

## BIOL 201 – Ecology & Evolution – Spring 2022

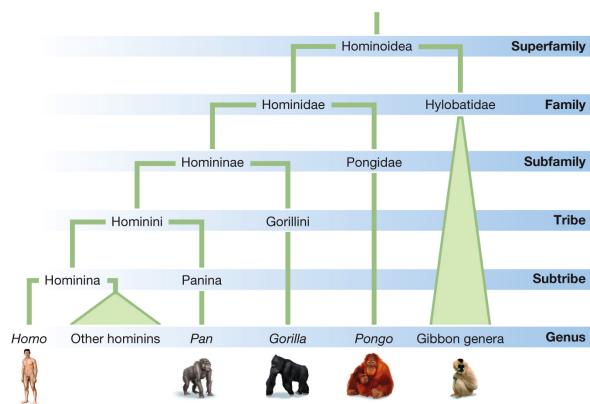
### Lesson 29. Human origins

#### Objectives

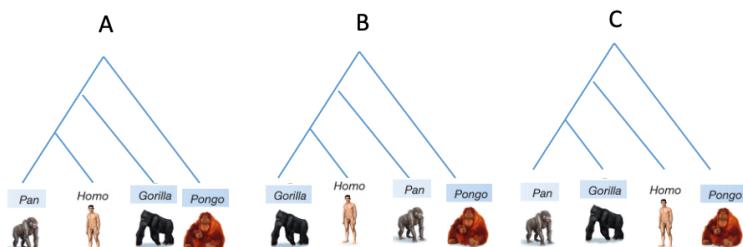
- Recognize what we can (and cannot) learn about the appearance of the traits that characterize modern humans from paleontology, archaeology and genetic evidence.
- Explain how factors such as deep coalescence (lineage sorting) and introgression affect the agreement among gene trees for *Homo sapiens* and its relatives (including both apes and more closely related lineages of *Homo*).
- Use results from gene trees to test the predictions of the Out of Africa and multiregional hypothesis.
- Explain what ancient DNA reveals about the genetic contribution of archaic human ‘cousins’ to modern human populations.

#### Outline

- Phylogeny and taxonomy of the apes

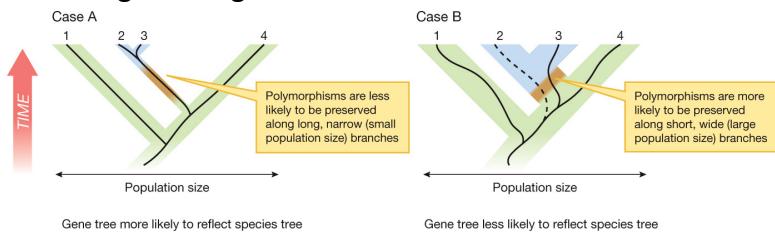


- Gene tree discordance



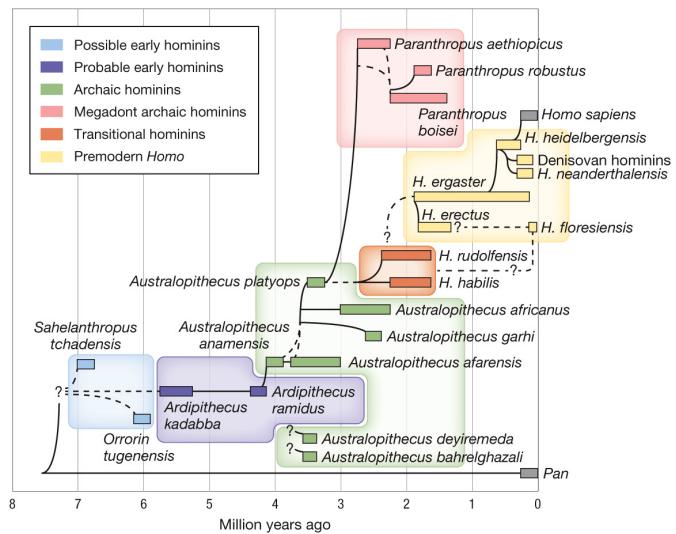
- What are the possible causes of gene tree discordance?

- Deep coalescence, or incomplete lineage sorting



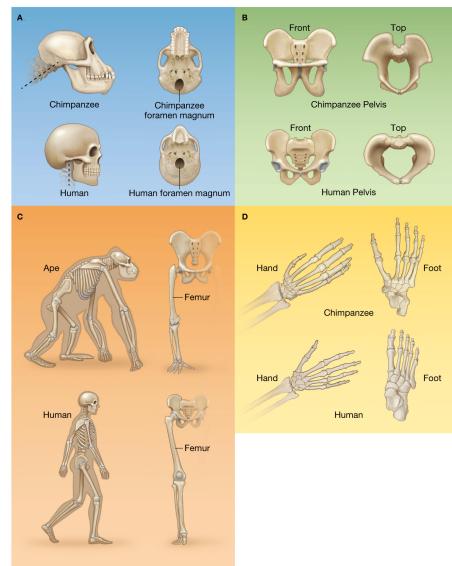
- From earliest hominins to modern civilization

- Phylogeny of (known) hominins

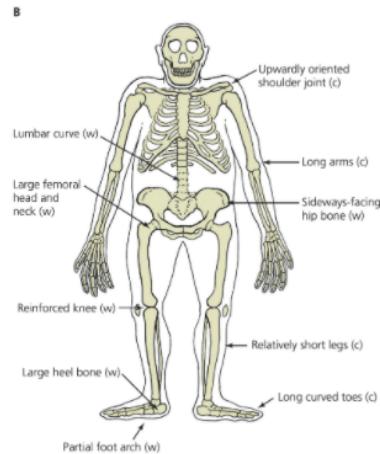


- What can we learn from comparative anatomy?

- Example: bipedalism

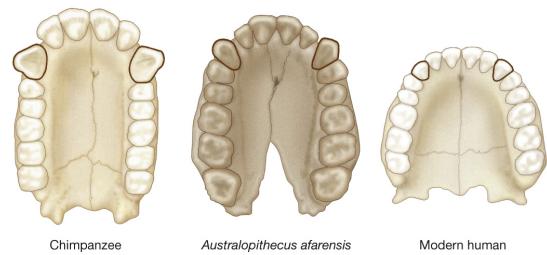


### i. *Australopithecus afarensis* ("Lucy")

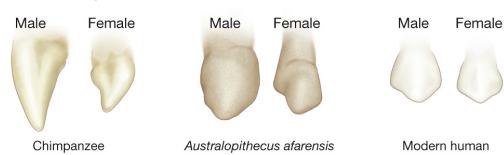


- Paleontological evidence for changes in behavior

A Upper jaw



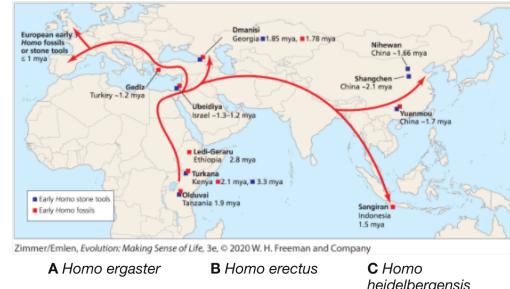
B Sexual dimorphism in canines



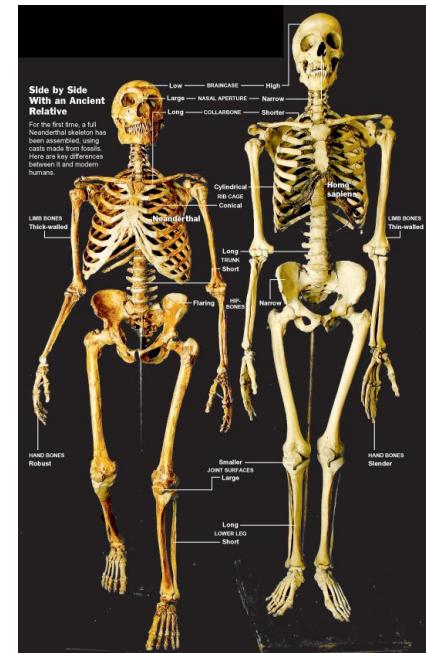
- Oldawan tools



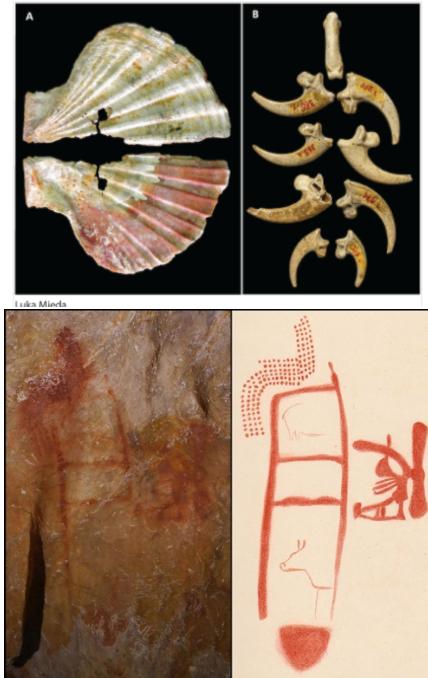
- The last million years
    - Early migrations of Homo out of Africa



- The genus Homo
    - Neandertals



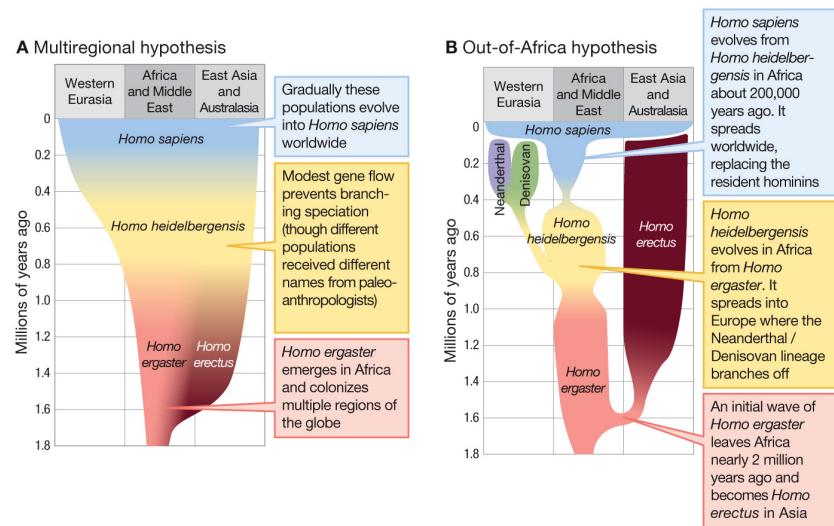
- Neandertal art



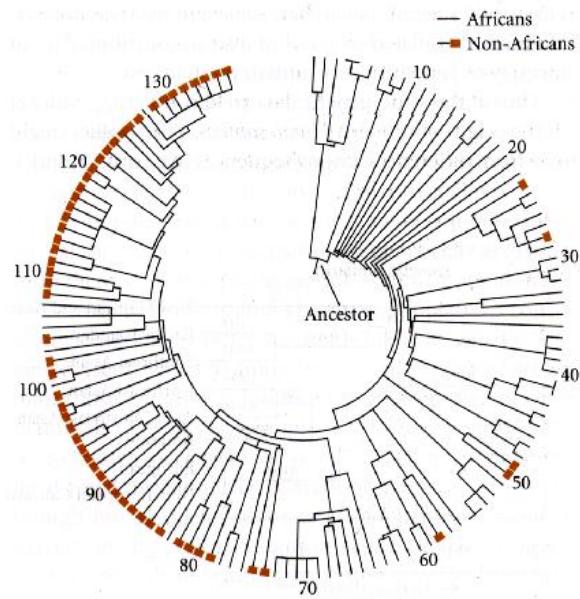
- Denisovans



- Homo dispersed from Africa into Europe and Asia ~2MYA. What happened next?



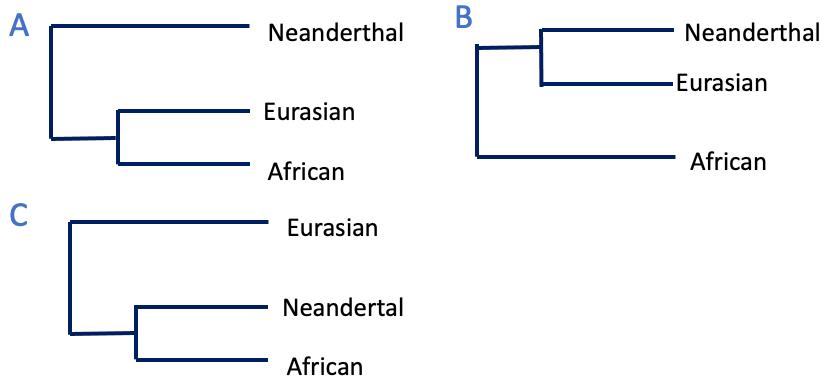
- Mitochondrial DNA evidence



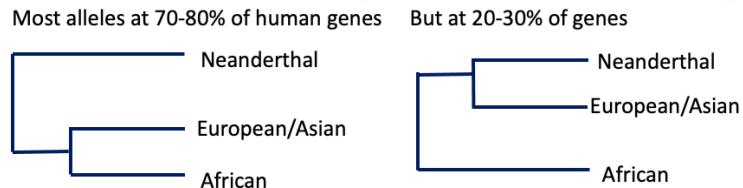
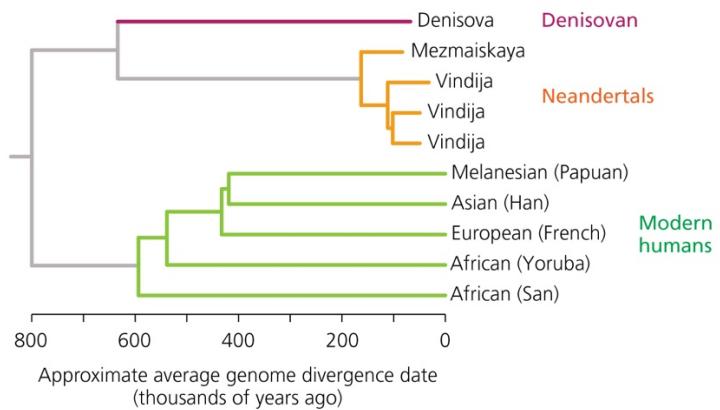
- The Neandertal world ~40Kya



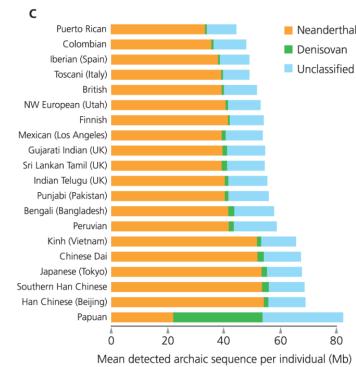
- Which phylogenetic pattern(s) would you predict for the Out of Africa vs the Multiregional Hypothesis?



- DNA phylogenies of *Homo sapiens*, Denisovans and Neanderthals



- Genetic remnants of introgression of archaic into modern humans



- "We're looking at a Lord of Rings" type world"

