Monkey Business: Evolution of Primates

Early Primates

- Arboreal theory
  - Primates became primates by adapting to life in trees
  - Enhanced sight (depth perception)
  - Grasping hands and feet
- Visual predation hypothesis
  - Binocular vision, grasping hands and feet, and reduced claws developed because they facilitated the capture of insects.
  - Early primates first adapted to life in the bushy forest undergrowth and low tree branches.

Early Cenozoic Primates

- The earliest primates date to the first part of the Cenozoic (65-54 m.y.a.).
- The Eocene (54-38 m.y.a.) was the epoch of **prosimians** with at least 60 different genera in two families.
  - The omomyid family lived in North America, Europe, and Asia and may be ancestral to all anthropoids.
  - The adapid family was ancestral to the lemur-loris line.

Prosimians: "lower primates"

Lemurs, loris, bushbabies, tarsiers

Anthropoids: "higher primates"

New World Monkeys: marmosets, tamarins, spider monkeys

Old World Monkeys: baboons, macaques, mandrills

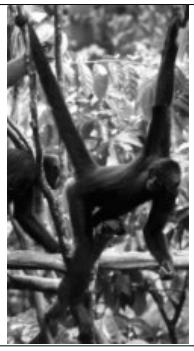
Homonoids: Gibbons, Pongids (Apes) and Hominids (Humans and related forms).

Prosimians

tarsier

lemur

New World Monkeys



Old World Monkeys

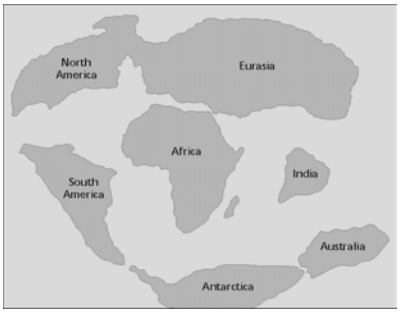
Hominoids

Lesser Apes
(Gibbons)

Panids, Pongids(Great Apes)
(Gorilla, Chimps, Orangutan)

Dumb Apes
(George Bush)

Continents at the end of the Mesozoic



Here is the placement of the continents at the end of the Cenozoic and beginning of the Mesozoic, about 65 m.y.a.

Omomyid

An artist's reconstruction of *Shoshonius*, a member of the Eocene omomyid family.

Anthropoids

- Anthropoids branched off from the prosimians during the Eocene.
  - Anthropoid eyes are rotated more forward compared to prosimians.
  - Anthropoids have a fully enclosed bony eye socket.
  - Anthropoids have a dry nose separate from the upper lip.
  - Anthropoids have molar cusps.

Oligocene Anthropoids

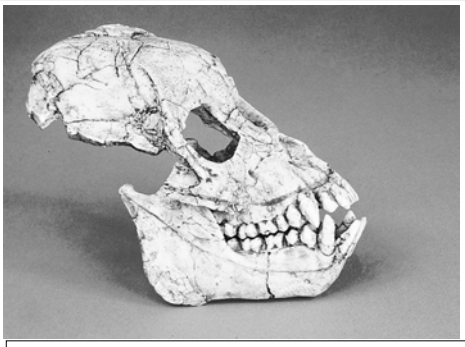
- During the Oligocene (38-23 m.y.a.), anthropoids were the most numerous primates.
- The *parapithecid* family may be ancestral to monkeys and "apes" (e.g. *Aegyptopithecus*)

Proconsul

A Miocene Hominoid:

- *Proconsul* was the most abundant anthropoid in the early Miocene.
- Its teeth have similarities with modern apes, but below the neck the skeleton is more monkey-like.
- Their teeth suggest that they ate fruits and leaves.
- *Proconsul* - common ancestor shared by Old World monkeys and the apes.

Proconsul



A skull of *Proconsul africanus* from the Kenya National Museum.

Proconsul

- *Proconsul* was replaced by monkeys in the late Miocene.
  - Monkeys probably were superior at eating leaves.
  - Monkey molars developed lophs which enhanced their ability to chew leaves.
- Traits
  - Primitive traits are those passed on unchanged from an ancestor.
  - Derived traits are those that develop in a particular taxon after a split from a common ancestor.

Afropithecus and *Kenyapithecus*

- *Afropithecus* is a large slow moving Miocene hominoid with large projecting front teeth from northern Kenya (18-16 m.y.a.)
- *Equatorius* - *Afropithecus* group- **stem hominoids ?**

Sivapithecus

- *Sivapithecus* belongs to the ramapithecid genera along with *Gigantopithecus*.
- *Sivapithecus* is now believed to be ancestral to the modern orangutan.

A *Sivapithecus* skull.

Gigantopithecus

- *Gigantopithecus* is the largest primate that ever lived, some standing over 10 feet tall and weighing 1,200 pounds.
- Since it died out around 400,000 years ago, it coexisted with *Homo erectus*.
- Some people believe it is still alive today as the yeti and bigfoot.

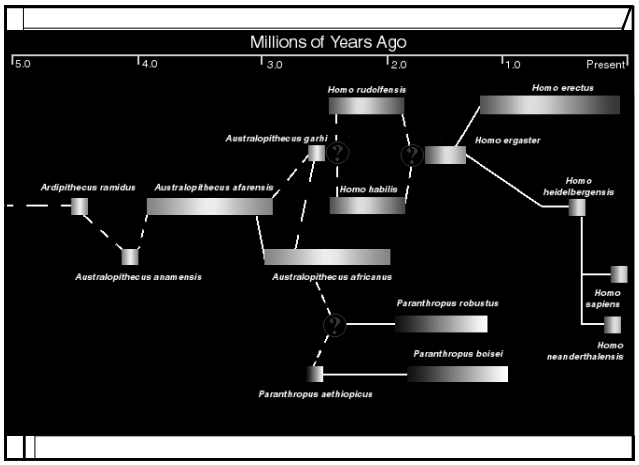
A reconstruction of *Giganopithecus* by Russel Ciochon and Bill Muns.

Dryopithecus

- *Dryopithecus* lived in Europe during the middle and late Miocene.
- This group probably includes the common ancestor of the lesser apes (gibbons and siamangs) and the great apes.
- *Dryopithecus* has the Y-5 arrangement of molar cusps typical of *Dryopithecus* and of hominoids.

A Missing Link?

- The last ancestral population held commonly by humans, gorillas, and chimpanzees is known as Hogopans (after the genus names of these three).
- The lines of the orangutans, gibbons and siamangs having split off several million years earlier, the hominid line almost certainly diverged from those of chimps and gorillas late in the Miocene epoch, between 7 and 5 m.y.a.
- Hogopans probably split into the three separate lines leading to gorillas, chimpanzees and humans no more than 8 m.y.a., with each group moving into separate niches: equatorial forest-dwelling and eating bulk vegetation (gorilla), Central African woodland-dwelling frugivores (chimpanzee), and open grassland (hominids).



END OF LECTURE