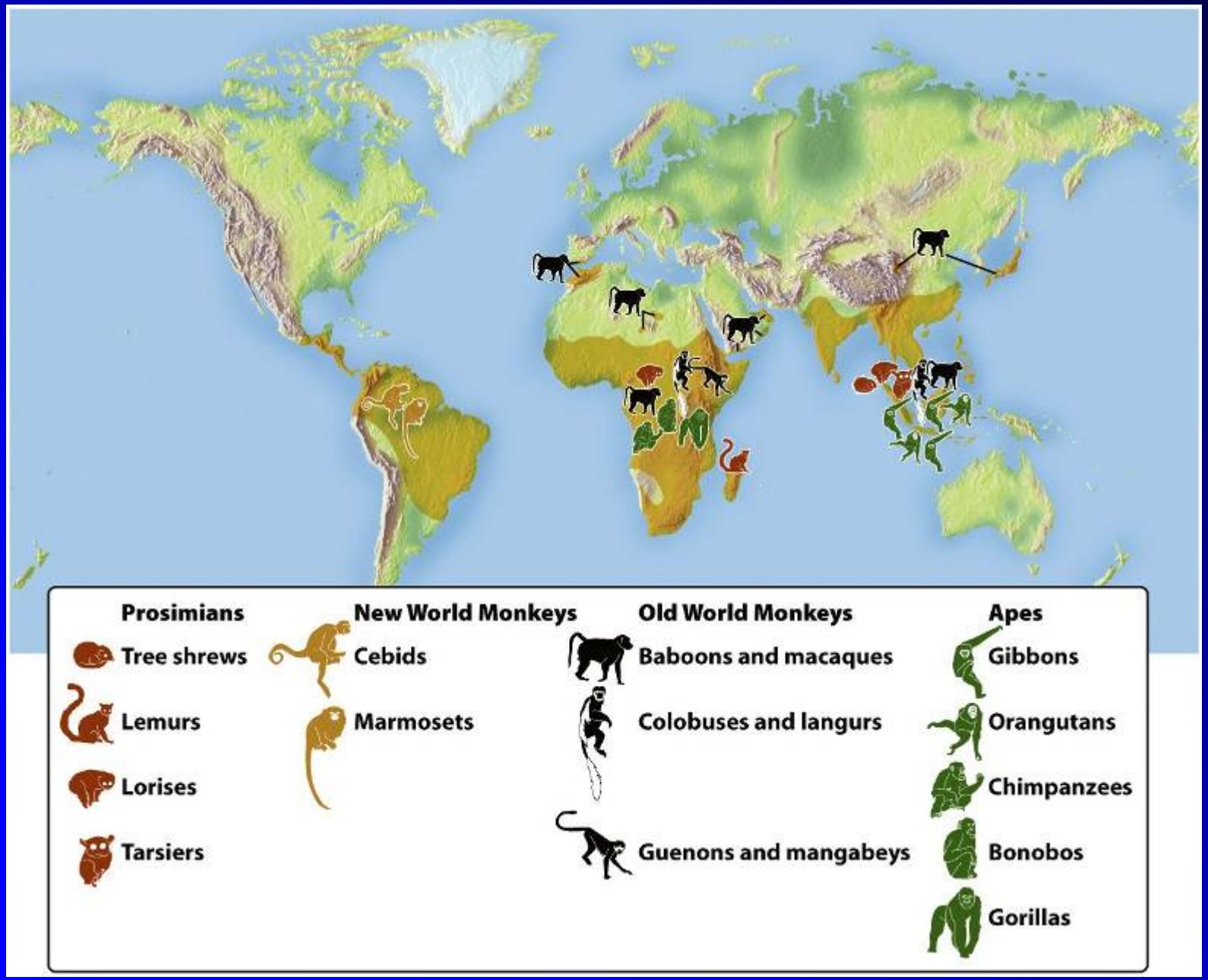
Introduction to the Living Primates


Prosimians
Tree shrews
Lemurs
Lorises
Tarsiers
New World Monkeys
Cebids
Marmosets
Old World Monkeys
Baboons and macaques
Colobuses and langurs
Guenons and mangabeys
Apes
Gibbons
Orangutans
Chimpanzees
Bonobos
Gorillas

What is a Primate?

- Kingdom
- Phylum
- Class
- Order

- *Metazoa (Animalia)*
- *Chordata*
- *Mammalia*
- *Primates*

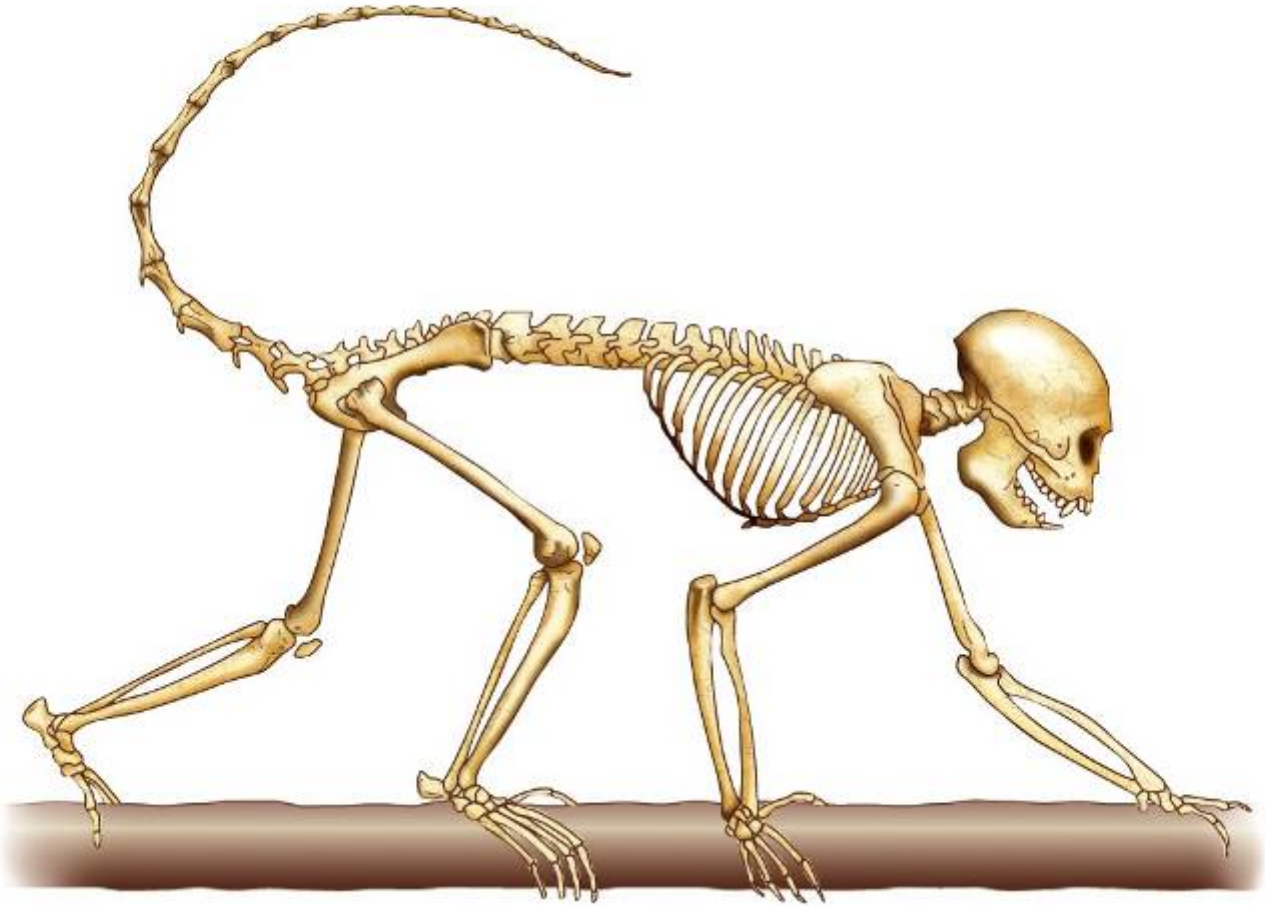
Three Primate Tendencies

1. **Arboreal adaptation-**primates live in the trees and are good at it

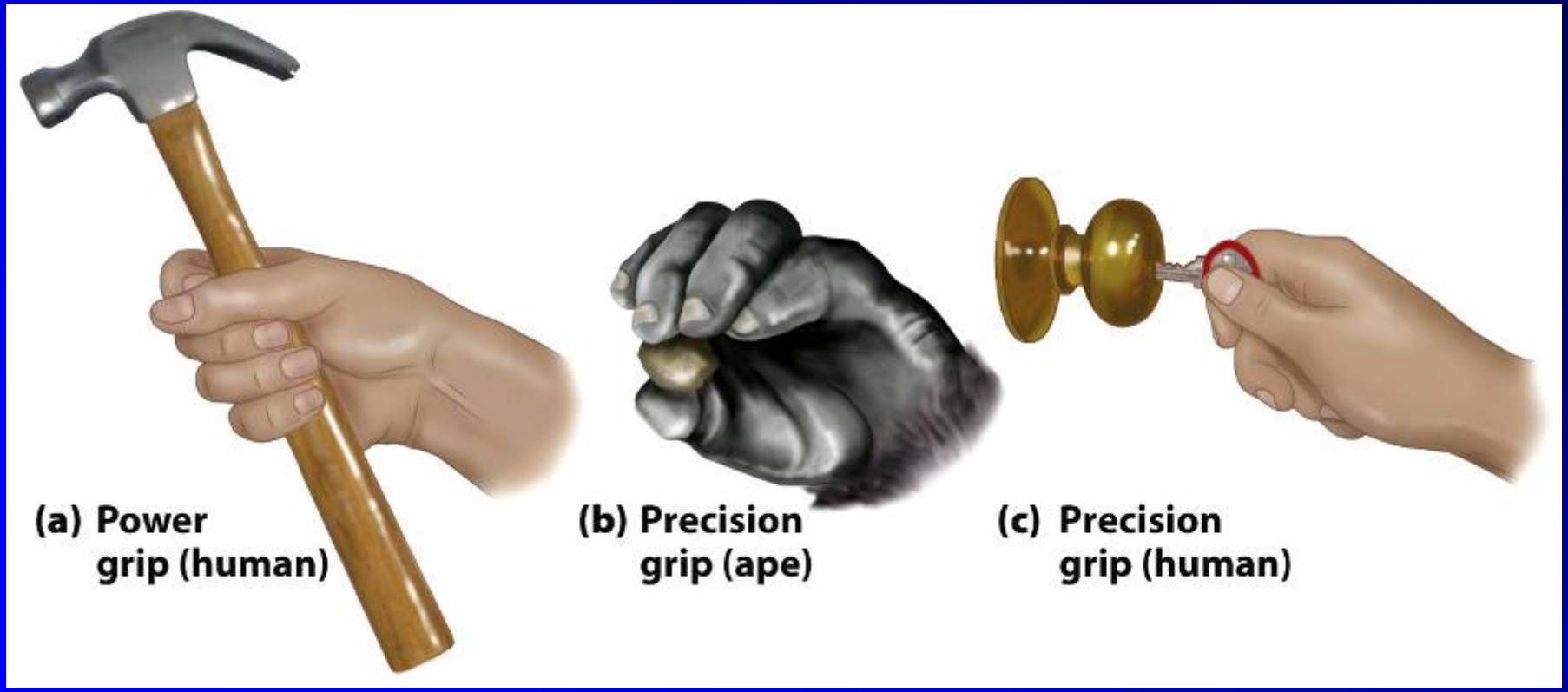
2. **Dietary plasticity-**primates exhibit great dietary diversity/variety

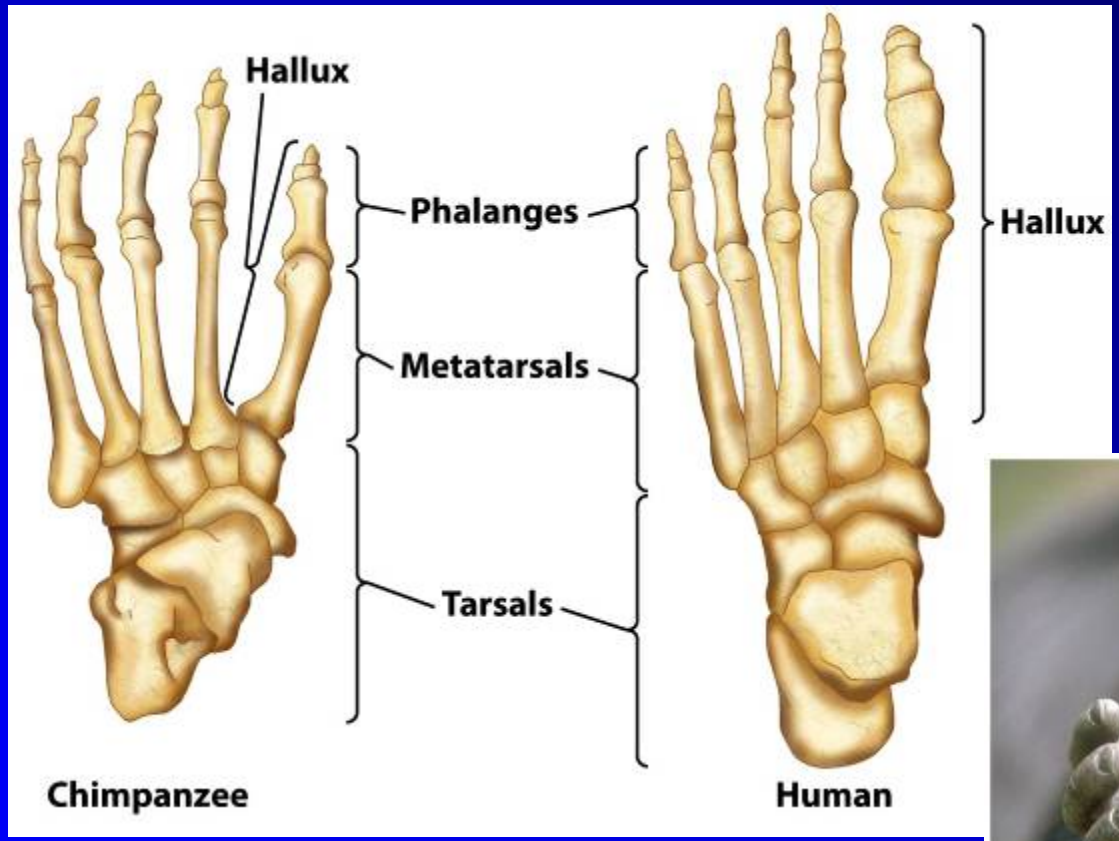
3. **Parental investment-**primates have fewer offspring and spend more time taking care of those offsping

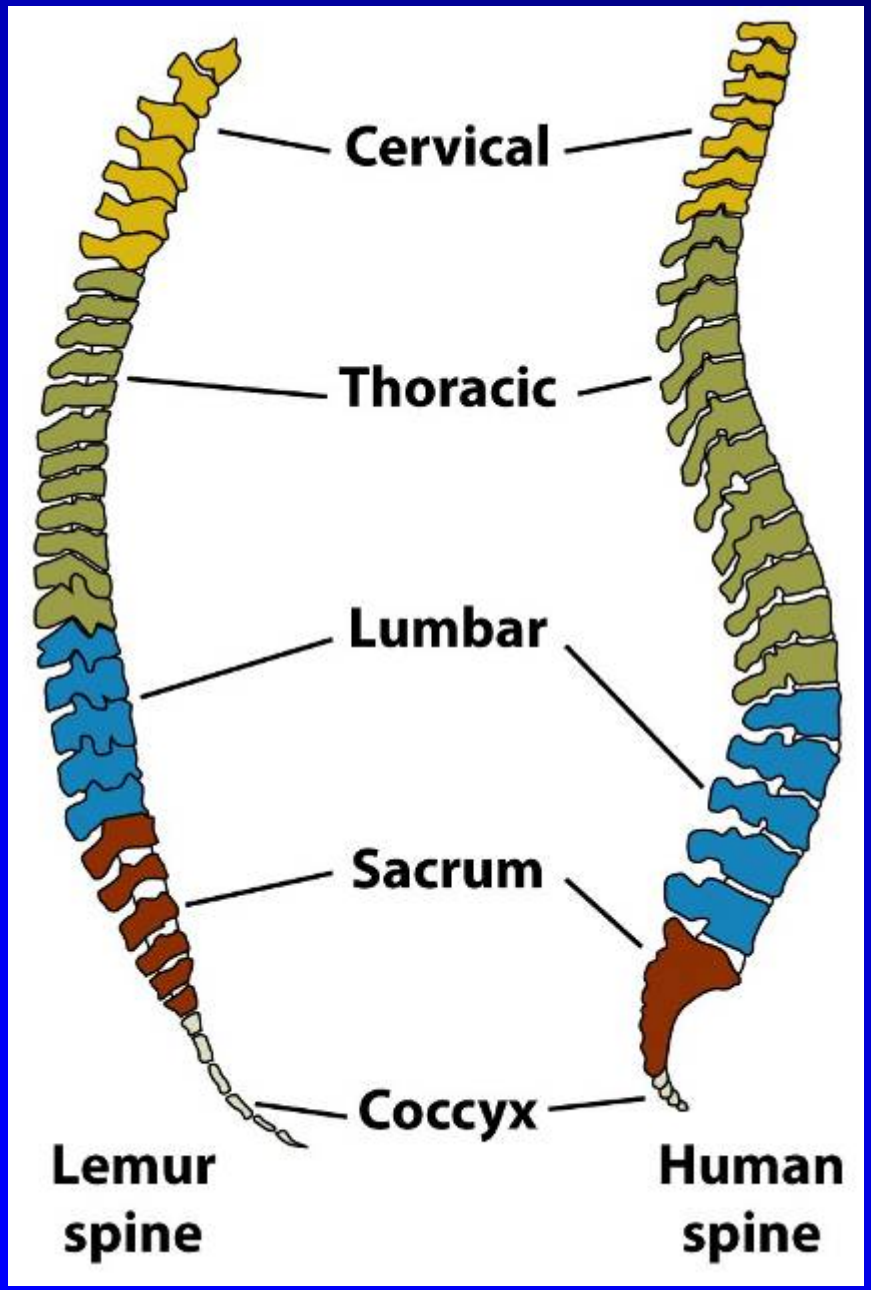
Generalized Skeletal Structure



Opposable Thumb

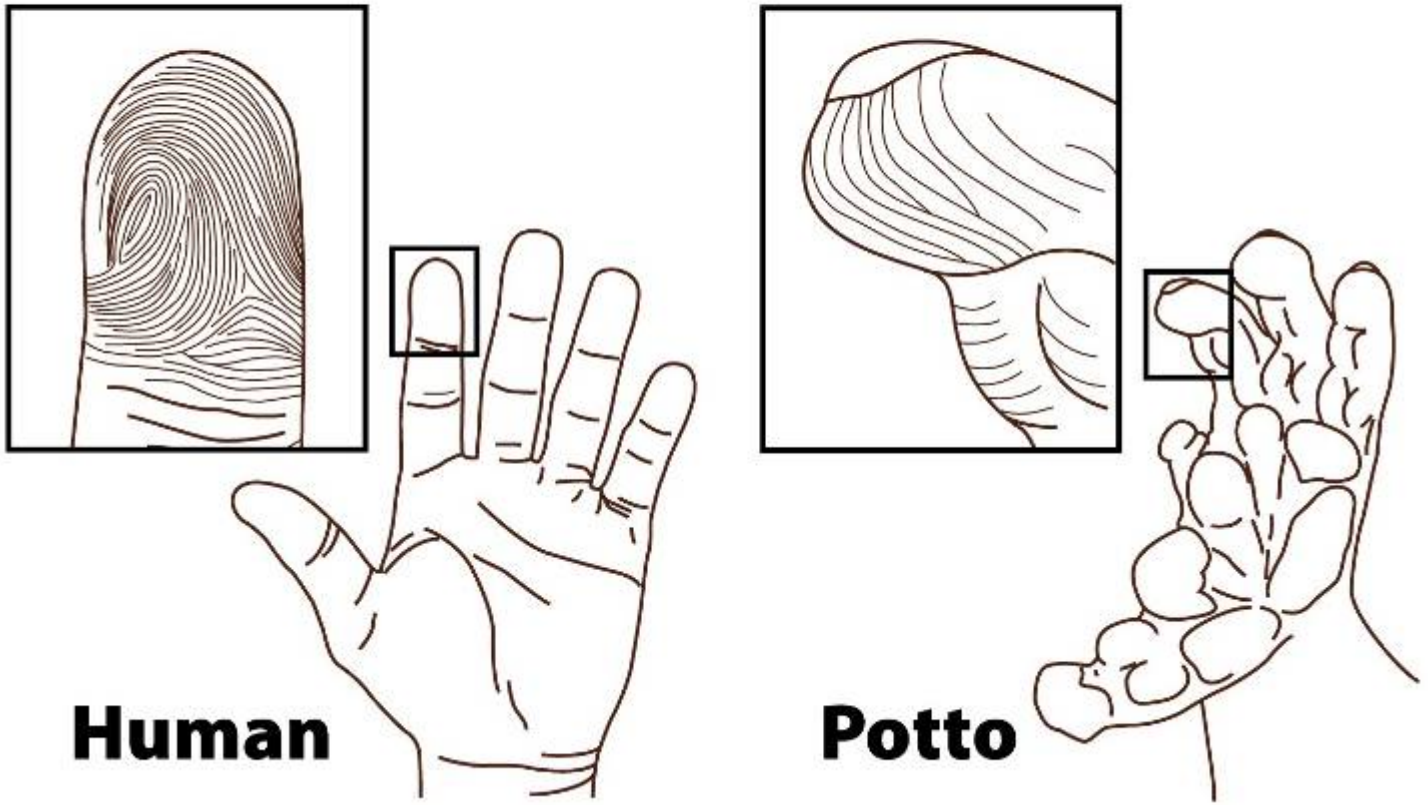



Hallux
Phalanges
Metatarsals
Tarsals
Hallux
Chimpanzee
Human



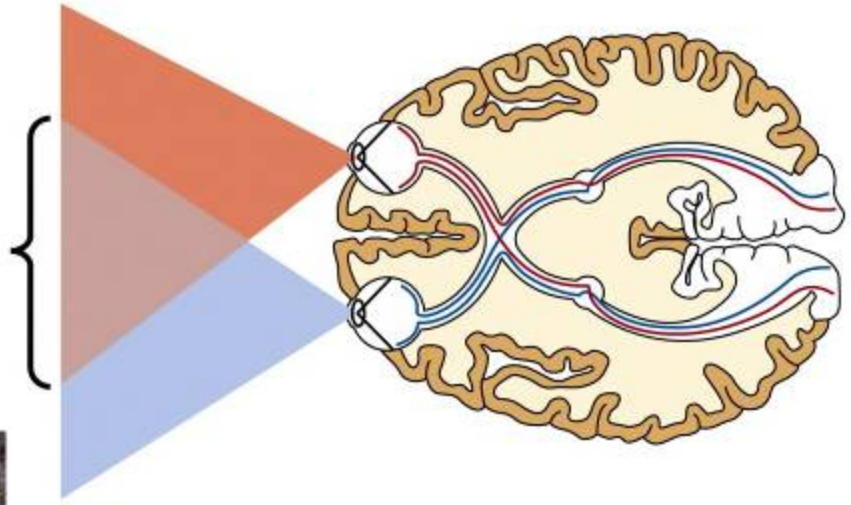
- five different types of vertebrae
- great range of movement
- vertically oriented trunk
- preadaptation to bipedality

Enhanced Touch



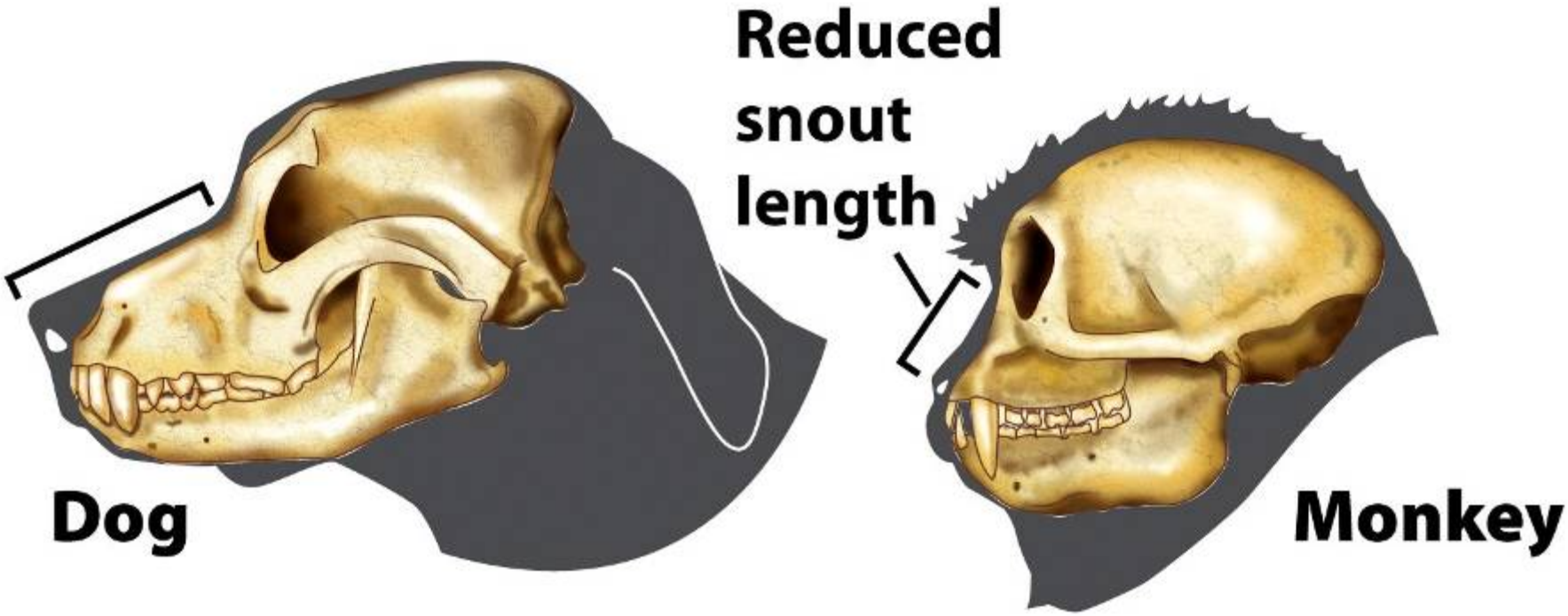
- dermal ridges (fingerprints)
- nails instead of claws

Enhanced Vision

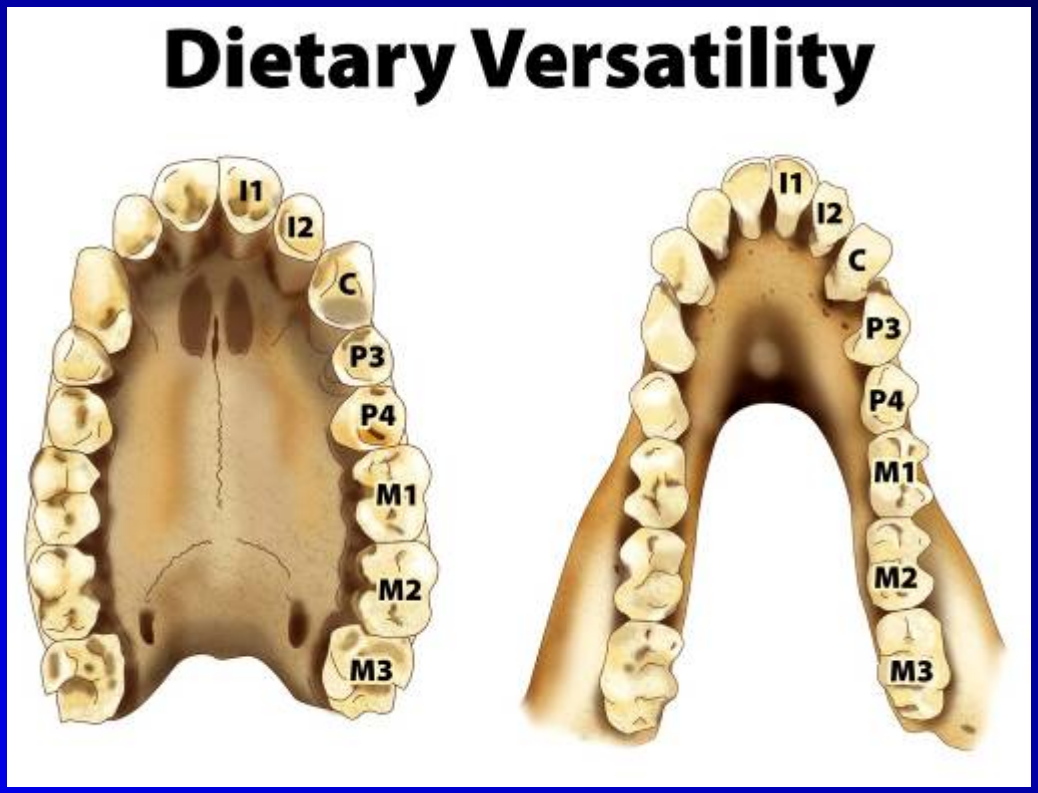


- eyes rotated to the front of the head
- color vision

Reduced Smell



- Lost naked rhinarium (wet nose) except some strepshirhines
- Smell is secondary



- four functionally distinct tooth types
- generalized dentition
- dental formulas (# of teeth in ¼ of the jaw)
  - –3/1/4/3 for early mammals
  - –2/1/2/3 for Old World monkeys, apes and humans
  - –2/1/3/3 for New World monkeys (most)

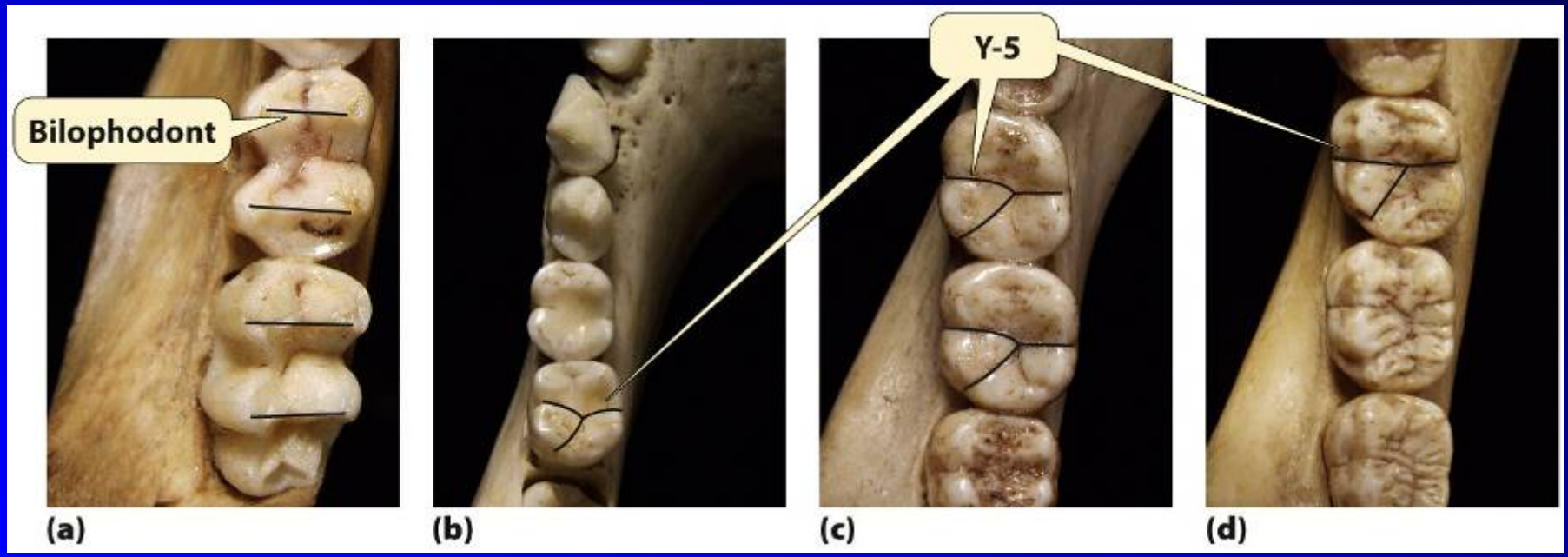
Dental Specializations

Insectivores-high pointed cusps

Folivores-crests for shearing leaves

Frugivores and seed-eaters-low, round cusps

Dental Specializations (Molars)

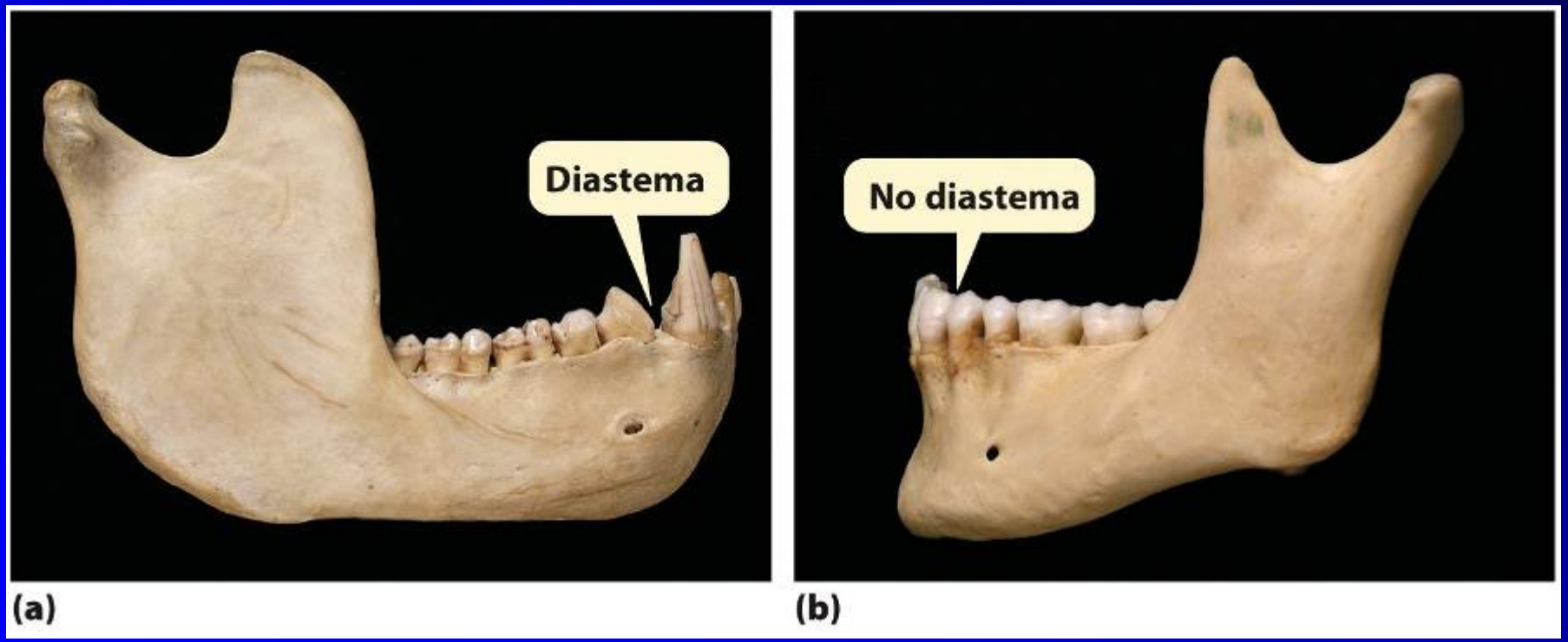


- Bilophodont molars (Old World monkeys)
- Y-5 molar pattern (apes and humans)

Primate Dentition

- canine-premolar honing complex
- diastema

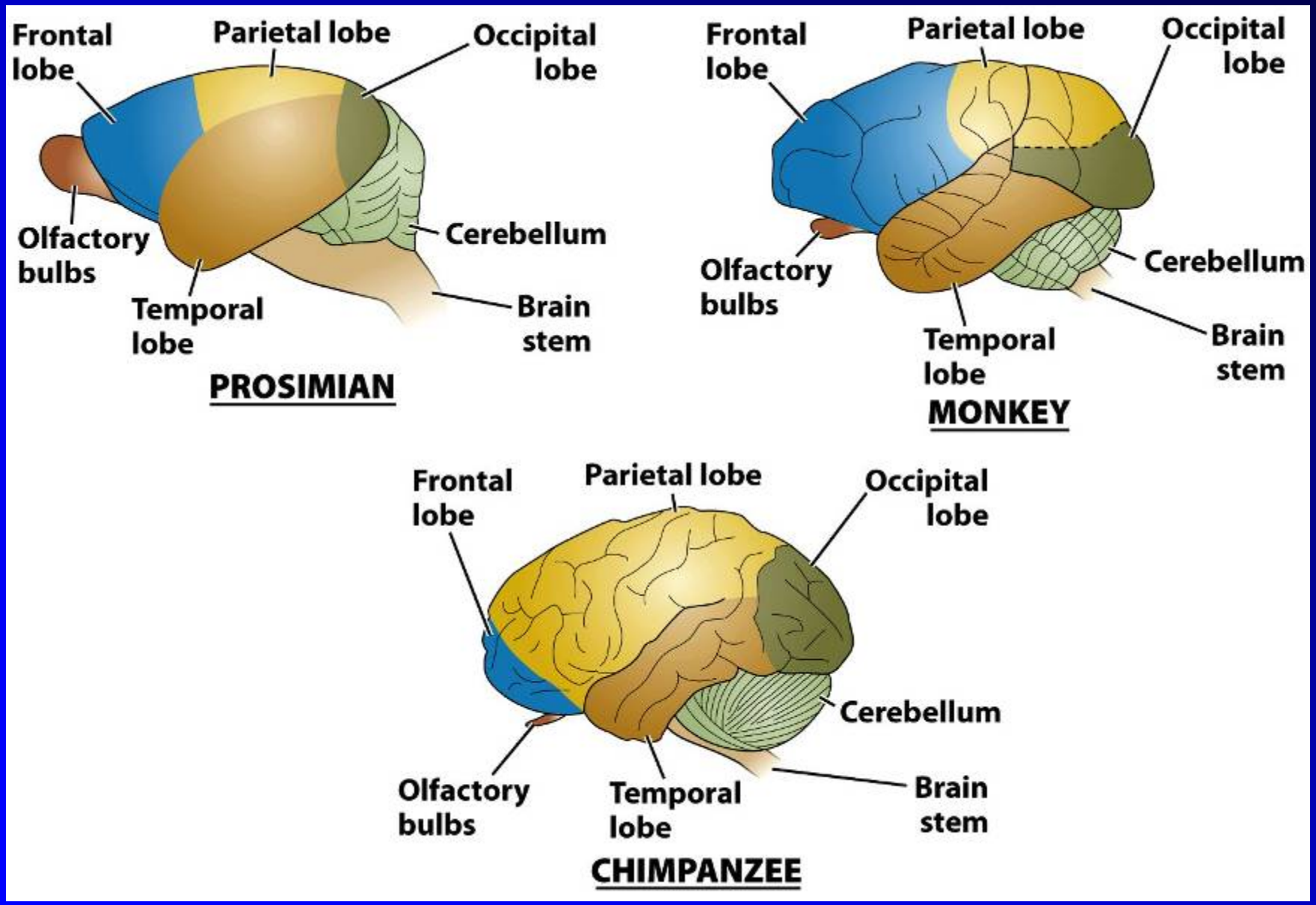
Diastema



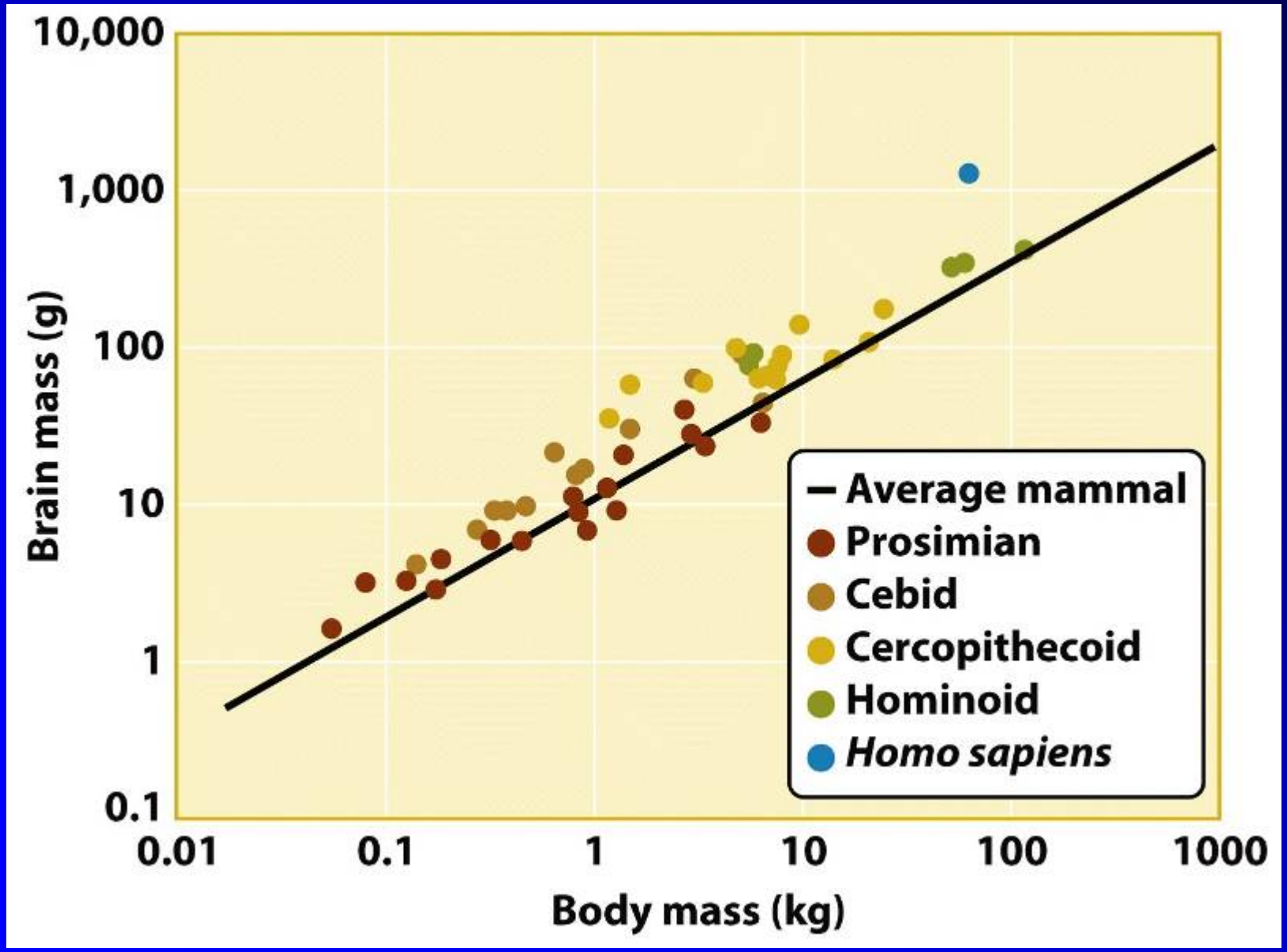
Parental Investment in Primates

- give birth to fewer offspring
- investment in offspring is high
- development period is longer
- larger brain size

The Primate Brain



Brain Size and Body Size



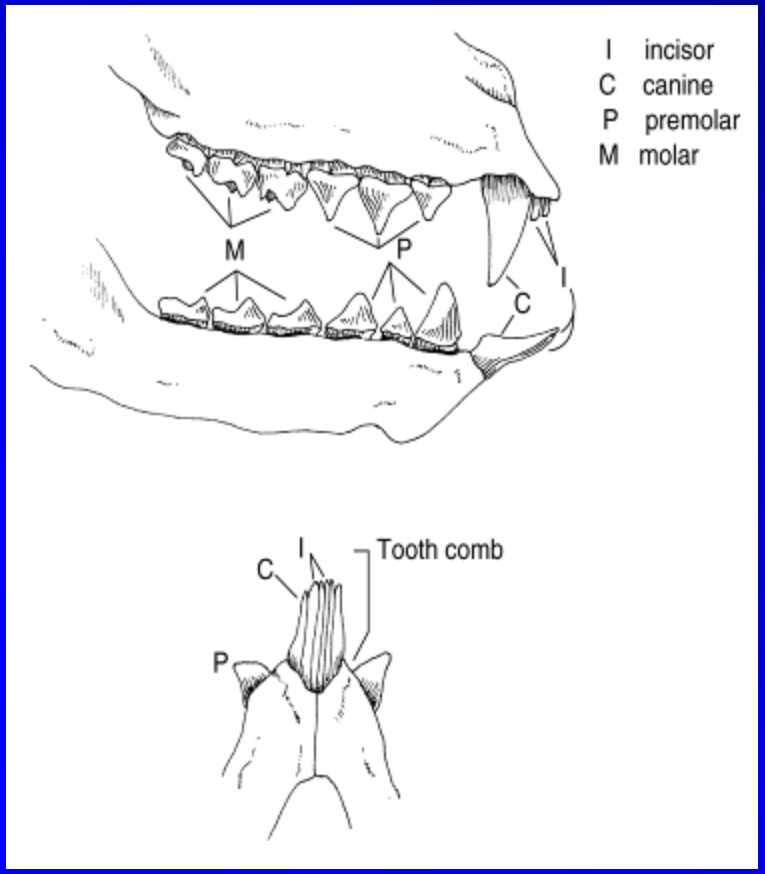
What are the Kinds of Primates? Primate Taxonomy

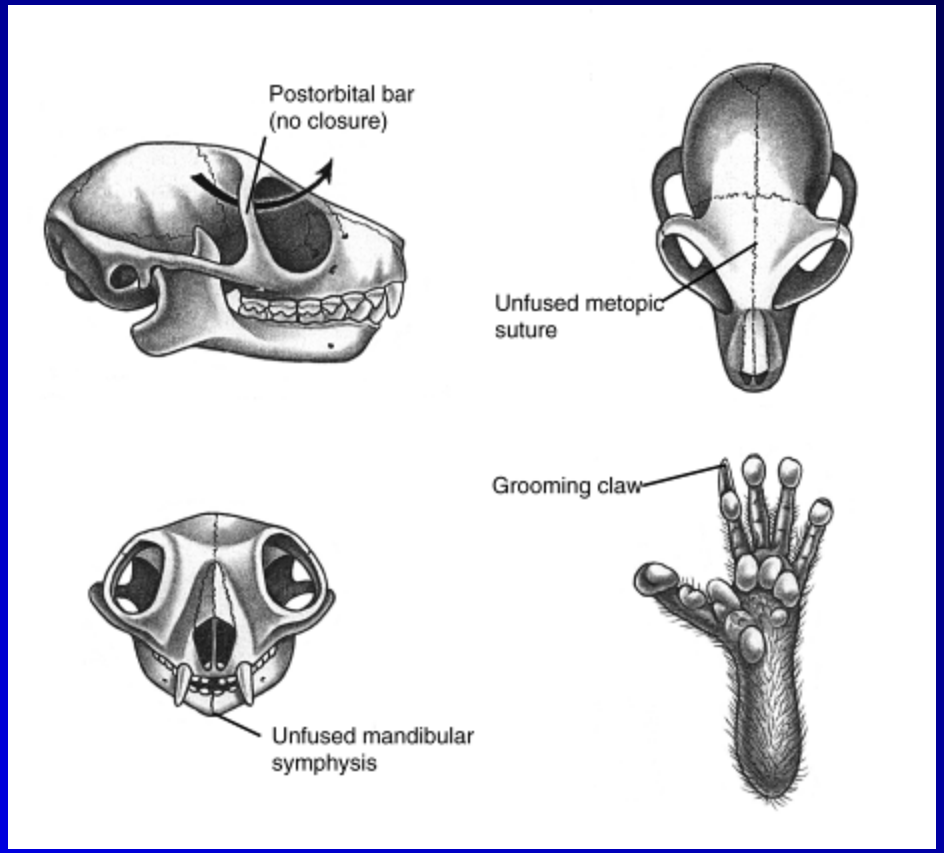
- Order: Primates
  - Suborders: Strepsirhines and Haplorhines
    - Strepsirhines (lemurs, lorises & galagos)
    - Haplorhines (tarsiers, monkeys, apes, humans)

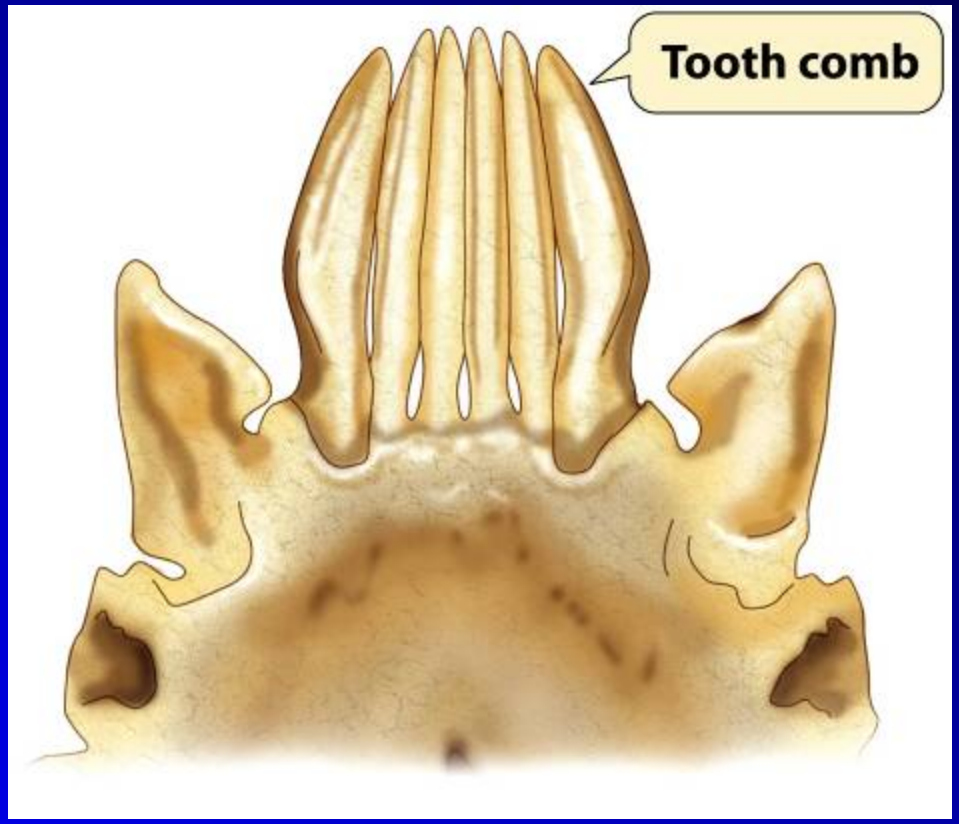
Strepsirhines

- large eyes and very large eye orbits
- rhinarium
- combination of nails and claws
- 3 premolars (2/1/3/3 dental formula)
- dental comb

Strepshirhine Morphology

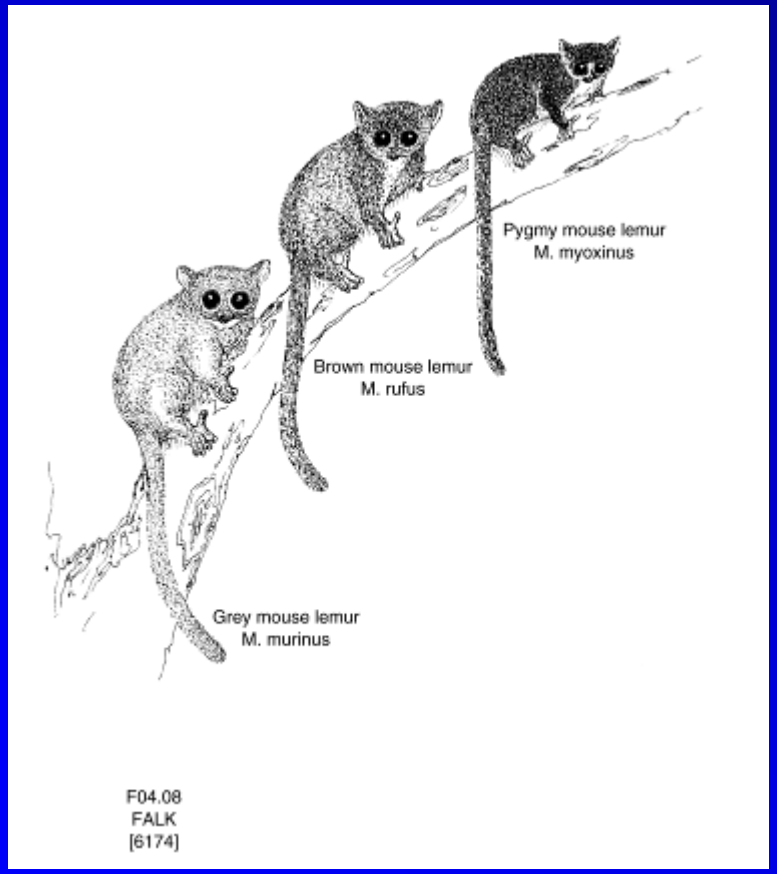


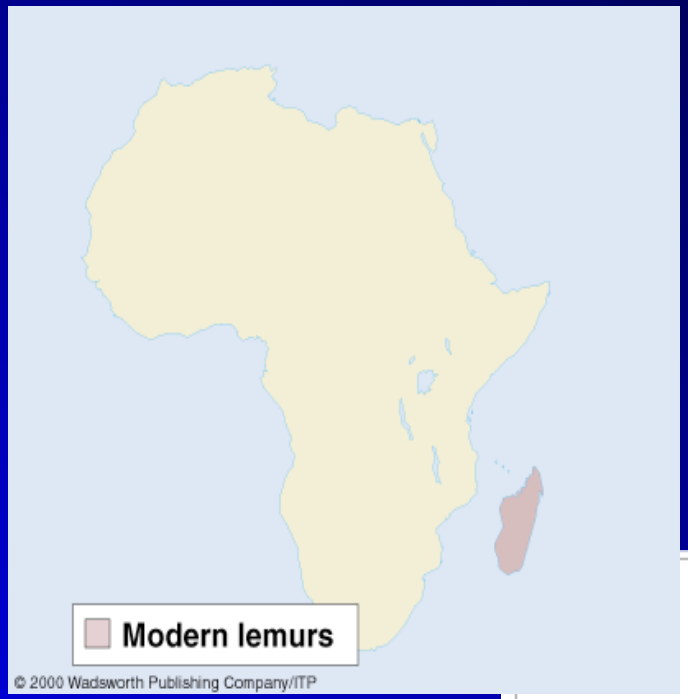



Tooth comb


Tooth comb

Lemurs



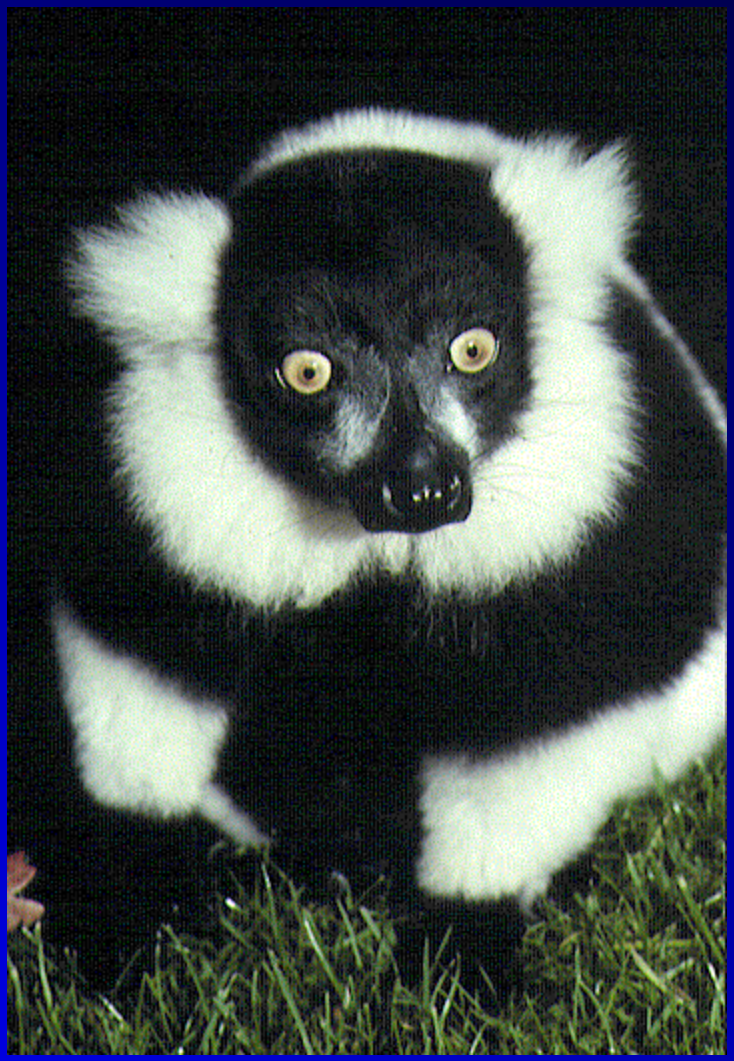


Madagascar

Lemurs

Daubentonia: The Aye Aye

The Sifaka

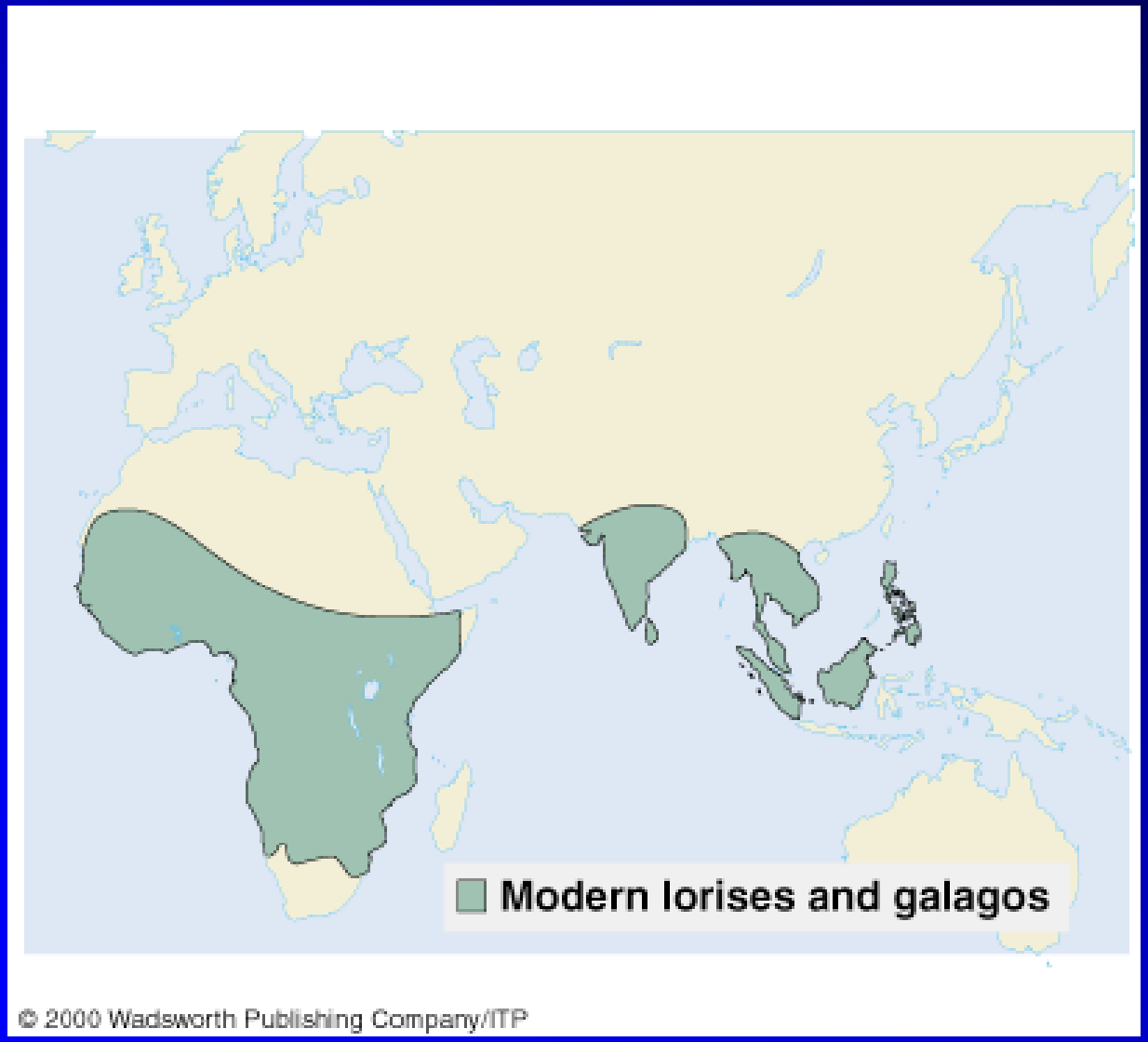


Black & White Ruffed Lemur

Lemurs

- Found **ONLY** on the island of Madagascar in the wild
- Great example of an **adaptive radiation**
- Diversified on the island because they had no predators (until humans arrived and killed most of the large-bodied species)
- Includes “true” lemurs, indris, and sifakas
- Range in size from 2 oz (mouse lemur) to 20 pounds (indri)
- Includes true lemurs, indris, and sifakas

Distribution of Lorises and Galagos



Lorises

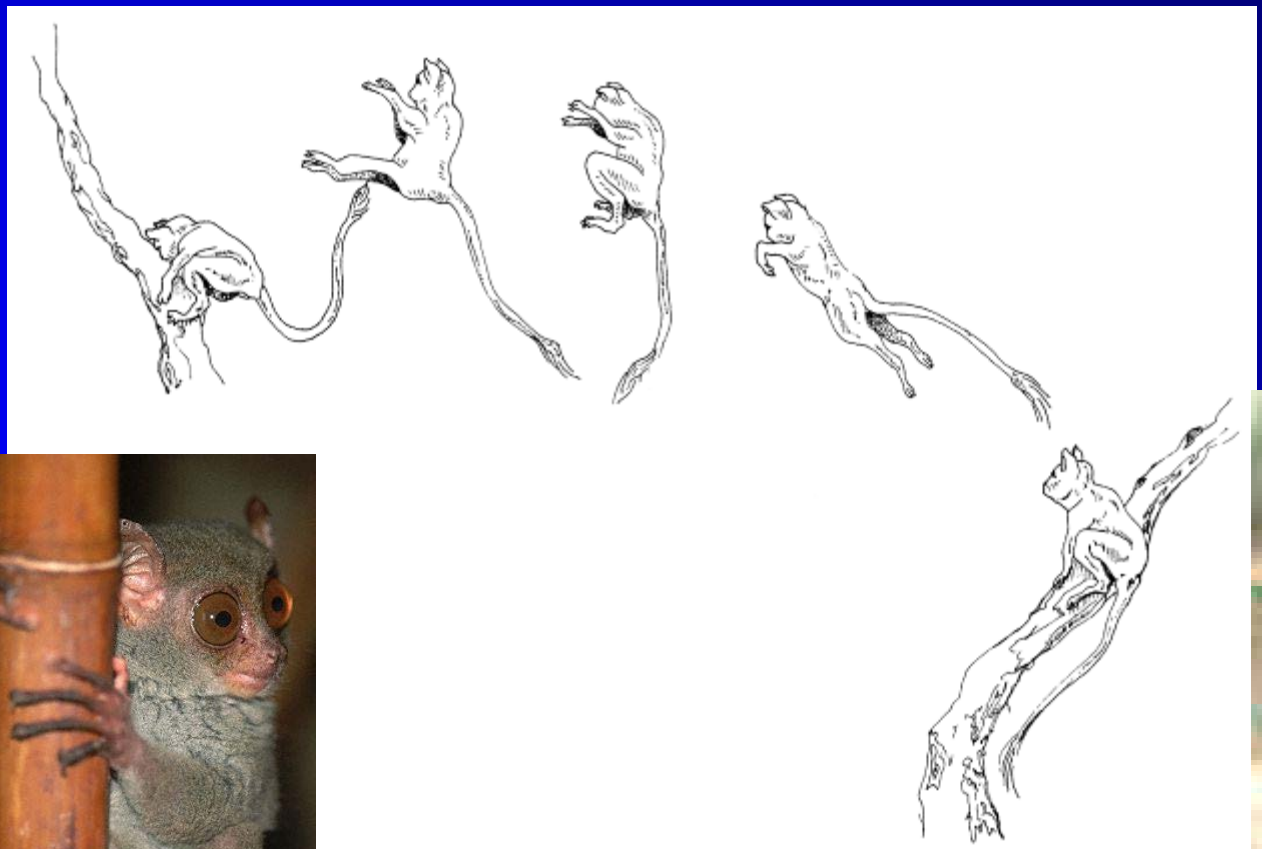
Pottos

Lorises and Galagos

- Diverse group of strepsirhines in tropical Africa and Asia
- Lorises are found in Africa and Asia and galagos [also called bush babies] are found in Africa only
- Lorises are nocturnal; spend nights feeding on fruits, insects, and other small animals
- Lorises are slow-moving, deliberate stalkers, capturing small prey
- Galagos are active, leaping animals ranging in size from a house cat to a rat, and are more insectivorous than the lorises
- Most species are solitary

Galagos

Vertical Clinging and Leaping



Tarsiers

Tarsiers: Who Are They Related To?

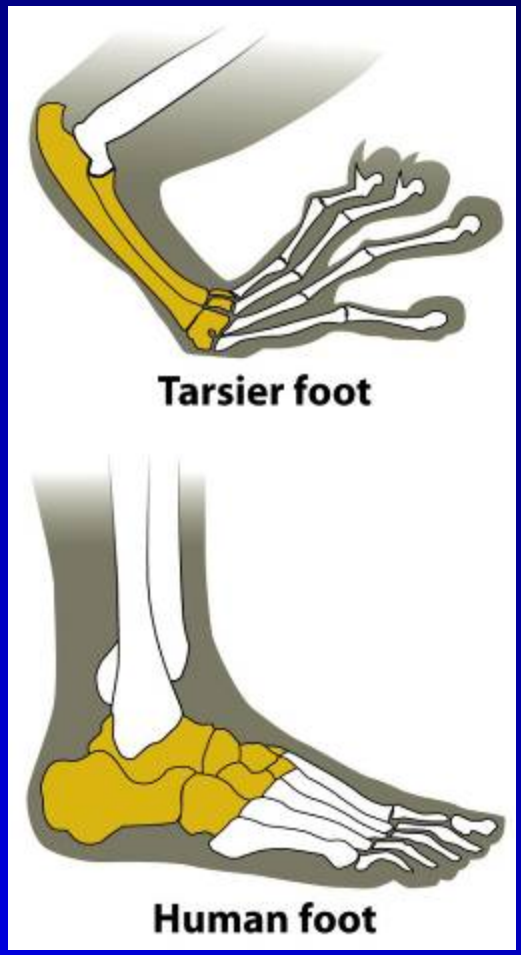
Tarsiers share many characteristics with the anthropoids:

- some dental features
- no rhinarium
- absence of tapetum lucidum
- presence of fovea
- blood supply around the middle ear

Tarsiers: Who Are They Related To?

Tarsiers share certain characteristics with the lesser primates:

- three premolars
- nocturnal
- small brain
- leaping



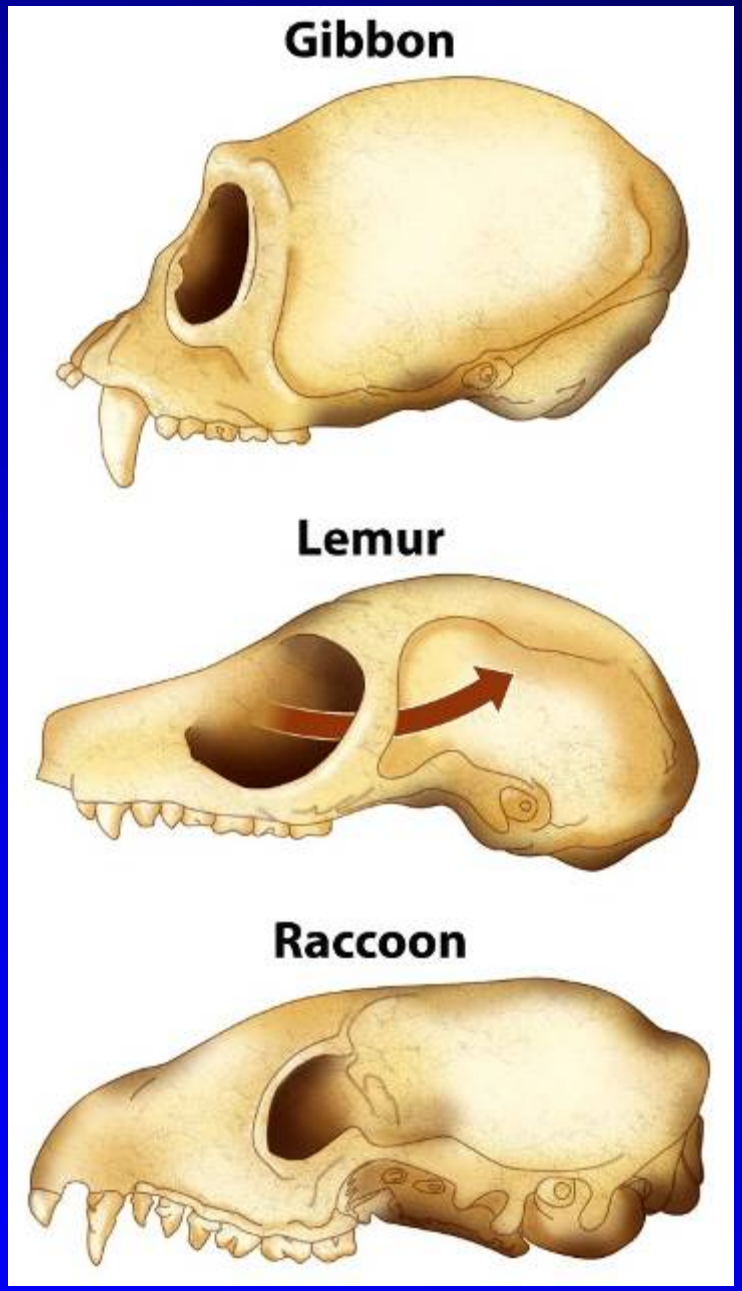
Strepsirhines vs. Anthropoids

Anthropoids have:

- larger brains and bodies
- sexual dimorphism
- postorbital closure
- color vision (rely less on smell)
- increased parental care

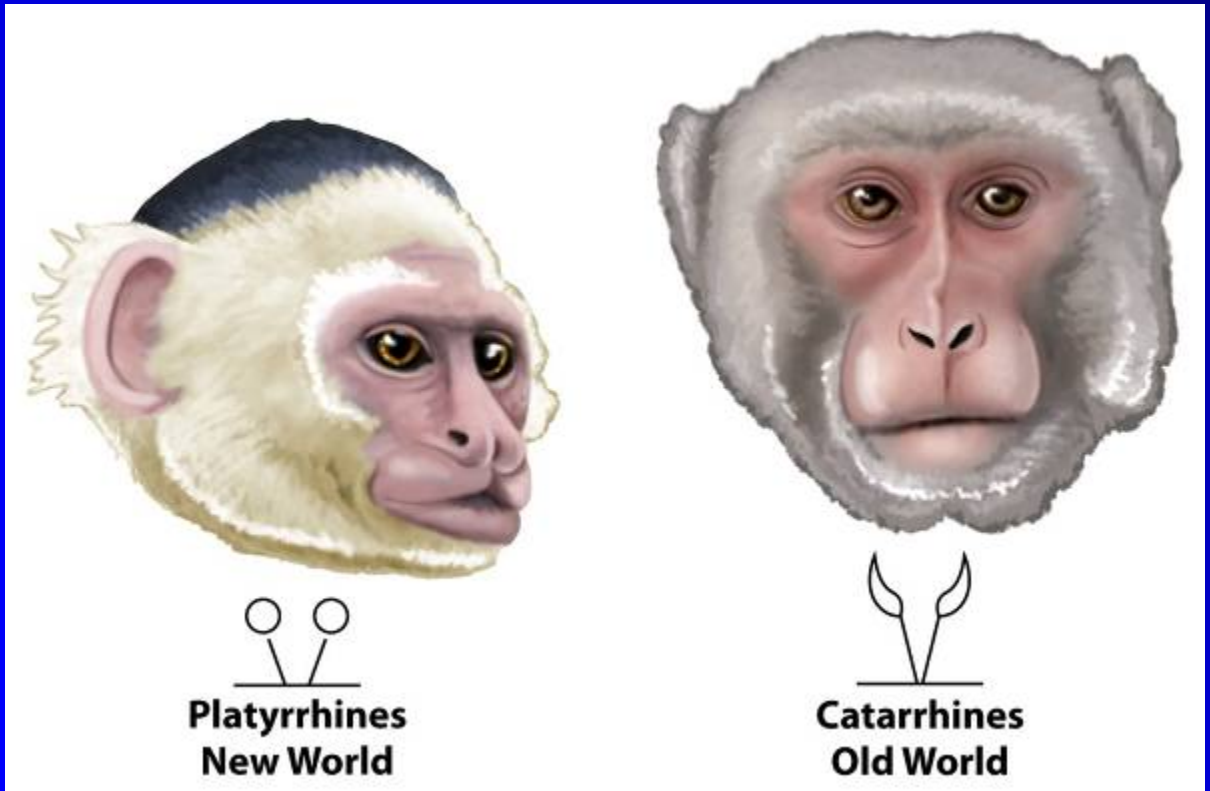
Also:

- Anthropoids are NOT nocturnal (diurnal)


Gibbon
Lemur
Raccoon

Anthropoids

- New World Monkeys (Platyrrhines)
- Old World Monkeys (Catarrhines)
- Apes and Humans (Catarrhines)



New World Monkey Distribution

New World Monkeys (Platyrrhines)

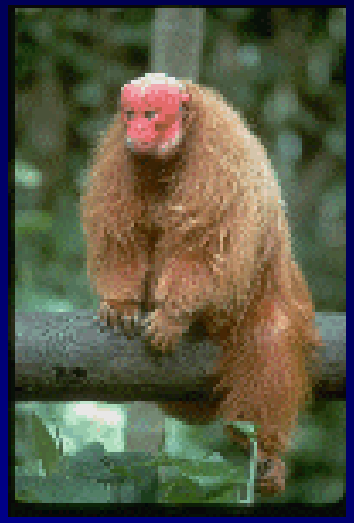
- Arboreal
- Suspensory locomotion
- Prehensile tail (sometimes)
- Diverse diet
- Three premolars
  (2/1/3/3 dental formula)

Atelidae

Howler monkey

Spider monkey

Woolly monkey



Uakari

Owl monkey

Cebidae

Pygmy marmoset

Black ear-tufted marmoset

Golden lion tamarin

Emperor tamarin

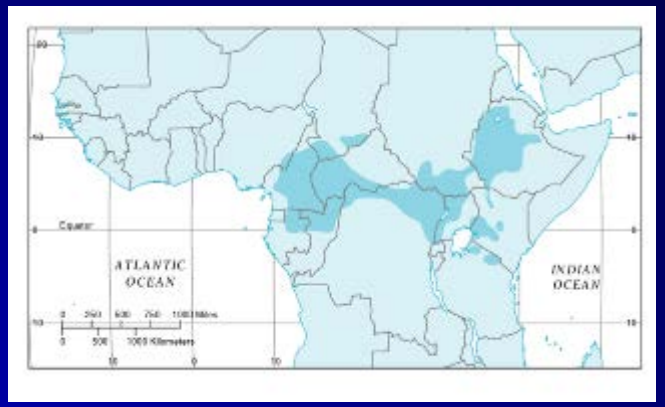
Capuchin

Squirrel monkey

Catarrhines

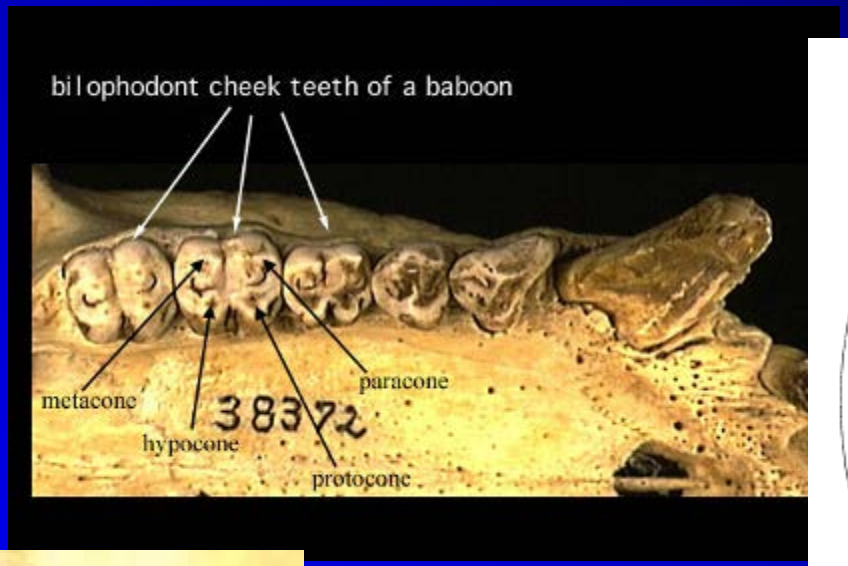
- Old World Monkeys (Cercopithecoids)
  - Cercopithecines
  - Colobines (leaf monkeys)
- Apes (Hominoids)

Old World Monkey Distributions



Old World Monkeys

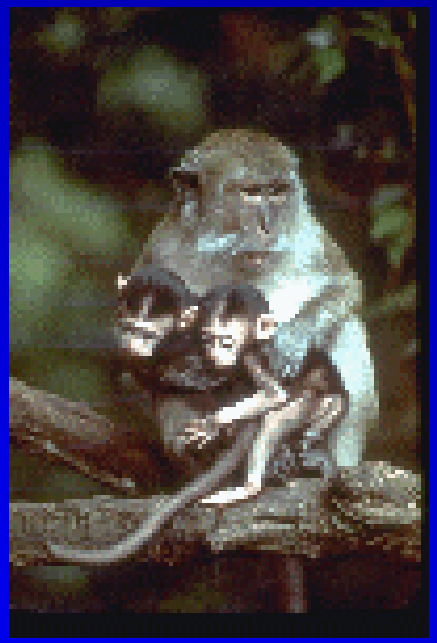
arboreal AND
terrestrial
(some species)



Ischial Callosities

Cheek Pouches

Cercopithecines



Macaque

Baboon

Mangabey

Mandrill

Guenon

Colobines

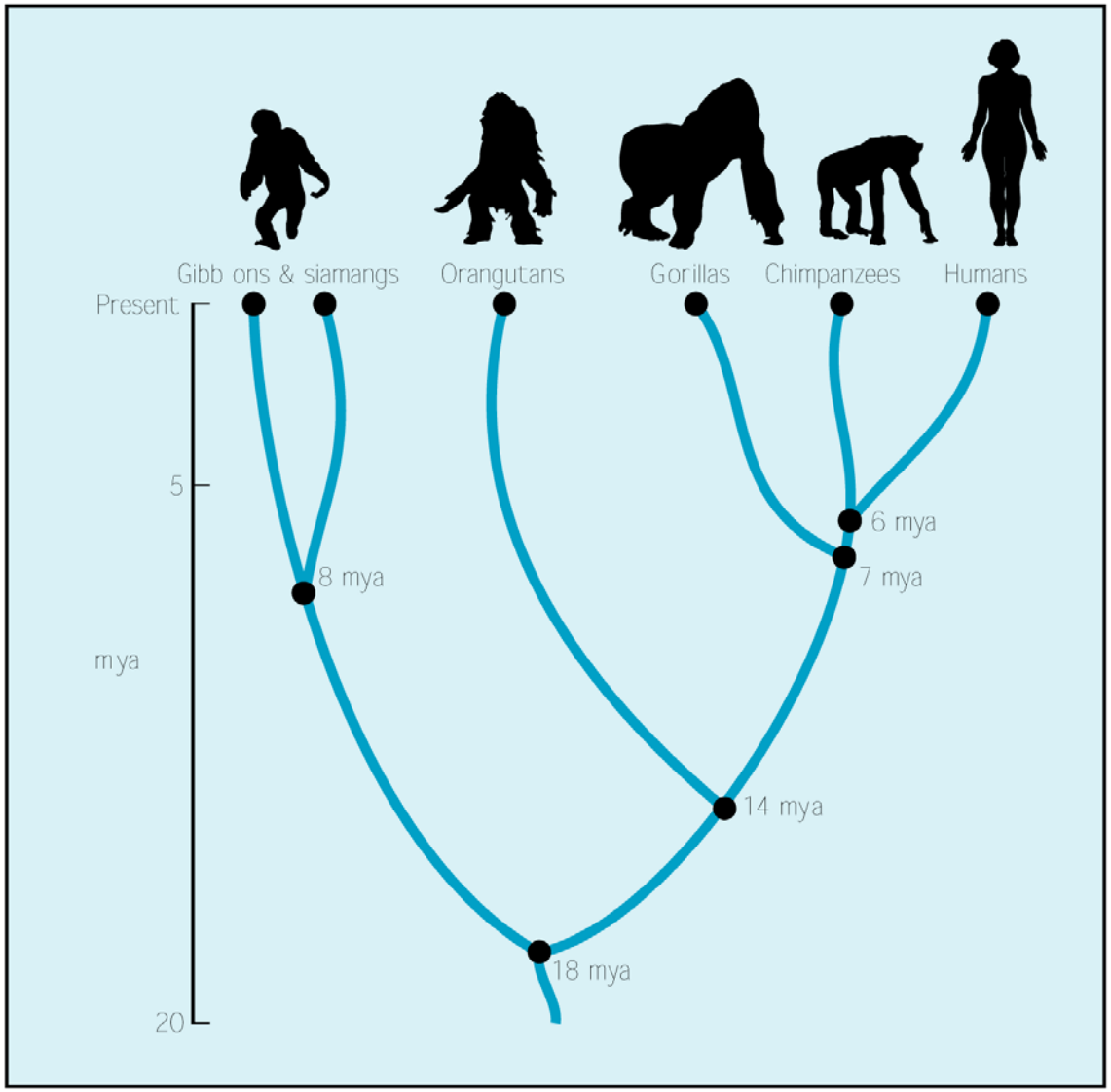
Langur

Black and White Colobus

Proboscis Monkey

Colobines are leaf eaters with sharp molar cusps and specialized stomachs

Hominoid Phylogeny

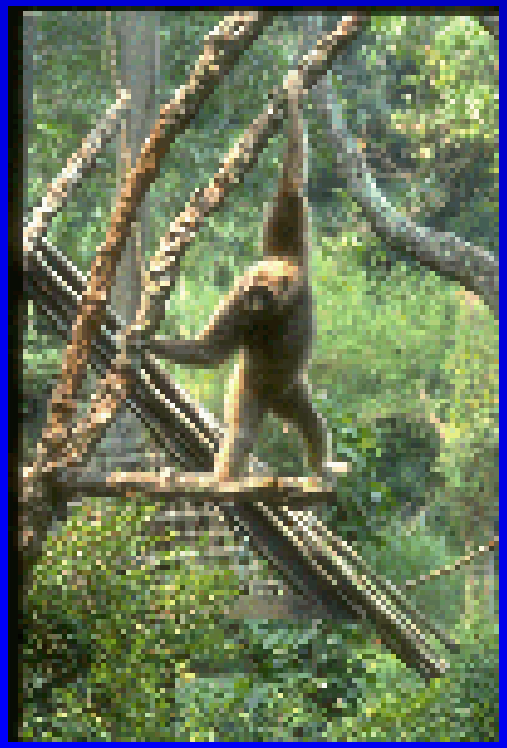


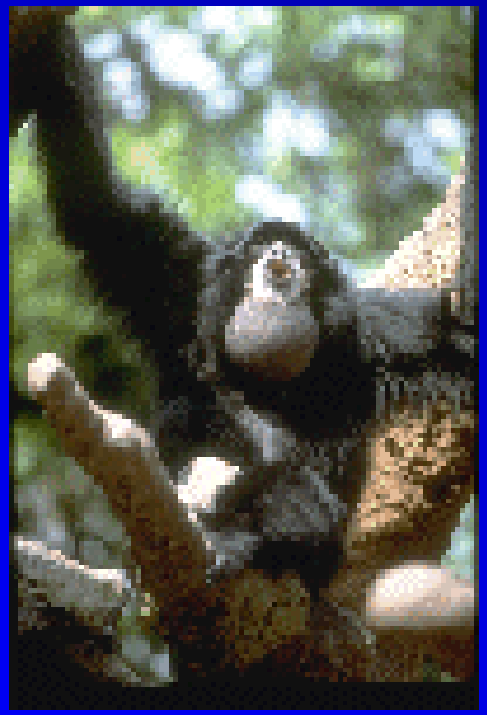
Apes vs. Monkeys

Apes are/have:

- Larger
- No tail
- Shortened trunk

- More mobile shoulder joint: brachiation
- Forelimbs (arms) longer than hindlimbs (legs)
- More complex behavior and cognitive abilities (larger brains)
- Increased period of development





Gibbons

and

Siamangs

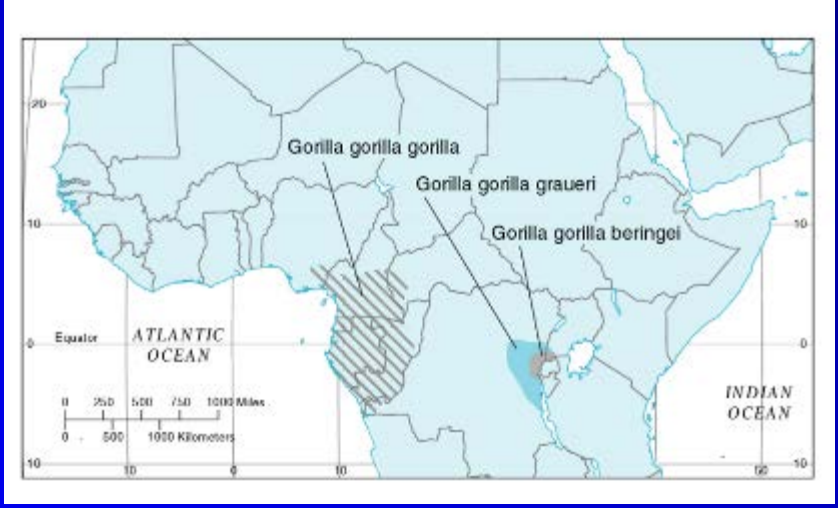
(*Hylobates*)

Gibbon/Siamang Characteristics

- Southeast Asian Tropical Rain Forests
- Smallest of the apes
- Arboreal
- Fruit
- Diurnal
- Monogamous
- Paternal care of young
- Territorial/VERY vocal
- Little sexual dimorphism

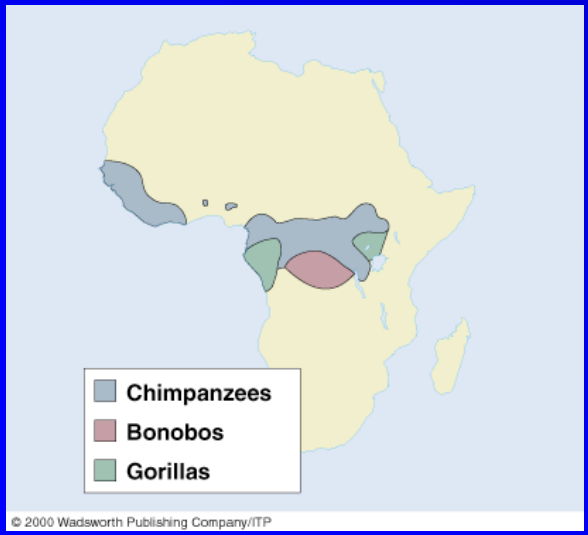
Brachiation

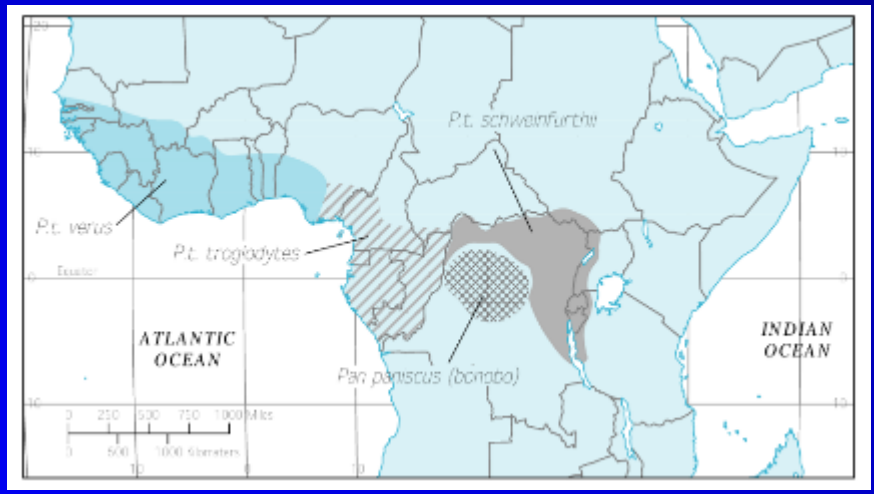
Great Ape Distributions



Gorilla: *Gorilla*

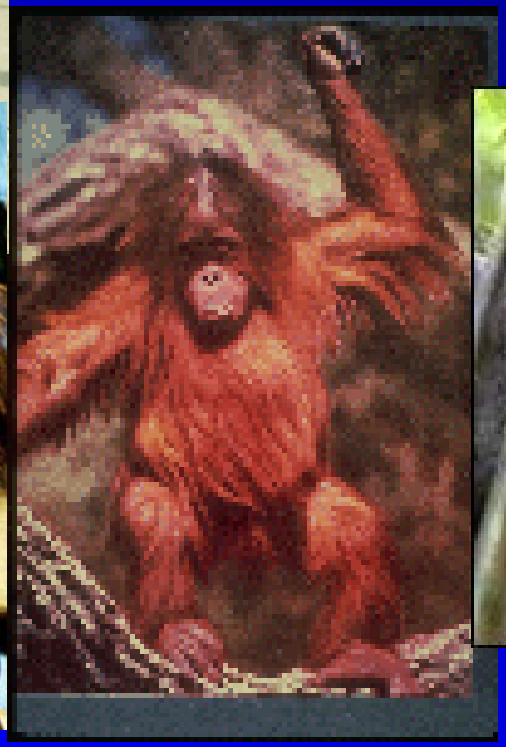
Orangutans: *Pongo*





Chimpanzee: *Pan*

Orangutans (*Pongo pygmaeus*)



Orangutans

- Orangutans are found only on the Indonesian islands of Borneo and Sumatra
- Severely endangered to due poaching by humans and habitat loss
- Thus, they are the only great ape living outside of Africa
- They are easily recognizable by their red fur
- They live in tropical rain forest
- They are mostly frugivorous (fruit-eating)
- They are diurnal (active during the day)
- They are mostly solitary, although females move around with their dependent offspring
- First births occur when females are about 10 years old. They have one offspring per litter. Their interbirth intervals are 3-4 years.
- Orangutans live to about 50 years in the wild, and into their 60s in captivity.

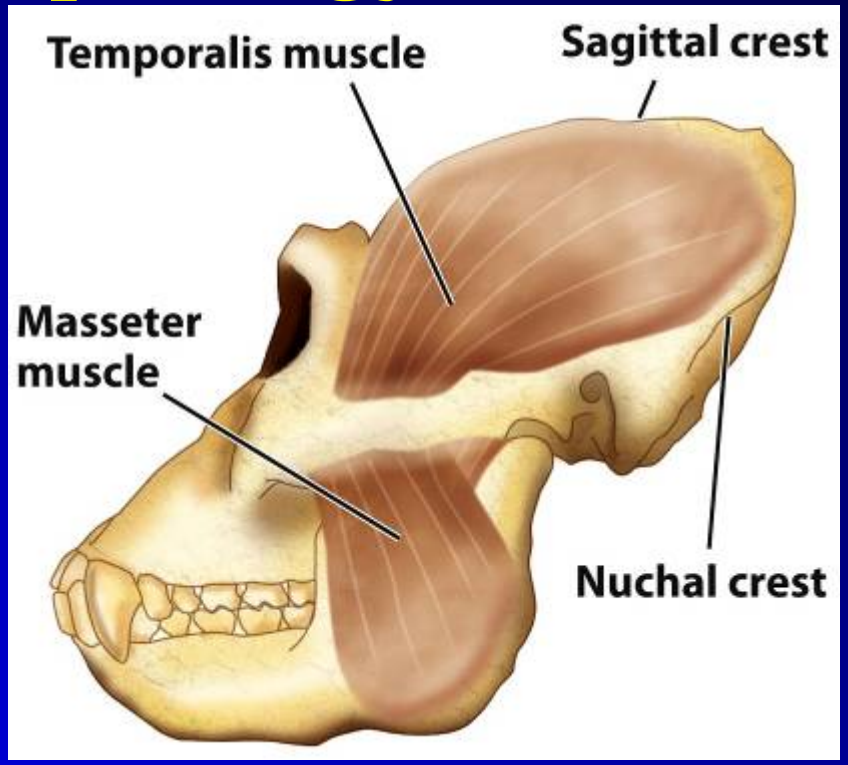
Gorilla (*Gorilla gorilla*)

Knuckle-Walking

Gorilla Morphology

Sexual Dimorphism

MALE FEMALE



Gorillas

- Largest of all living primates (males weigh up to 400 lbs, females 150 to 200 lbs.)
- Also highly endangered, esp. mountain gorilla-only 600 left in the wild
- Found in forested areas of western and eastern equatorial Africa
- Exclusively vegetarians—mountain and western lowland gorillas concentrate on leaves, pith, and stalks, but western lowland gorillas eat more fruit
- Gorillas move around by **knuckle-walking,** in which very strong arms are used to support the upper body weight while supported on the backs of the fingers' middle phalanges. Orangutans are also knuckle-walkers when they are on the ground, but they do it on a different joint (more like fist-walking).
- Very high degree of sexual dimorphism in gorillas
- In orangutans and gorillas males have enormous masticatory muscles, which are accommodated by a large, well-developed sagittal crest, a ridge of bone running along the midline plane of the skull. The sagittal crest is the terminal attachment site for the temporalis muscle.

Chimpanzees (*Pan troglodytes*)

Chimpanzees

- They are both terrestrial and arboreal, spending about equal amounts of time in the trees and on the ground.
- They move about terrestrial by means of quadrupedal knuckle-walking, similar to the gorillas. When on the ground they also sometimes walk bipedally for short distances when carrying food or other objects. While in the trees, they may brachiate like gibbons.
- They are diurnal
- Chimps are the smallest of the great apes, with females a little smaller than males
- They eat a large variety of food items including fruits, leaves, insects, nuts, birds' eggs, berries, caterpillars, and small mammals
- Life span: avg. 53 years

Chimpanzee Behavior

NESTS

TERMITE FISHING

TOOL USE

Social Behavior

Chimpanzee Behavior

- They build nests for sleeping
- They are famous for 'termite fishing.' Termites live in mounds of dirt. In order to get termites to eat, chimpanzees use sticks to stick into the mounds and pull out termites. They will use appropriate sticks; they fid sticks that are strong enough so that they won't break and long enough so that they reach far enough into the mound. They have also been observed to modify the sticks. If there are occluding twigs they will break them off. If the sticks are too thick, they will strip off some bark to make them thin enough to fit into the mounds.
- They also use stones as hammers to crack open nuts (only in West Africa)
- Spear use—to kill bushbabies (galagos)

Bonobo (Pygmy Chimpanzee)
Pan paniscus

Bonobos

- More slender build than common chimps, with longer limbs
- Face is black from birth
- Hair is ‘parted’
- Found only in parts of Democratic Republic of Congo
- **Unusual sexual behavior**—use sex as a form of social communication

- Black-and-white colobus
- Campbell's
- Chimpanzee
- Demidoff's galago
- Diana monkey
- Human
- Lesser spot-nosed
- Olive colobus
- Potto
- Putty-nosed
- Red colobus
- Sooty mangabey
- Thomas's galago
- Eagle

Emerging canopy

Main canopy

Understory

3:00