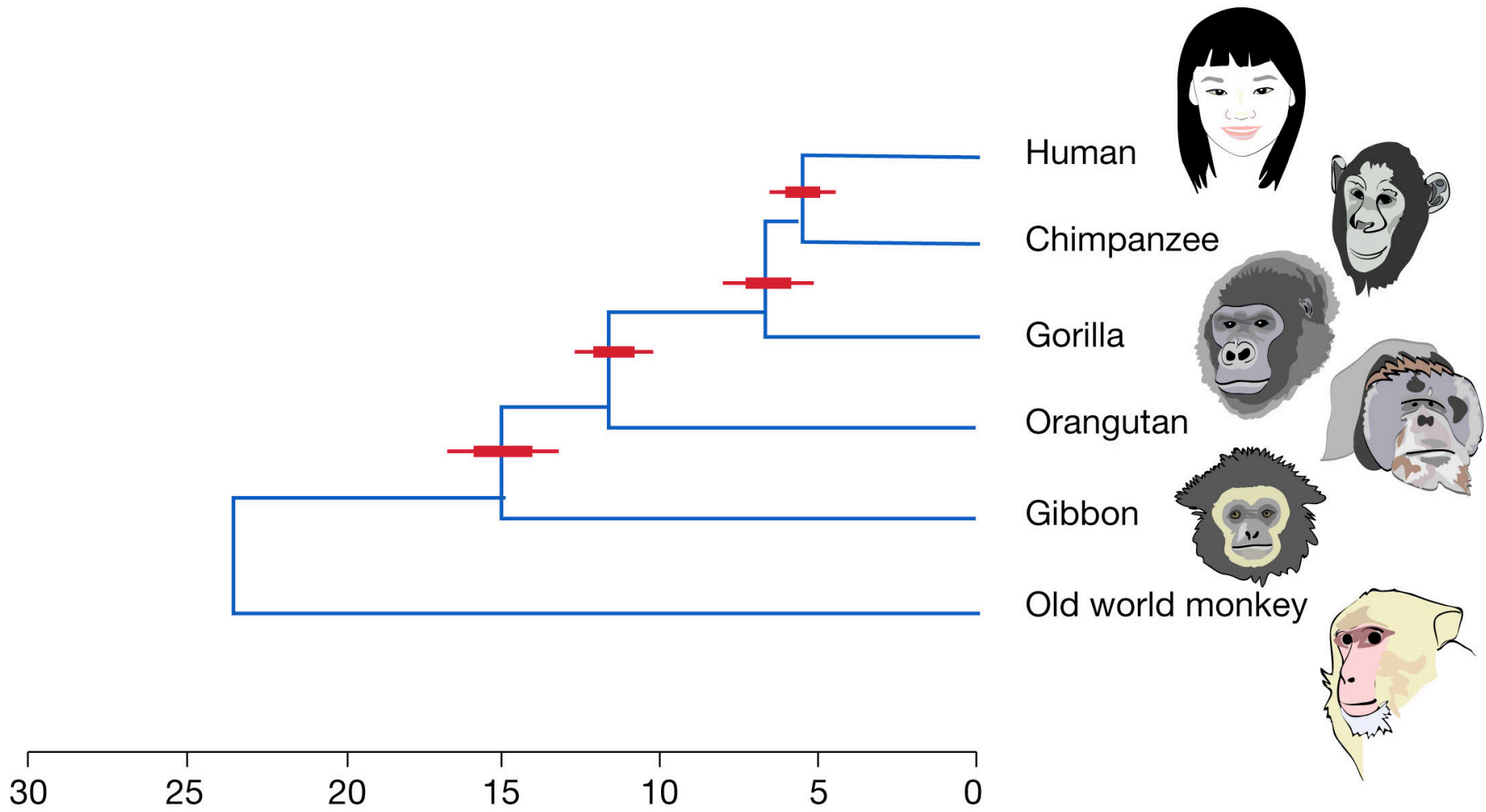


(a)





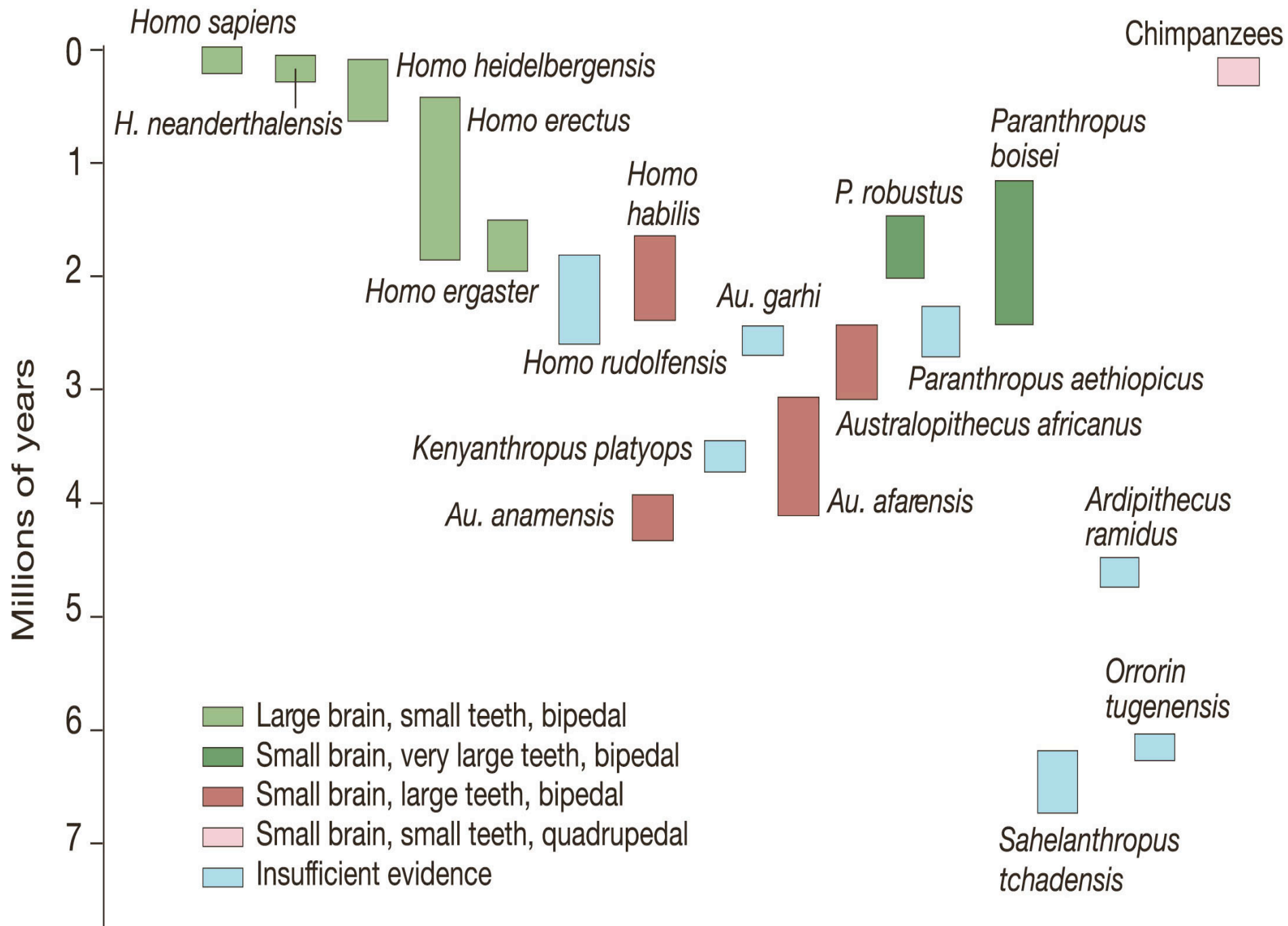
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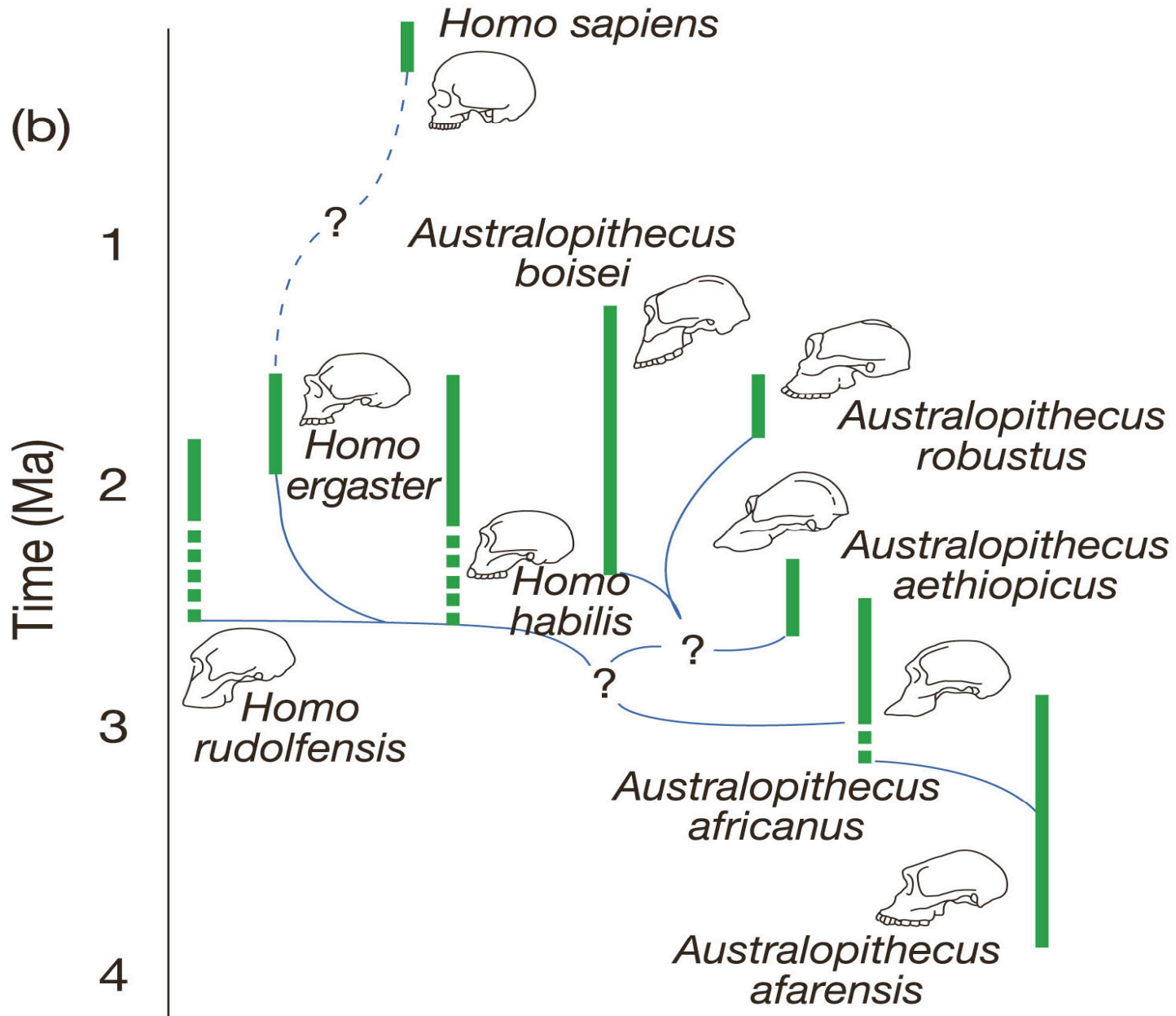


Million years ago

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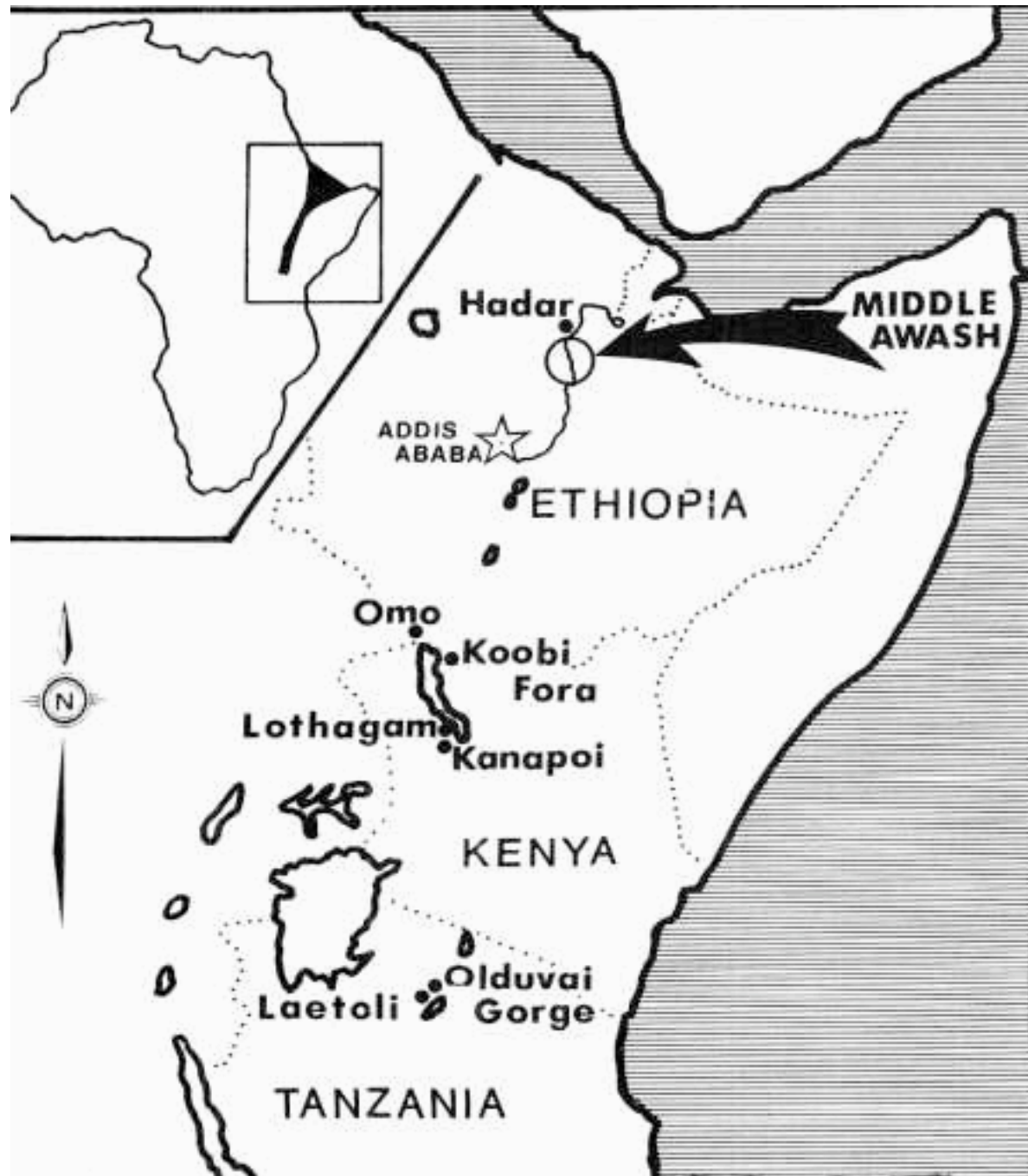






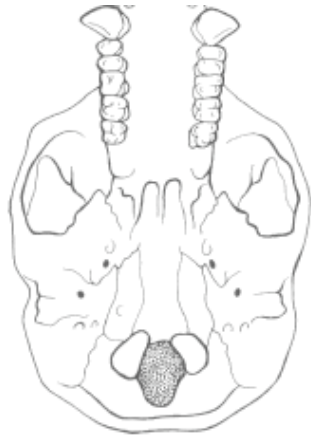
# What were global conditions when hominids first evolved?

- Africa was forested, but drying of climate brought about savannah conditions
- Climate change created local pockets with very different conditions across Africa
- Onset of Ice Ages at 2.5 million years ago further changed climate
- Human evolution during time of major environmental changes

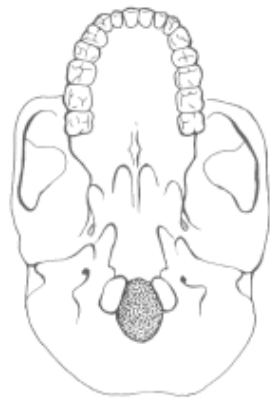


# Hominids as fossils

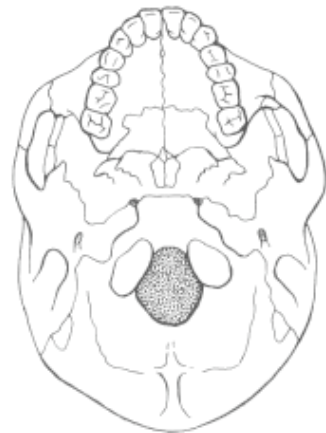
- Why so rare?
- Environment - grassland - not conducive for fossilization
- Need bogs or lakes - very rare then
- When hominids died, bones rapidly scavenged
- Makes hominids among rarest of fossils



Female Gorilla

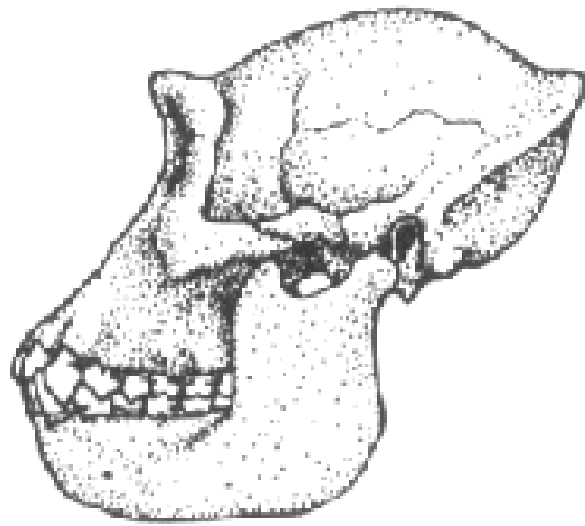


*Australopithecus africanus*

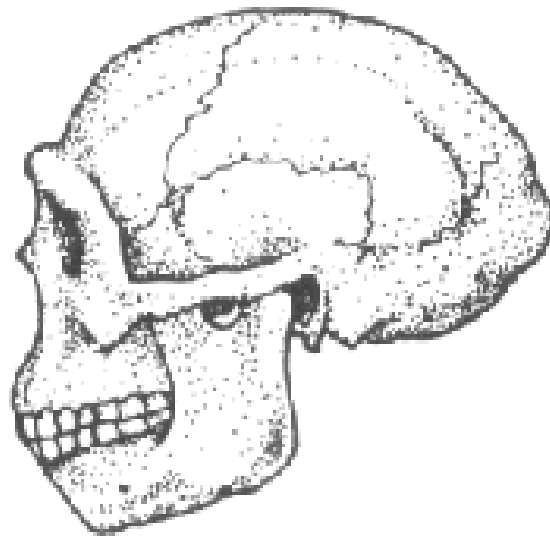


*Homo sapiens*

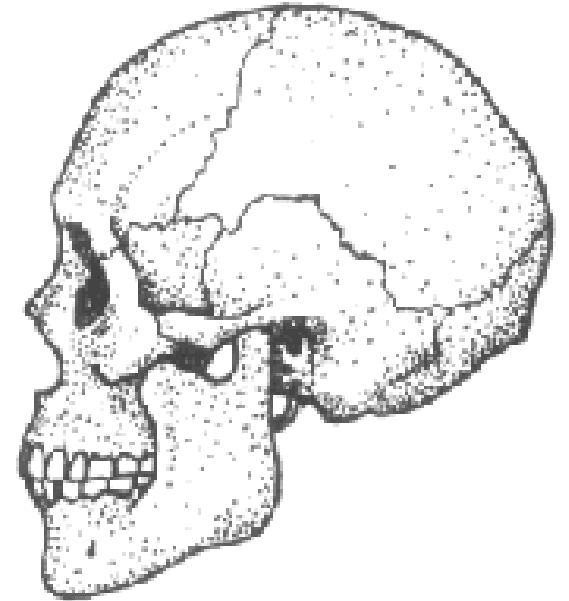




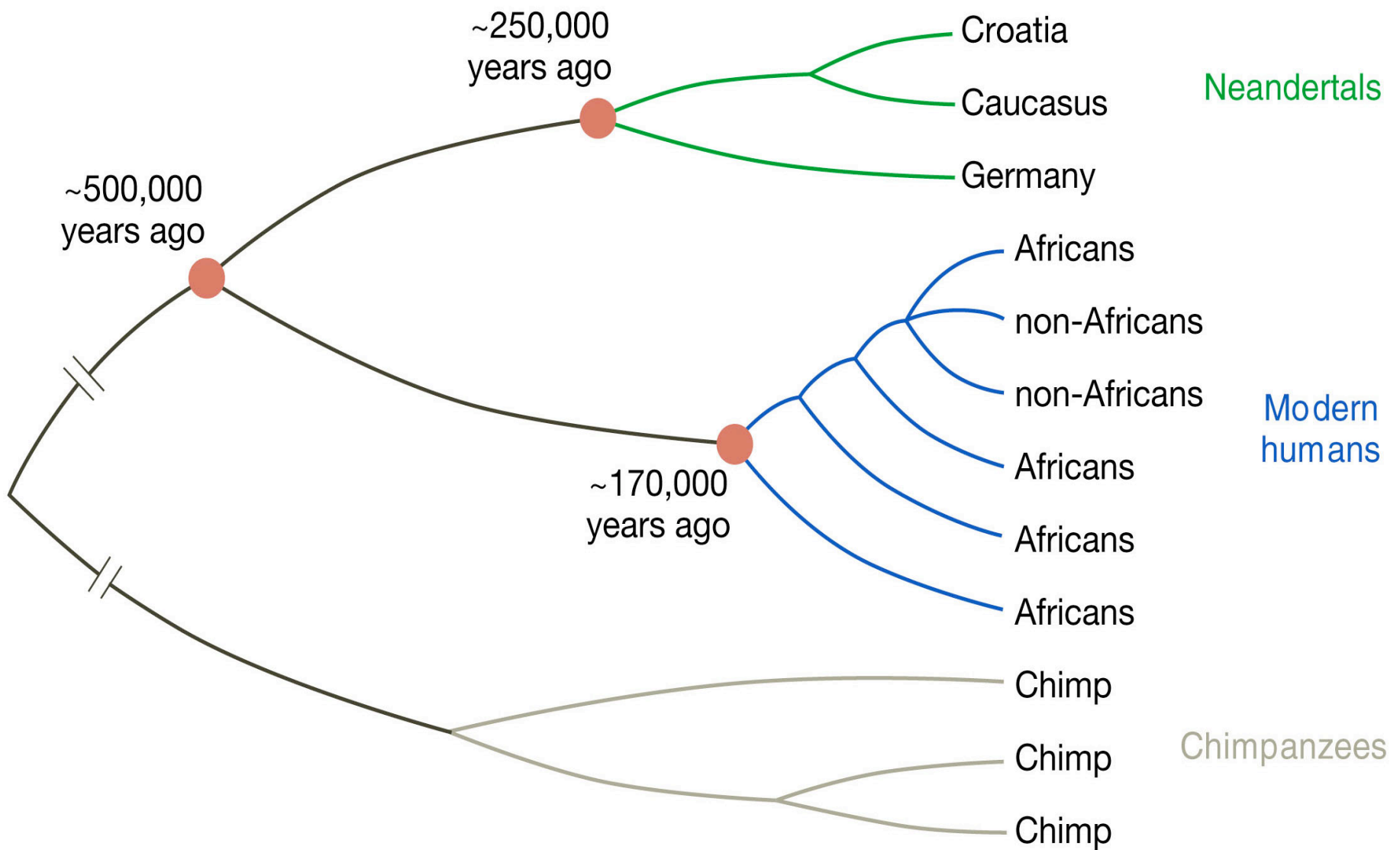
Gorilla



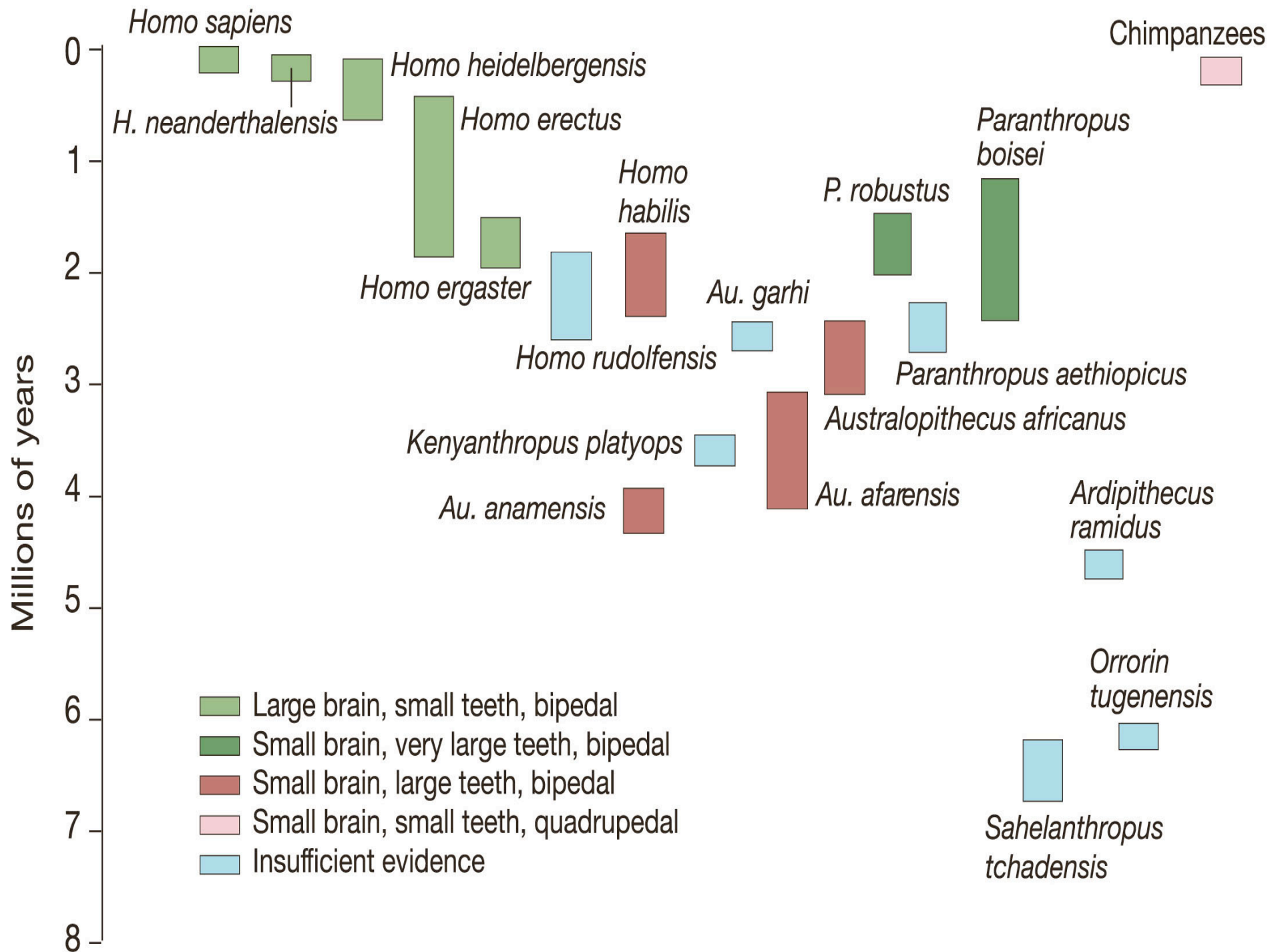
*Homo erectus*  
(*Sinanthropus*)



*Homo sapiens*

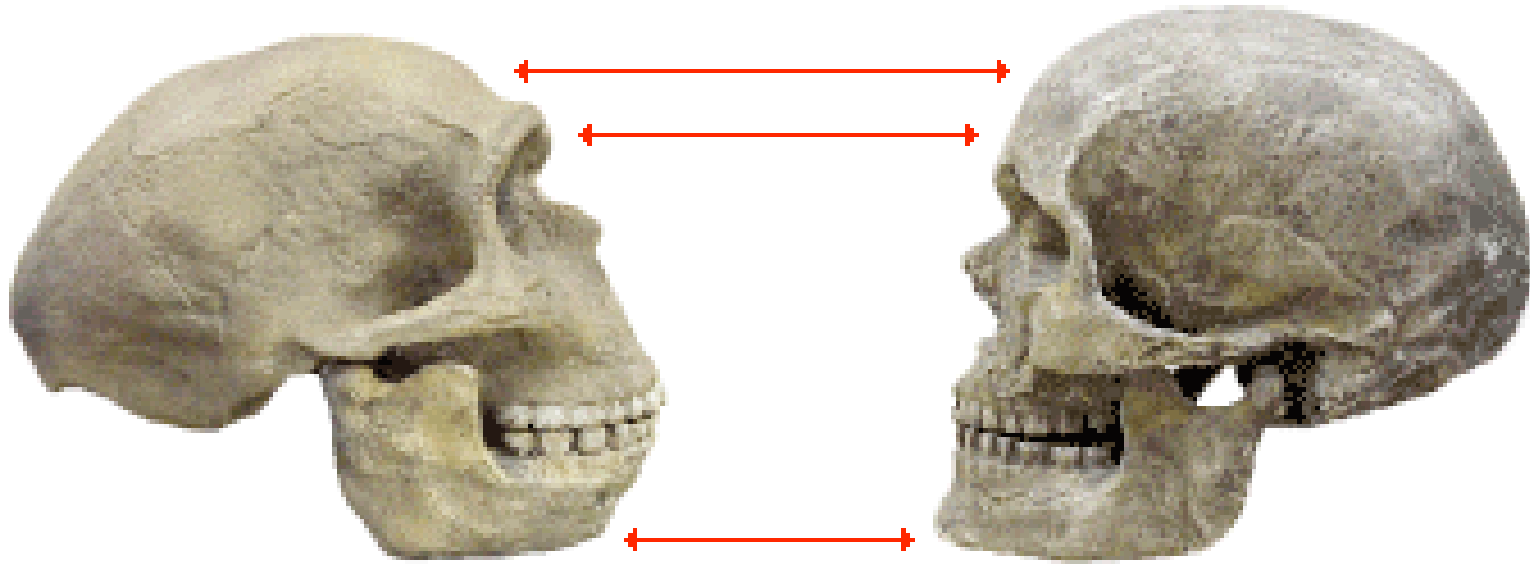






# *Early Modern Homo sapiens*

**Anatomically modern humans are classified as *Homo sapiens sapiens*. Every human today belongs to this variety of *Homo sapiens*. They first began to appear 120,000-100,000 years ago in association with technologies not unlike those of the early Neanderthals. It is now clear that they did not come after the Neanderthals but were their contemporaries.**



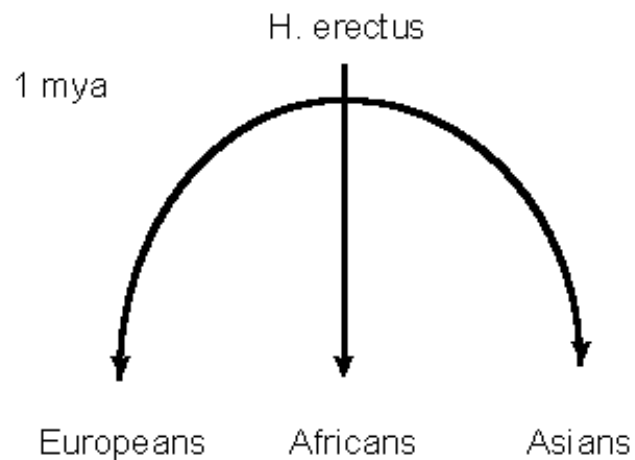
**Compared to the Neanderthals and other late archaic *Homo sapiens*, modern humans generally have more delicate skeletons. Their skulls are more rounded and their brow ridges protrude less. They also have relatively high foreheads and pointed chins.**

# **Climate Change Killed Neandertals, Study Says**

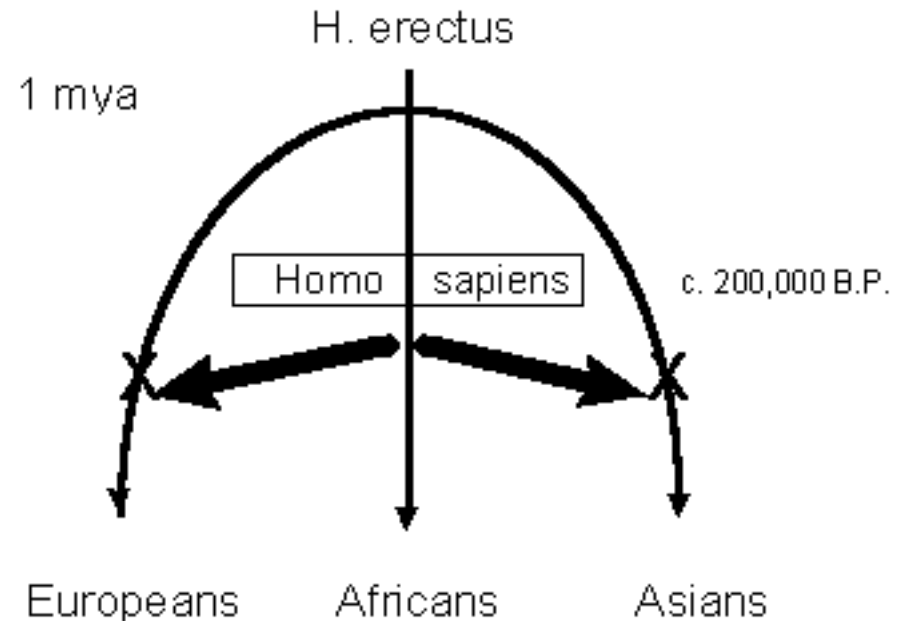
**What are the alternatives:**

- 1. Homo sapiens killed them**
- 2. Loss of food through extinction of Pleistocene big game**
- 3. Disease?**
- 4. Assimilation through hybridization?**

# Theories of human evolution

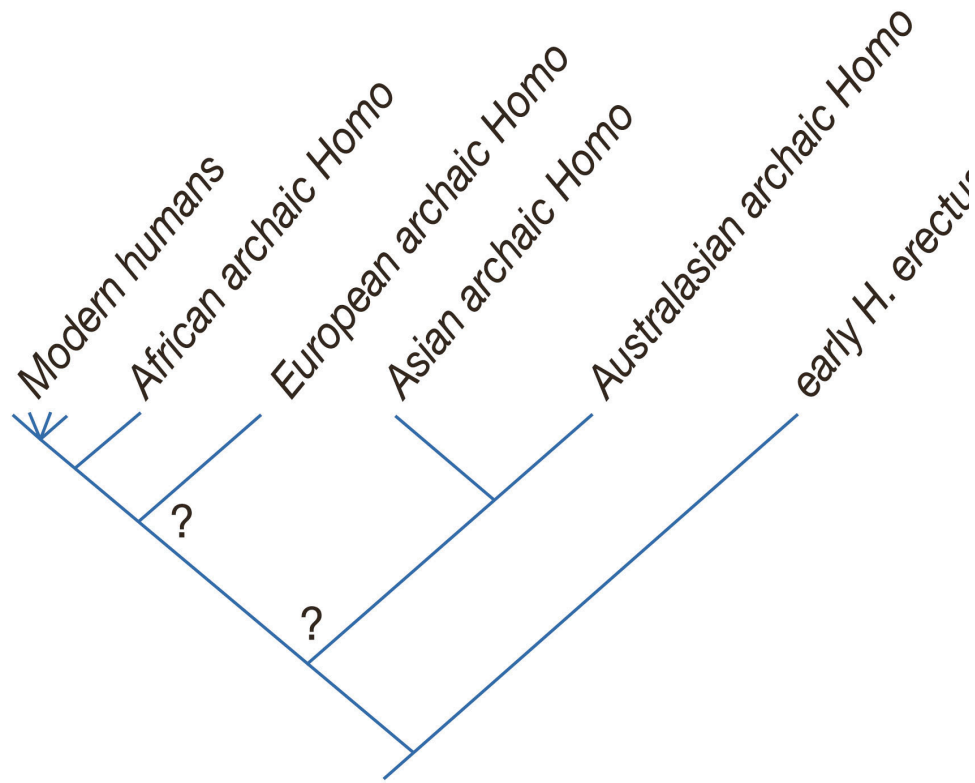


1. CANDELABRA (Separate Evolution)



2. OUT OF AFRICA (Replacement)

(a) Cladogram predicted by African replacement model



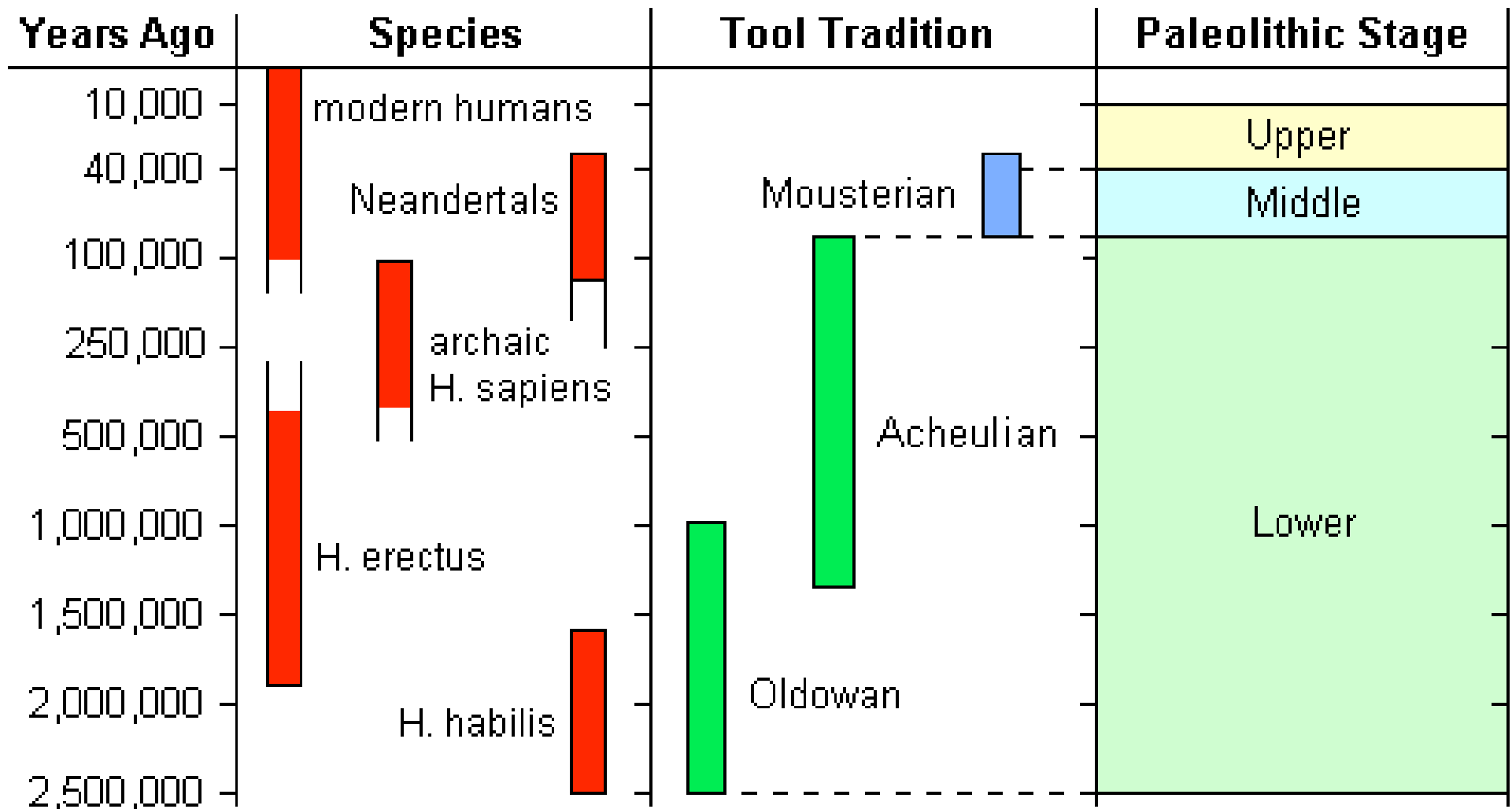
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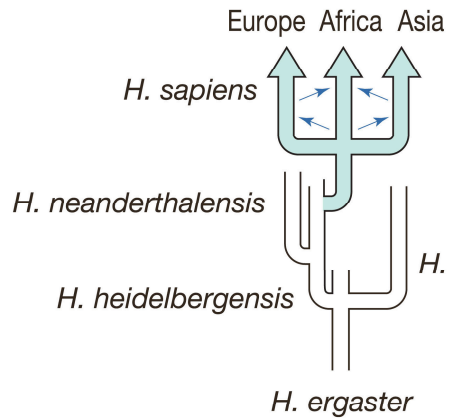
(b) Cladogram predicted by multiregional evolution model



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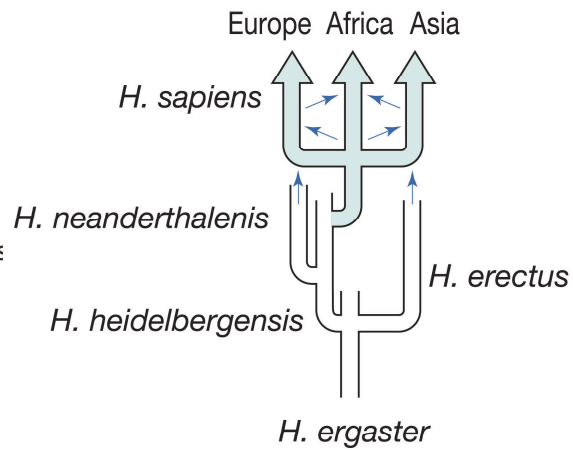
# *Archaic Homo sapiens Culture*





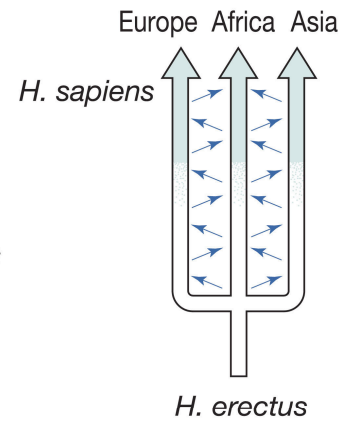
(a) African replacement

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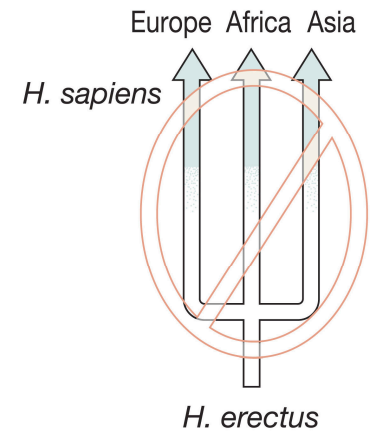
(b) Hybridization and assimilation

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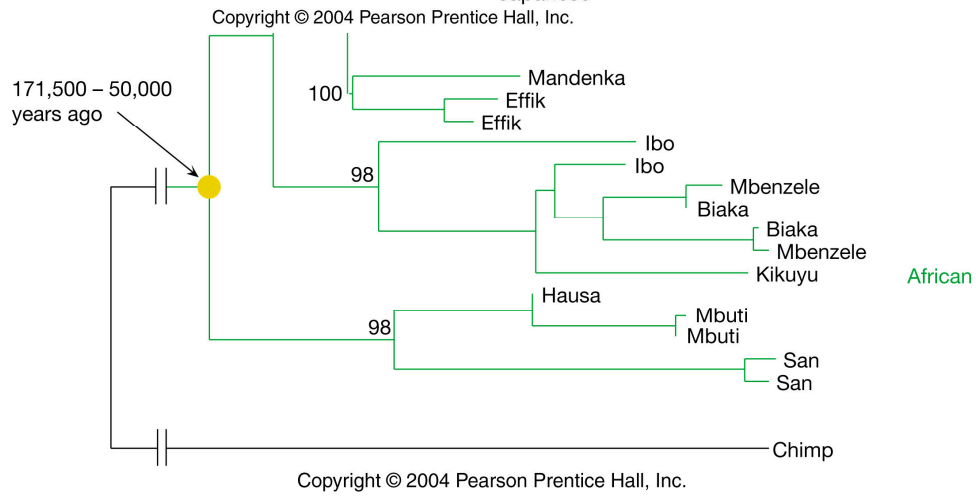
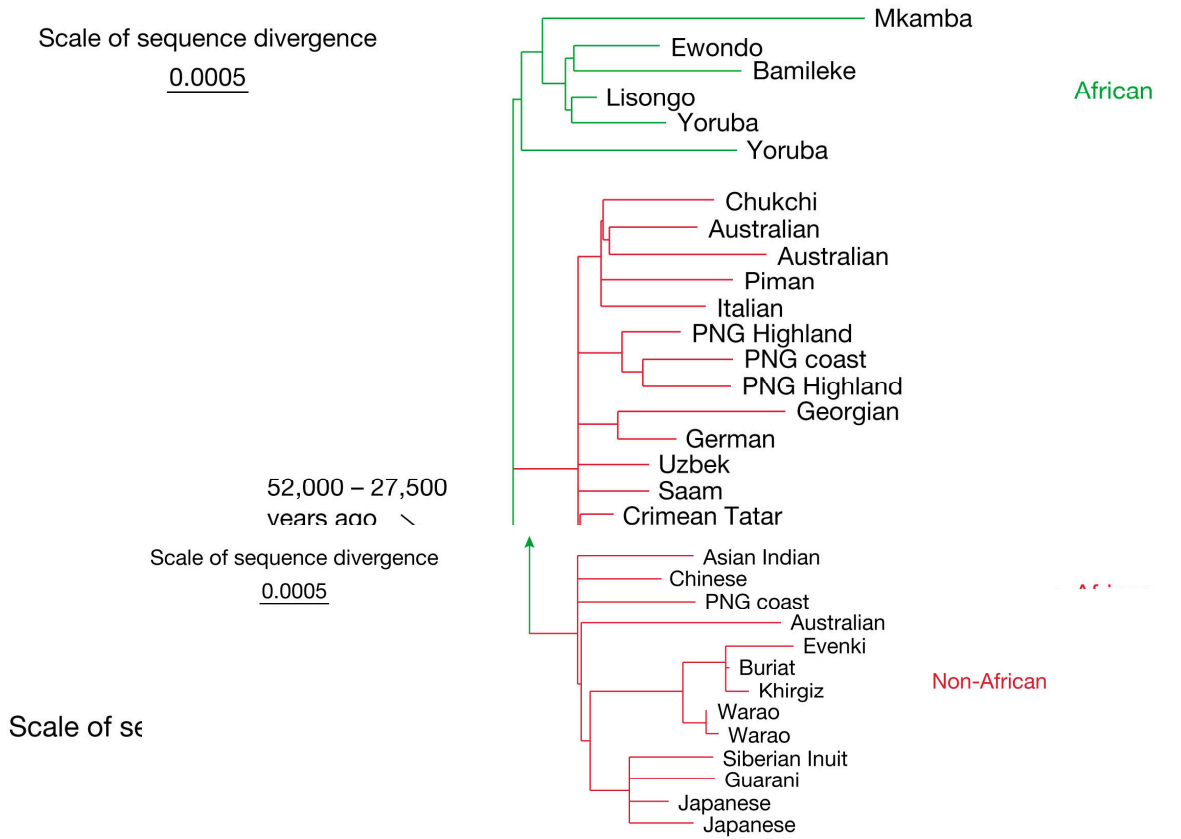
(c) Multiregional evolution

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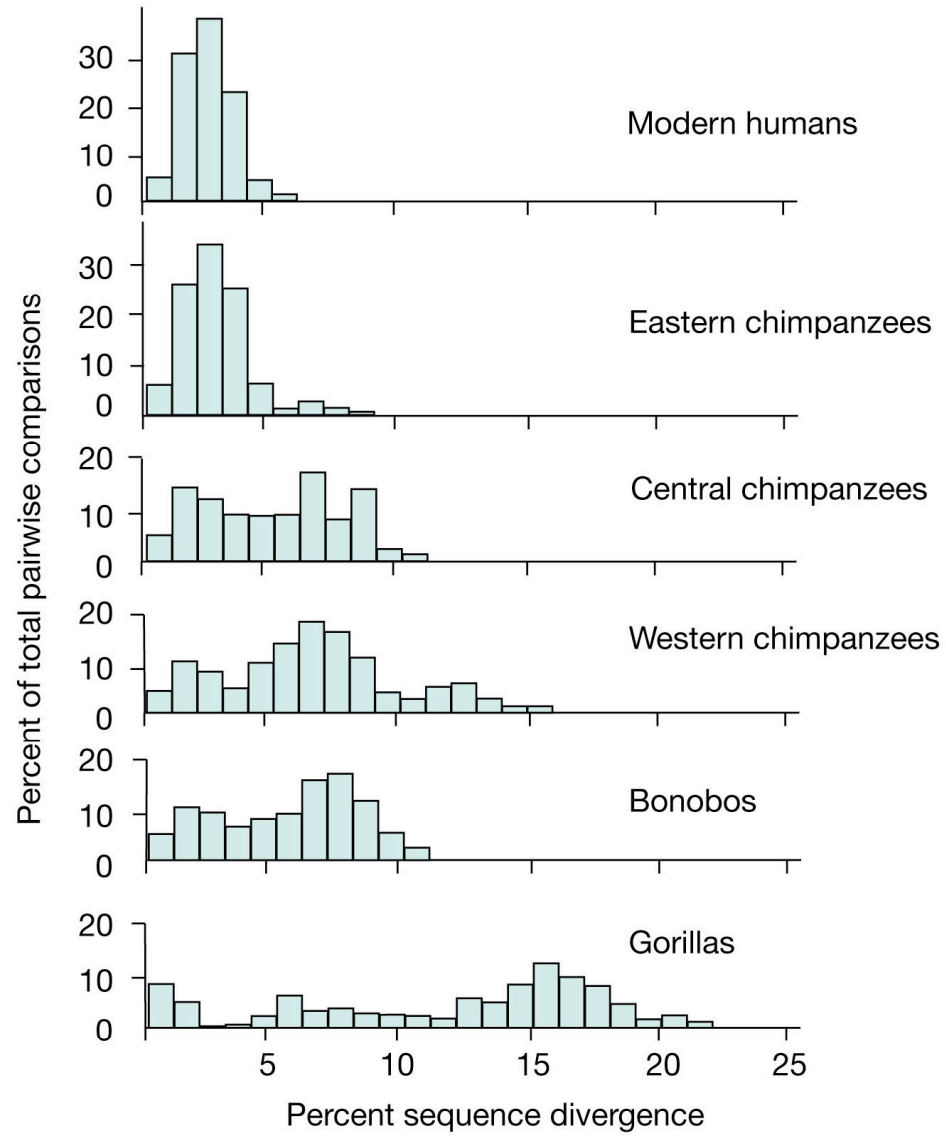


(d) Candelabra

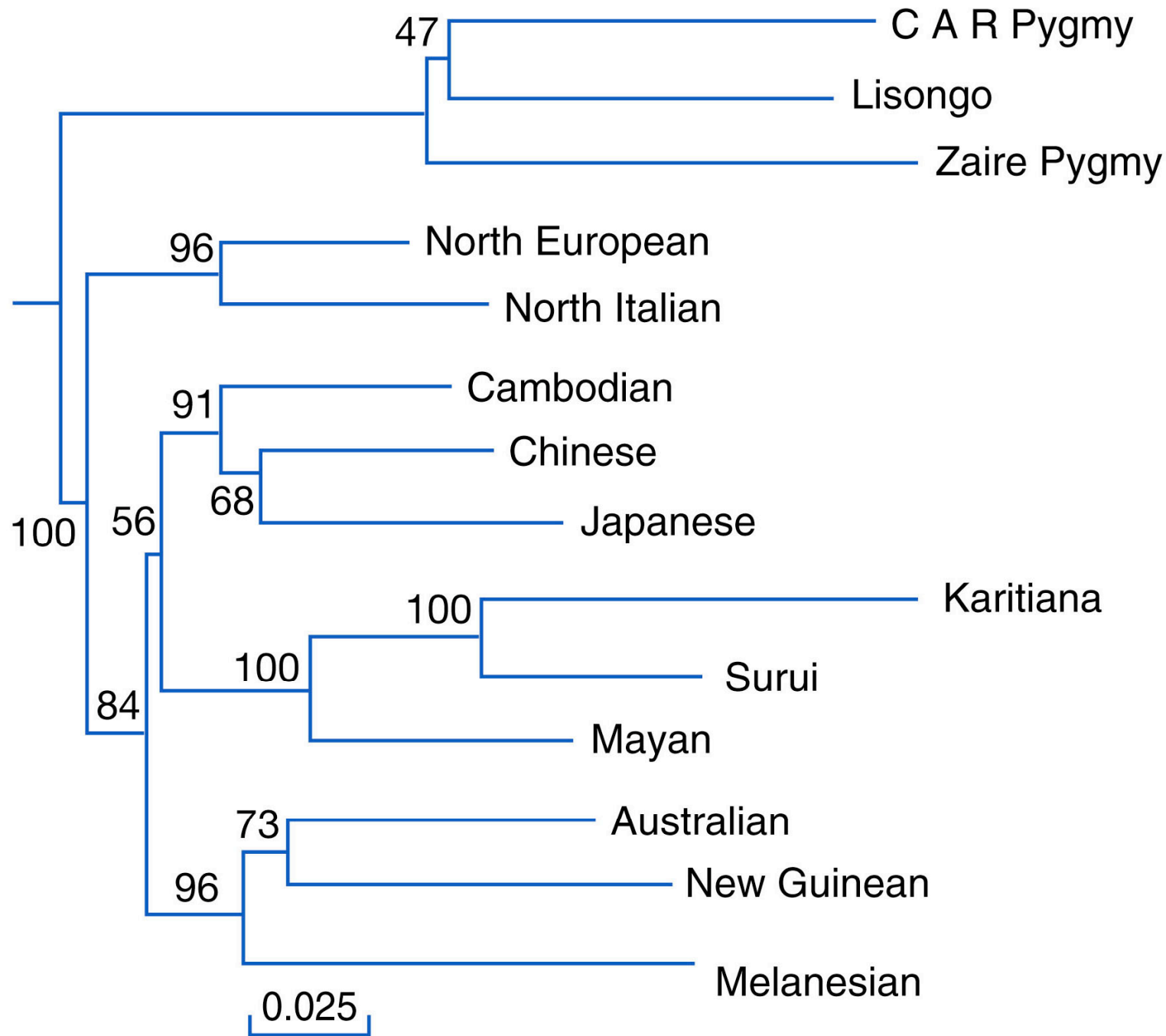
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# Some evolutionary implications

- It appears that human level intelligence evolved but once on the planet
- Still great mystery about how consciousness evolved and why
- Implications for intelligence elsewhere in the Universe - is it hard to achieve intelligent life capable of detecting other intelligence across space?