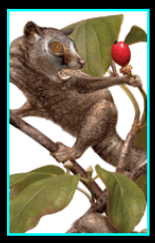
Primates : mammal order with about 185 spp. (out of 4500 mammal species)

bonnet macaque

squirrel monkey

Primates

- largely tree-dwelling (arboreal) and tropical



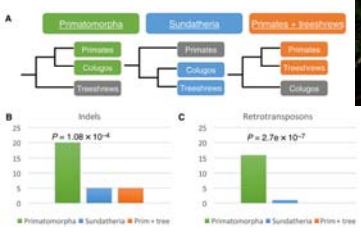
56 mya – opposable toe, for grasping

Sister order = tree shrews? (order Scandentia)

MRCA of all primates lived about 80 mya

Hidden Biodiversity in Colugos, Primate's Sister Group

Mason *et al.*



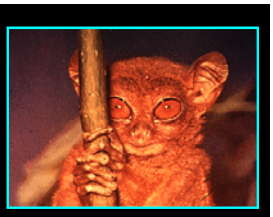
Phylogenetic placement of Colugos. (A) Phylogenies depicting alternative hypotheses for colugo relationships (B) Number of indels supporting each evolutionary relationship (C) Number of transposed elements supporting each theory.

Lea Lovin

Science Advances Vol.2 No. 8 8/10/2016

CHARACTERISTICS:

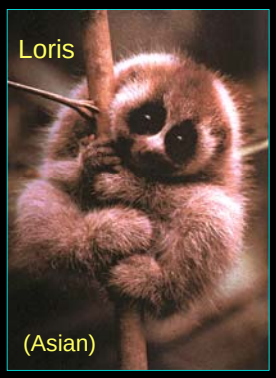
- stereoscopic color vision, bony orbits protect eyes
- large brain relative to body size



Baboon Hand

- Digits with independent mobility and opposable thumb
- Flat nails, no claws, sensitive fingers

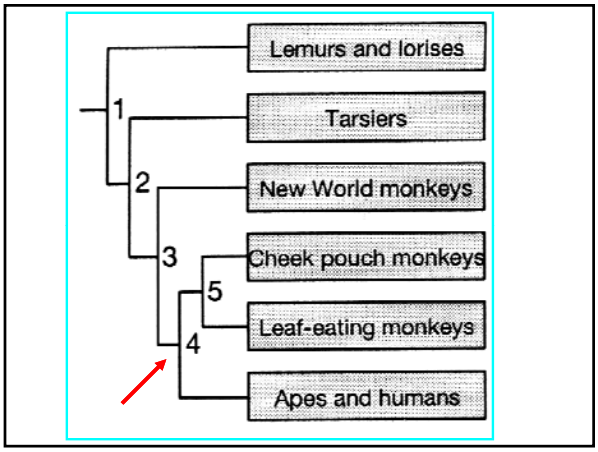
Prosimians



- **Lemurs**

Tarsiers

- Completely carnivorous
- good leaping ability
- nocturnal
- southeast Asia



NEW WORLD MONKEYS

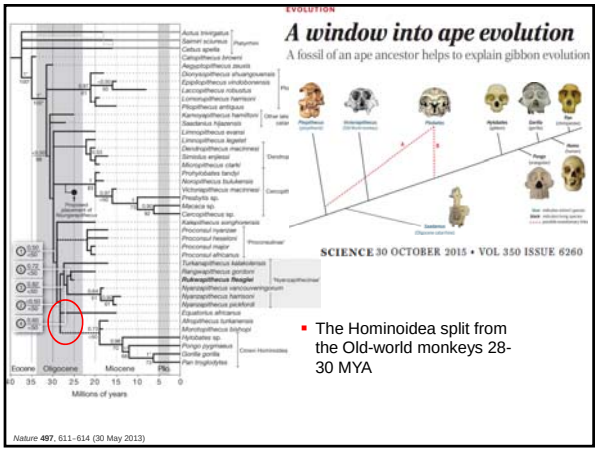
red uakari

pygmy marmoset

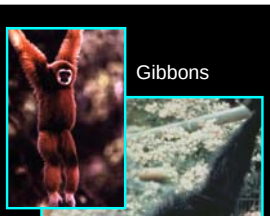
OLD WORLD MONKEYS

Proboscis monkey

Hamadryas baboon



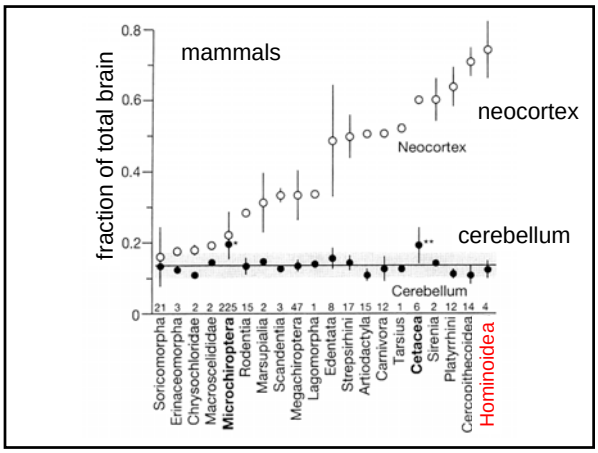
- The Hominoidea split from the Old-world monkeys 28-30 MYA



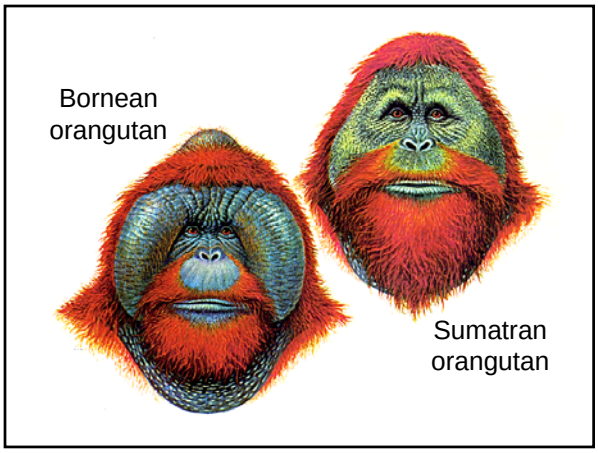
Gibbons

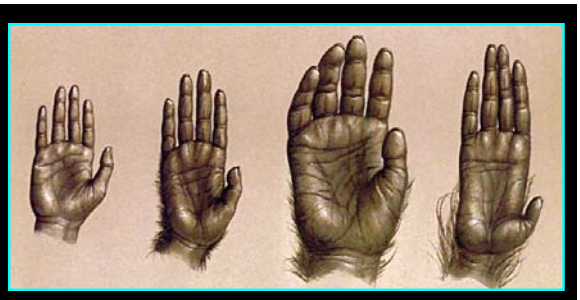
Hominoids:

- brachiation
- posture more erect than in monkeys
- arms and shoulders more flexible, spine stiffer
- broader, larger pelvis
- loss of a tail
- five-cusp lower molars instead of four
- scapulae more dorsal so arms can be extended laterally


mammals
fraction of total brain
0.8
0.6
0.4
0.2
0
neocortex
Neocortex
cerebellum
Cerebellum
21 3 2 2 225 15 2 3 47 1 8 17 15 12 1 6 2 12 14 4
Soricomorpha
Erinaceomorpha
Chrysochloridae
Macroscelididae
Microchiroptera
Rodentia
Marsupialia
Scandentia
Megachiroptera
Lagomorpha
Edentata
Strepsirhini
Artiodactyla
Carnivora
Tarsius
Cetacea
Sirenia
Platyrrhini
Cercopithecoidea
Hominoidea


orangutan
"How about this zoo diet!"


Bornean
orangutan
Sumatran
orangutan

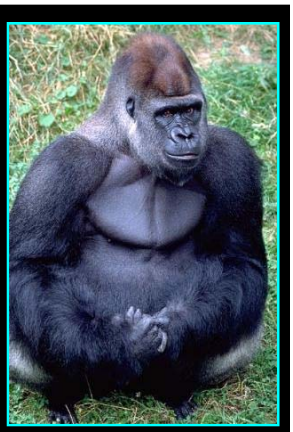


human chimpanzee gorillla orangutan

habitual brachiation

Orangs, genus *Pongo*

- *"old man of the woods"*
- fruit eaters, not social, males territorial
- only occasionally on forest floor
- especially endangered in Malaysia



gorilla

Lowland Mountain

Gorilla - genus *Gorilla*

- small groups of 10-20

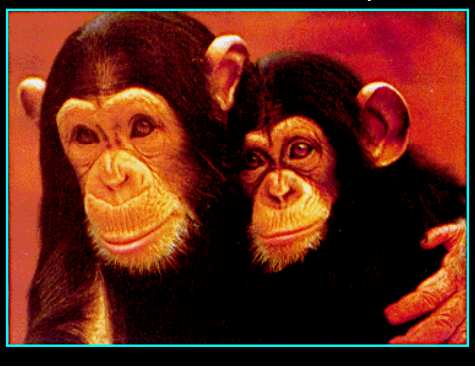
- Dominated by male silverback, male-male competition - POLYGYNY
- Males almost twice as big as females

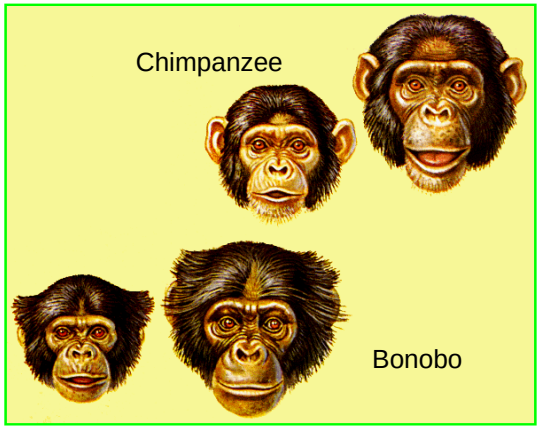
Figure 1 Western equatorial Africa. Commercial hunting is concentrated near transport routes (major roads in white), whereas Ebola impact has been heaviest in remote areas. Ape density in the Minkébé forest block (shaded area in northern Gabon) has dropped by about **99%** over the past decade. The Ebola epidemic is currently most severe between Lossi and Odzala National Park. Observations of unpredated ape carcasses span 600 km, from 40 km west of Booue to the Nouabale–Ndoki region of northern Congo.

Walsh et al. 2003. NATURE 422:611:614

Genus *Pan*

chimpanzees





Kin groups

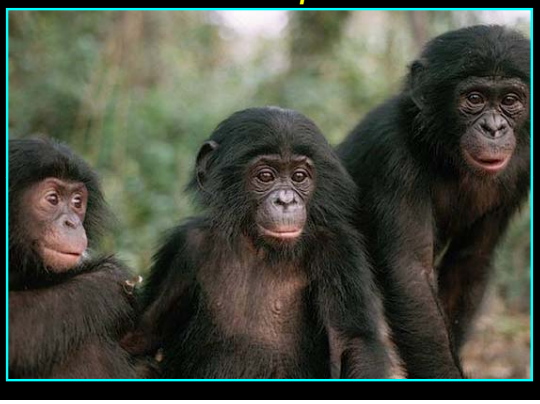
Extensive tool use

Communicating and probing a hidden "snake"

Common chimpanzee
Pan troglodytes

- extended child care, prolonged adolescence
- puberty at 8-10 years
- feed, sleep in trees, but often on ground
- polygamous (promiscuity), highly social

Bonobo - *Pan paniscus*



Bonobo
Pan paniscus

- *much* less well known, deep in rain forests of Congo
- more upright posture, less "violent" than chimps?
- *female* bands control resources; form hierarchy
- male "standing" depends on its mother's

POPULATION GENETICS

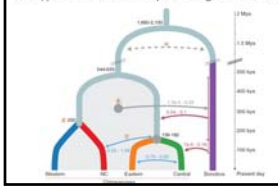
Chimpanzee genomic diversity reveals ancient admixture with bonobos

de Manuel *et al.*

28 OCTOBER 2016 • VOL 354 ISSUE 6311

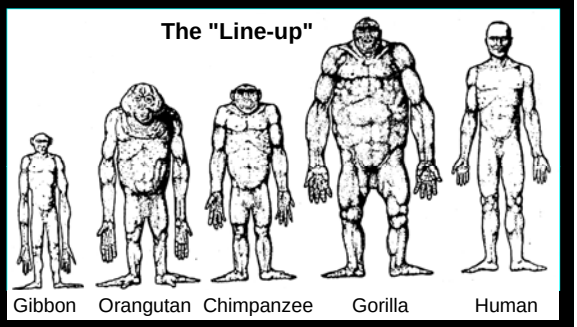
Our closest living relatives, chimpanzees and bonobos, have a complex demographic history. We analyzed the high-coverage whole genomes of 75 wild-born chimpanzees and bonobos from 10 countries in Africa. We found that chimpanzee population substructure makes genetic information a good predictor of geographic origin at country and regional scales. Multiple lines of evidence suggest that gene flow occurred from bonobos into the ancestors of central and eastern chimpanzees between 200,000 and 550,000 years ago, probably with subsequent spread into Nigeria-Cameroon chimpanzees. Together with another, possibly more recent contact (after 200,000 years ago), bonobos contributed less than 1% to the central chimpanzee genomes. Admixture thus appears to have been widespread during hominid evolution.

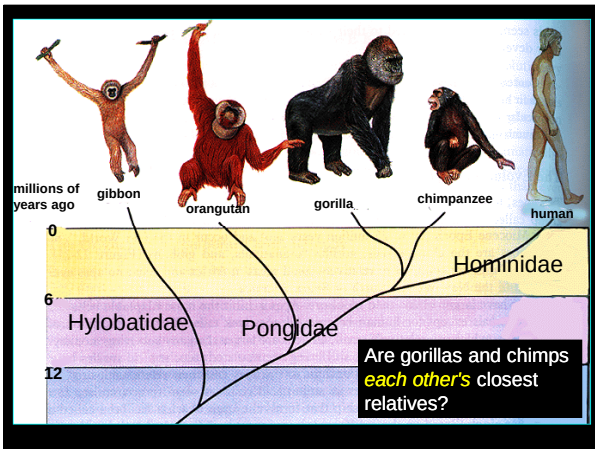
Science AAAS



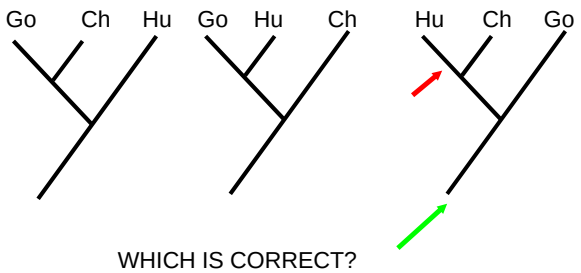
The making of ancient hybrids

How are the hominoids related to each other?





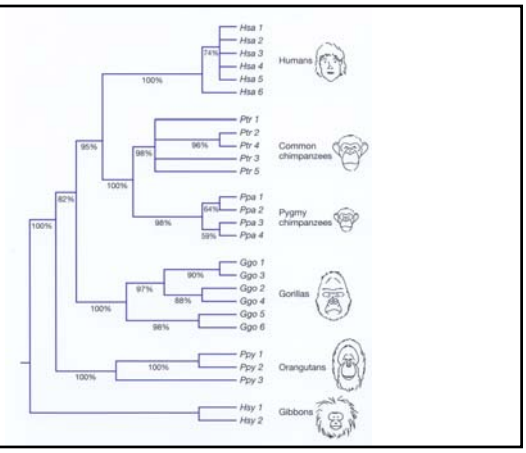
Only *three* possibilities:

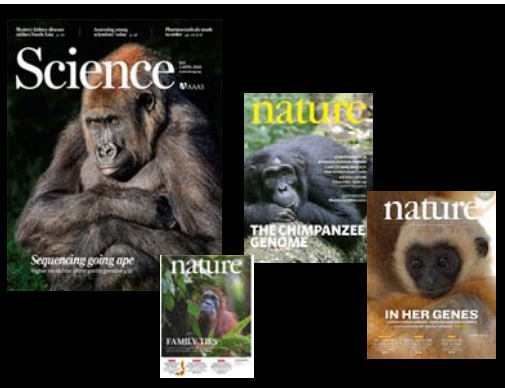


WHICH IS CORRECT?

% divergence of nucleotides at globin pseudogene

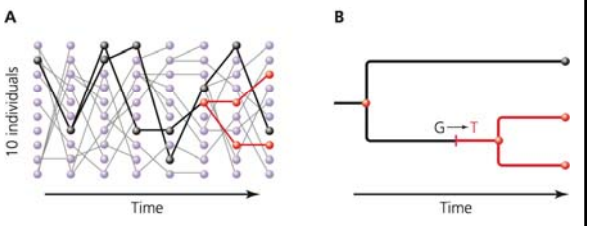
	Orang *Pongo*	Gorilla *Gorilla*	Chimp *Pan*	Human *Homo*
Orang		3.39	3.42	3.30
Gorilla			1.82	1.70
Chimp				1.56
Human				0.38



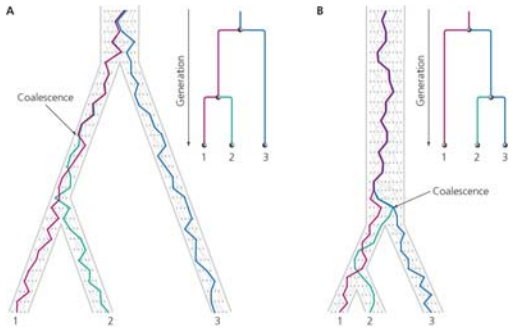


There are well resolved genome sequences for all the great apes

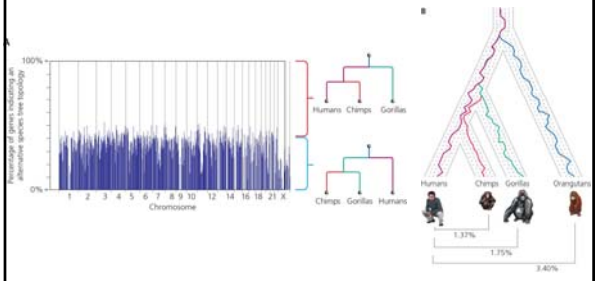
Alleles in populations **coalesce** to a common ancestor



Incomplete lineage sorting: Gene trees do not always match species trees



Phylogenetic relationships constructed by weighing evidence from multiple genes



Data from clock-like genes suggest:

Split between orangs and chimp-human-gorilla clade	10 - 13 mya
Split between gorillas and human-chimp clade	8 - 10 mya
Split between human and chimp from common ancestor	5 - 7 mya