

## Outline 8: Human Evolution

### Primate Classification

- Order Primates
  - Suborder Prosimii
  - Suborder Anthropoidea
    - Superfamily Hominoidea
      - Family Pongidae: apes
      - Family Hominidae: hominids

### Prosimians

- Tarsiers of Borneo
- Lemurs of Madagascar

### Anthropoids

- Old World Monkeys
- New World Monkeys
- Hominoids

### Hominoids

- gibbons, orangutans, chimps, gorillas, humans
- Pongidae: orangs, chimps, gorillas
- Hominidae: the hominids *Ardipithecus*, *Australopithecus*, *Paranthropus*, *Homo*

### Oldest Hominoid

- *Proconsul africanus*, 18 MY old from Kenya. Looked like a gibbon.

## Timing of Lineage Splitting on the way to Humans

- Based on DNA studies
- Old World monkeys: 33 MY
- gibbons: 22 MY
- orangs: 16 MY
- gorillas: 8 MY
- chimps: 7 MY

## Genetic Differences

- humans - chimps: 1.2%
- humans - gorillas: 1.4%
- chimps - gorillas: 1.2%
- humans - orangs: 2.2%

## Origin of Hominids

- What differentiates hominids from apes? This is what evolved first.
- Large brain?
- Bipedalism?

## Origin of Hominids

- Early hominid brains were the same size as modern chimps.
- Bipedalism evolved before large brains. In fact, it was bipedalism that allowed the evolution of large brains by freeing the hands for tool use.

## Origin of Bipedalism

- Thought to be associated with climatic change 5 MY as spreading glaciers caused global cooling.
- Global cooling created a drier Africa with fewer rain forests and more savannahs.

## Origin of Bipedalism

- Earliest hominids were forced to travel between isolated forests if food was in short supply.
- This produced selection pressure for upright walking.

## Origin of Large Brains

- Associated with selection pressure for tool use. Tools to find more food or defend against predators.
- Bipedalism freed the hands for extensive tool use, and for carrying helpless babies.

## Origin of Large Brains: Neoteny

- Neoteny: an evolutionary/genetic process
- A slowing of developmental rates while growth continues normally.
- Developmental stages are reached at a later stage or not at all.

## Consequences of Neoteny

- Helpless babies
- Walk later
- Extended juvenile period
- Prolonged period of learning
- Later puberty
- Longer life span

## Consequences of Neoteny

- large brain and cranium
- small face, jaws, and teeth: impacted wisdom teeth
- naked skin, hair mostly on head
- form of external ear

## Mosaic Evolution

- Neoteny does not affect all parts of the body equally. Some parts are like juveniles, others like adult apes. We have retained some juvenile features yet have reached sexual maturity.

## Hominid Brain Sizes

- Chimps: 350 cc

*A. afarensis*: 400 cc

*A. africanus*: 450 cc

*H. habilis*: 800 cc

*H. erectus*: 1000 cc average

*H. sapiens*: 1400 cc average