Primate Studies

(Asst)Prof. Soumi Dey
Dept. of Anthropology
Haldia Govt. College

Common Mammal Traits

- Fur (or body hair in Humans)
- Long gestation & live birth (relative to other types of organisms)
- Heterodontism (different kinds of specialized teeth)
- Ability to maintain constant body temp (Homeothermy)
- Increased brain size (greater ability for learning and behavioral flexibility)

Primate characteristics

- Arboreal
- Grasping hands
- Finger nails & finger pads with ridges
- Binocular vision
- Diurnal
- Colour vision
- Large brain
- High degree of parental care
- Long childhood

Trunk Verticality

- Tendency toward erect posture shown in all primates.
- Variously associated with sitting, leaping, standing, and occasionally, bipedal walking.

Types of Locomotion

- Vertical clinging/hanging & leaping (prosimians)
- Brachiation (apes)
- Semi-brachiation (combo leaping/brachiating)
- Quadrapedalism
- Bipedalism (us)

Semibrachiation

- New World
  - Hands + prehensile tail

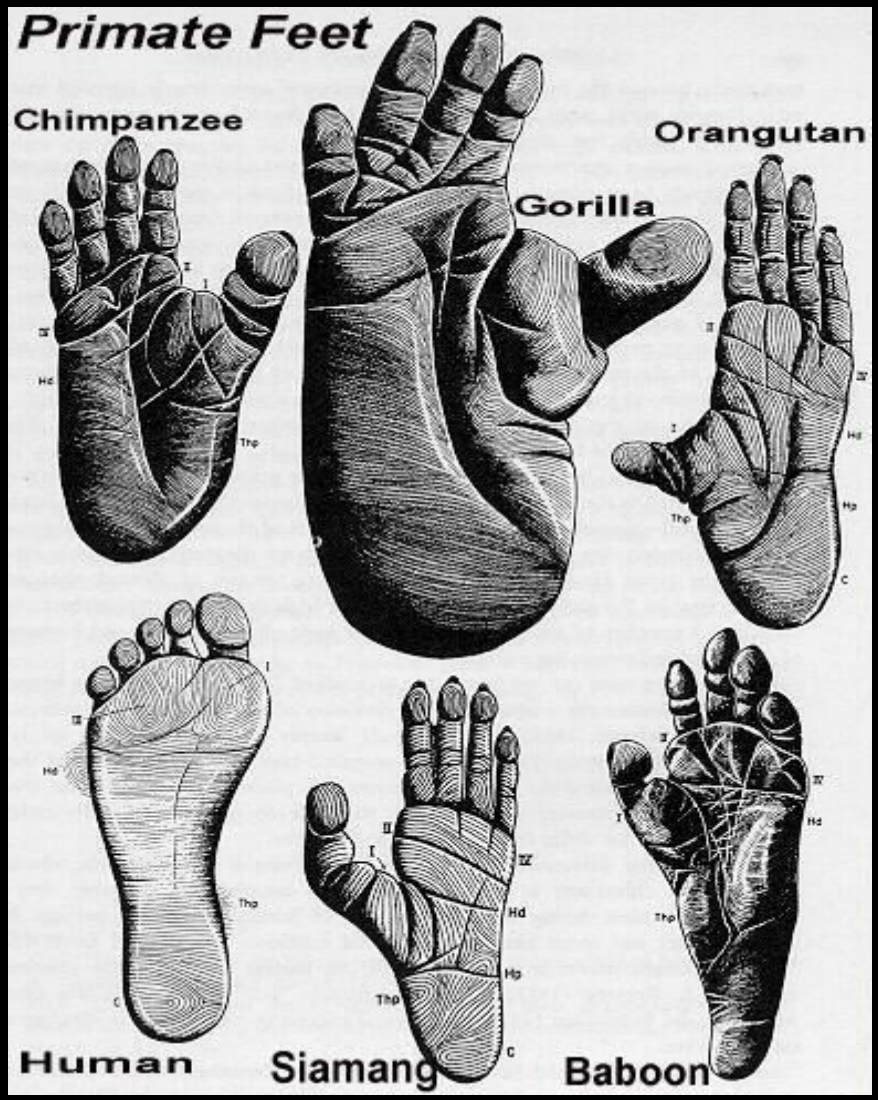
- Old World
  - Hands, no tail use

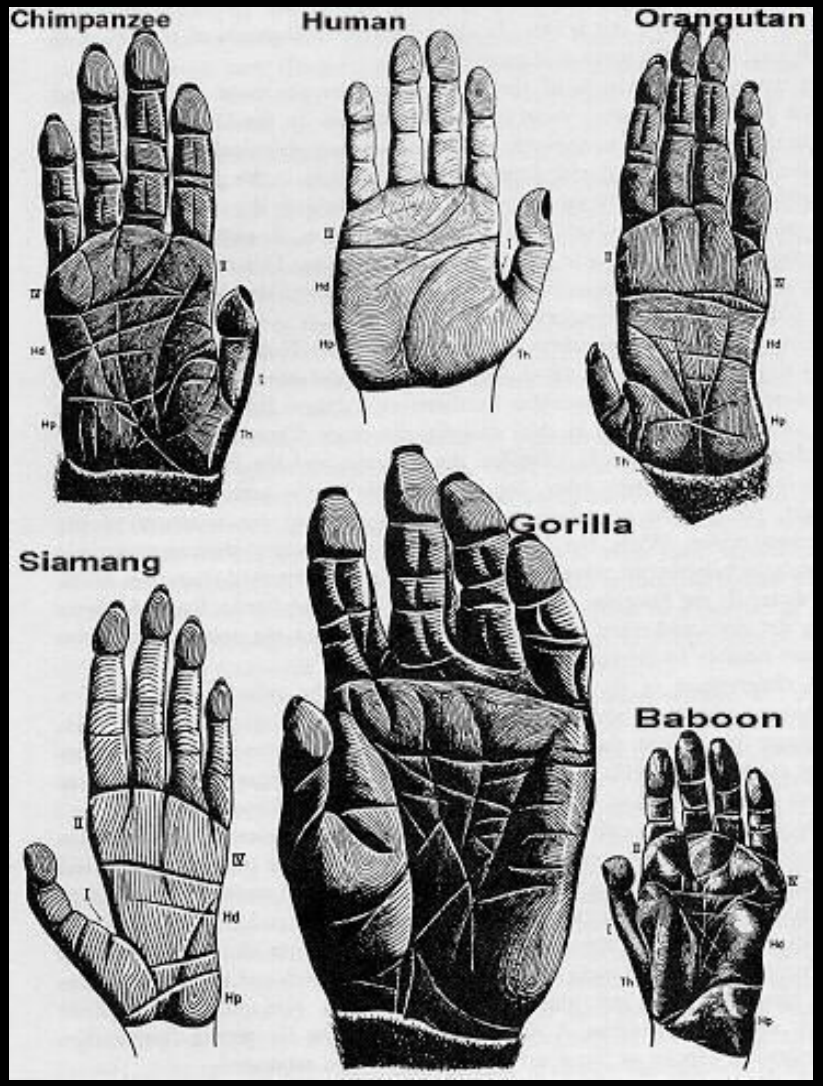
Swinging with upper limbs is brachiation, using all four limbs is semi-brachiation

Prehensile hands (& feet)

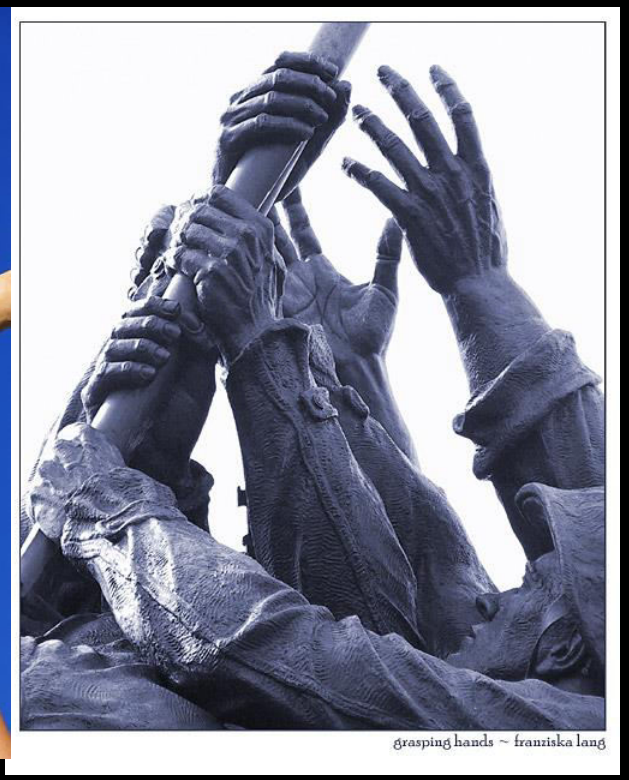
- All primates use the hands to grasp and manipulate objects (Power grip and Precision grip).
- And most also use their feet for similar purposes.
- These capabilities are enhanced by a number of characteristics.

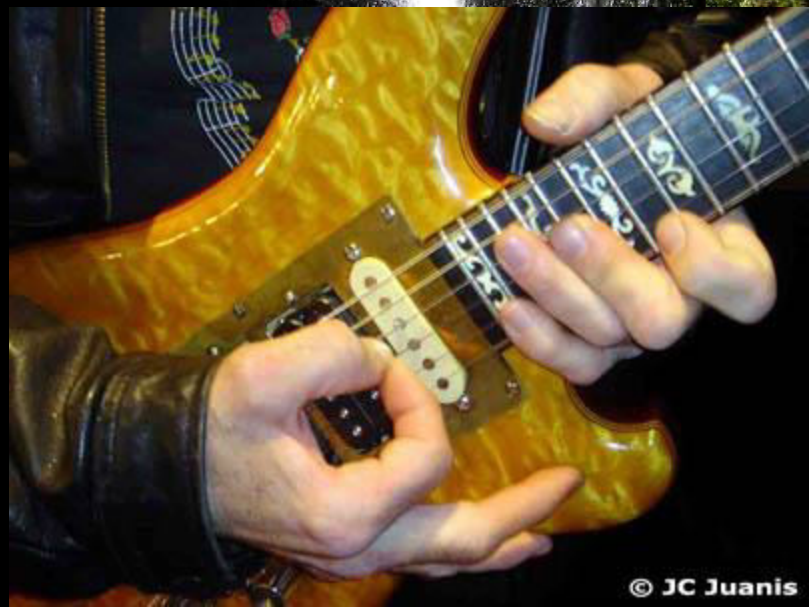
Pentadactyly (5 digits)





An opposable thumb

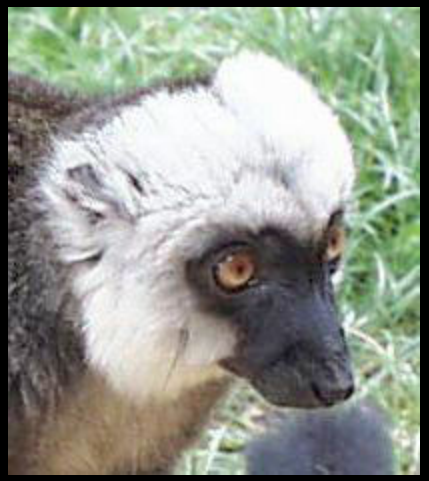


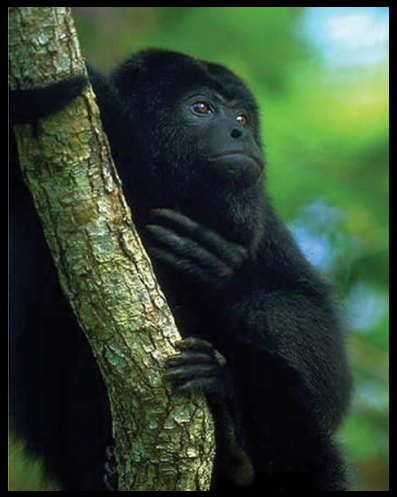


Senses and the brain

Color vision—all *diurnal* have it, *nocturnal* don't

Depth perception
- ***stereoscopic vision*** **allows to see in three dimensions**
- ***binocular vision*****-both eyes set toward front of head**





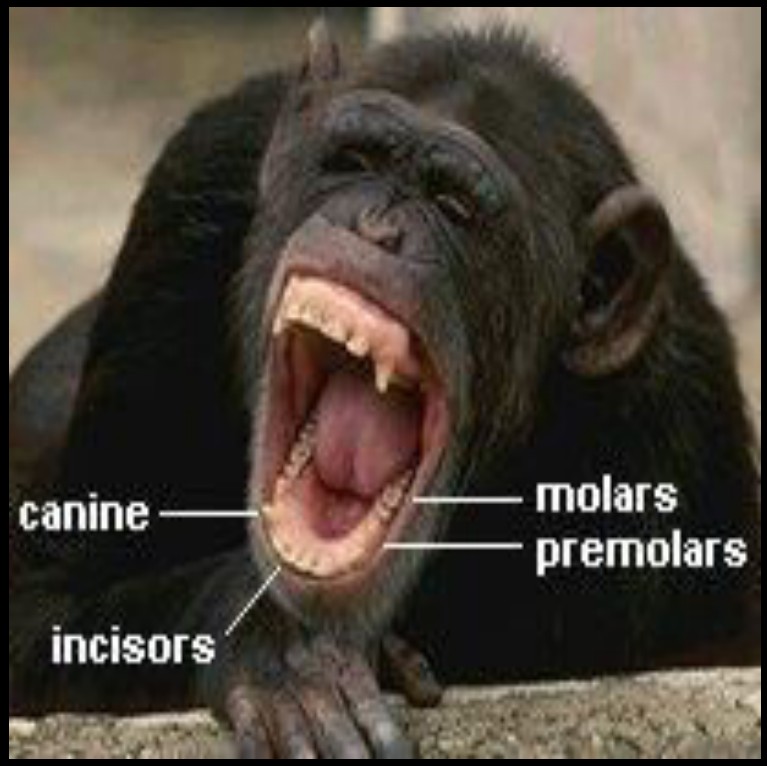
Decreased reliance on sense of smell (*olfaction*) - reduction in sensory areas of brain and in snout

Expansion and increasing complexity of brain-visual areas and areas having to do with hands (humans especially!)

Teeth

Lack of dietary specialization
Omnivorous
Carnivorous
Frugivorous

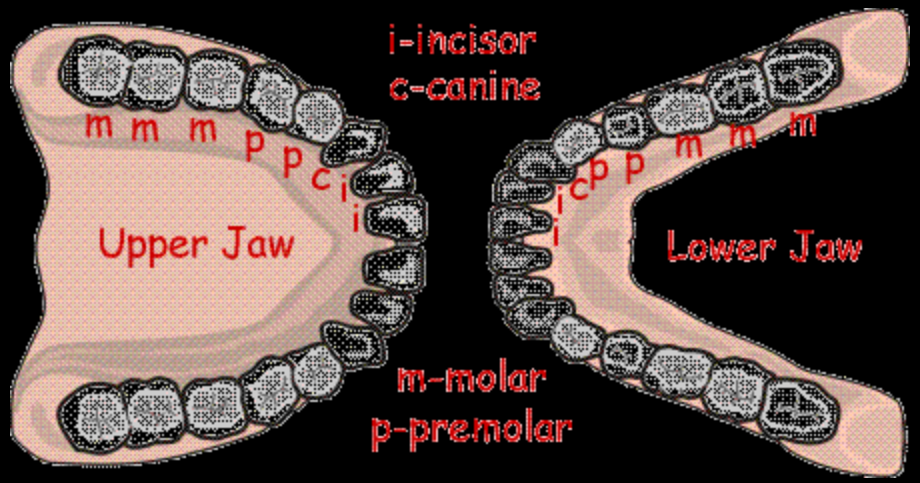
Diet and teeth—cutting, tearing, grinding



The dental formula is the quantity of each type of tooth (incisor, canine, premolar, and molar) in each quadrant of the mouth, counting from the front.

The human dental formula is 2.1.2.3.

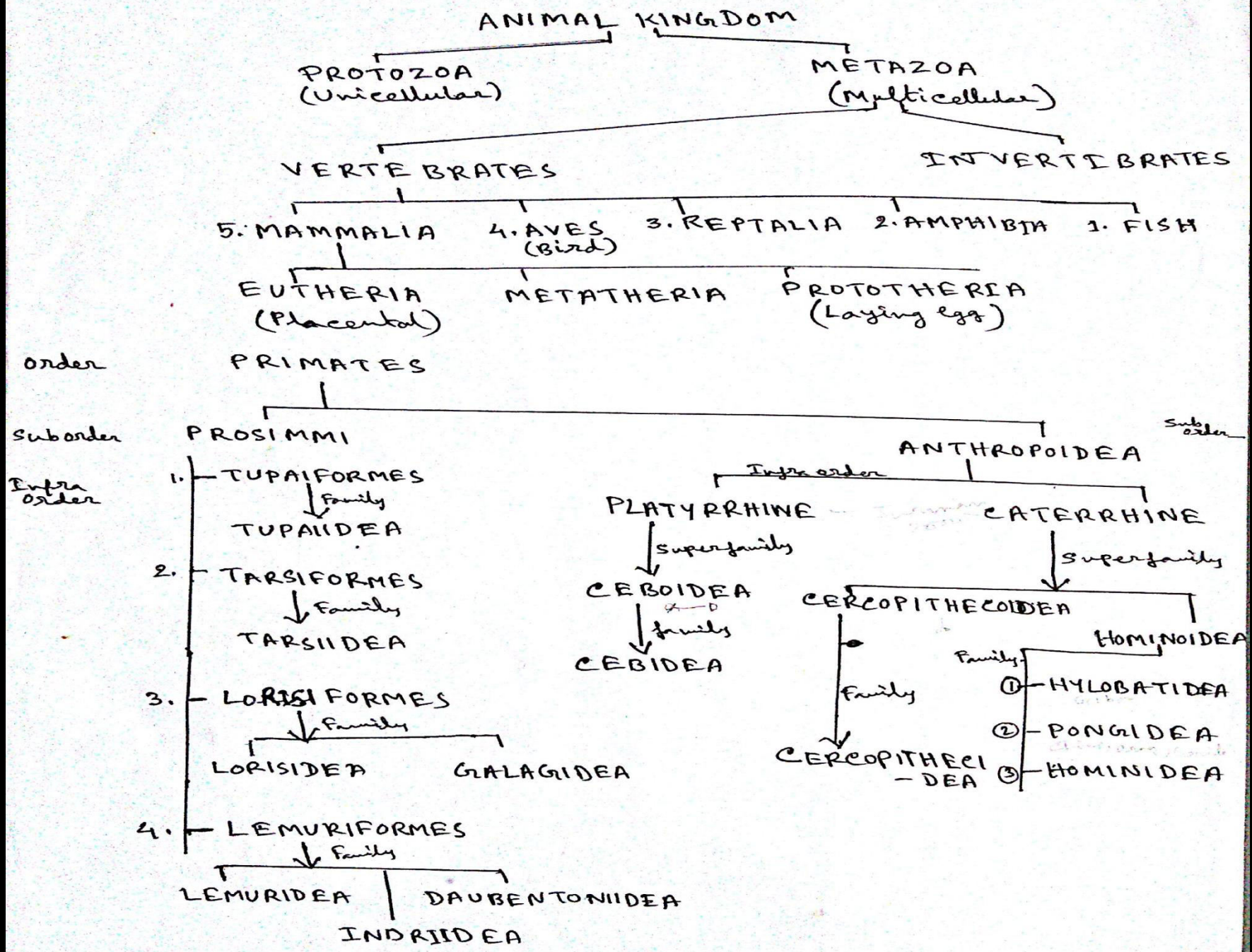
The Old World monkeys and apes also share this dental formula.



Primates have generalized *dentition*

Why Study Primates?

- Demonstrate our biological heritage as primates.
- Cast light on basic human behaviors and their ancestry.
- Window into the evolution of intelligence.
- Understand the evolution of language.
- Understand the origins of culture.


ANIMAL KINGDOM
PROTOZOA (Unicellular)
METAZOA (Multicellular)
VERTEBRATES
INVERTIBRATES
5. MAMMALIA
4. AVES (Bird)
3. REPTALIA
2. AMPHIBIA
1. FISH
EUTHERIA (Placental)
METATHERIA
PROTOTHERIA (Laying egg)
order
PRIMATES
Suborder
PROSIMMI
Infra order
1. TUPAIFORMES
Family
TUPAIIDEA
2. TARSIFORMES
Family
TARSIIDEA
3. LORISIFORMES
Family
LORISIDEA
GALAGIDEA
4. LEMURIFORMES
Family
LEMURIDEA
DAUBENTONIIDEA
INDRIIDEA
Sub order
ANTHROPOIDEA
Infra order
PLATYRRHINE
superfamily
CEBOIDEA
family
CEBIDEA
CATERRHINE
superfamily
CERCOPITHECOIDEA
Family
CERCOPITHECI-DEA
HOMINOIDEA
Family
1. HYLOBATIDEA
2. PONGIDEA
3. HOMINIDEA

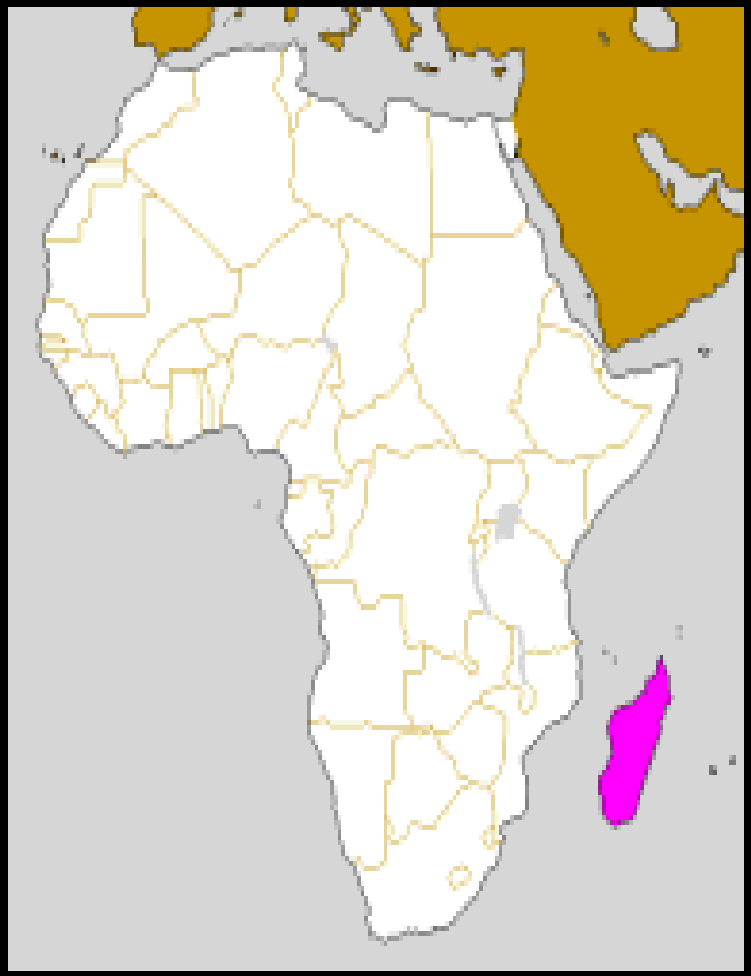
Prosimians:

- Most primitive
  - Greater reliance on olfaction (long snouts)
  - More laterally placed eyes
  - Shorter gestation & maturation
  - “dental comb” (projecting lower incisors & canines)

Lemur and Loris

Lemurs

- Island of Madagascar
- Many different species (diversified in absence of competing primates)
- Became extinct in other areas



Lemurs

- Range in size from 5” (2 oz. weight) to +2’ (22 lbs in weight)
- Larger lemurs are diurnal, omnivorous (take both plant and animal)
- Smaller lemurs are nocturnal, insectivores
- Many forms are arboreal, others are more terrestrial
- Some live in large social groups
- Others (Indri) are monogamous pairs

Lorises

- Similar in appearance to Lemurs
- Tropical habitats (Sri Lanka, India, SE Asia, Africa)
- Survived by adopting nocturnal habits

Lorises

- Slow, cautious climbing form of quadrupedalism
- Bushbabies active vertical climbers and leapers
- Almost entirely insectivorous
- Diet supplemented with fruit, leaves

Bushbabies

L & L

- Vision is stereoscopic, but less developed than anthropoids
- Color vision in diurnal, but not nocturnal
- Grooming claw on second toe (not fully nailed)
- Longer life spans than similarly sized mammals

Tarsiers

- Nocturnal
- SE Asia
- Mated pair & offspring
- Diet: insects & small vertebrates (small snakes, frogs) they catch by leaping from branches

Tarsiers difficult to classify

- Prosimian traits:
  - Small size
  - Grooming claws
  - Unfused mandible
- Anthropoid traits
  - Lack of Rhinarium (moist nose pad)
  - Orbits fully enclosed by bone

Anthropoids (monkeys, apes, H.s)

- Generally larger body
- Larger brains in absolute and relative size
- Increased reliance on vision
- Fully forward placed eyes; bony plate back of eye socket; greater degree of color vision
- Fused mandibles; less specialized dentition
- Female anatomy different; longer gestation; longer maturation; increased parental care
- More social interaction

Monkeys

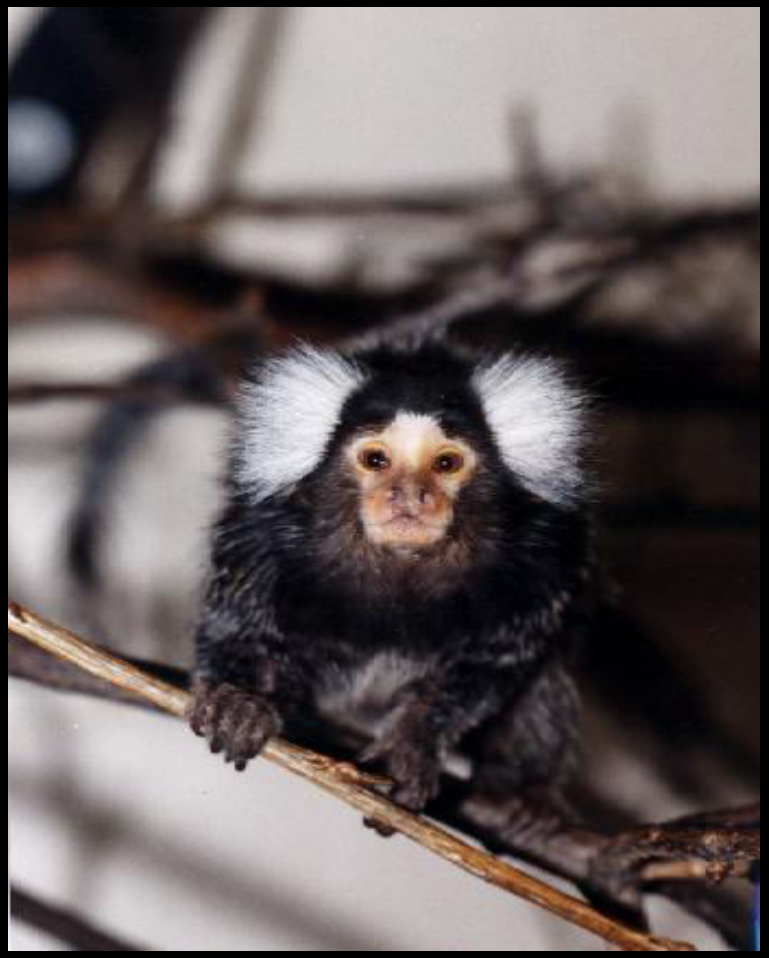
- ~ 70 % of all primates are monkeys
- Two types:
  - Old World or Catarrhini (downward-facing nose)
  - New World
    - Callitrichidae
    - Cebidae

New World Monkeys

- Wide flaring noses with nostrils that face outward
- Almost exclusively arboreal
- Prehensile tails
- With one exception, diurnal
- Found in tropical forest environments of southern Mexico, Central, and South America.
- Mostly herbivorous. They eat leaves, fruits, nuts, gums, and occasional small prey such as insects
- Two Groups: Callitrichidae and Cebidae

Callitrichids

- Small Marmosets and Tamarins



Marmosets and Tamarins

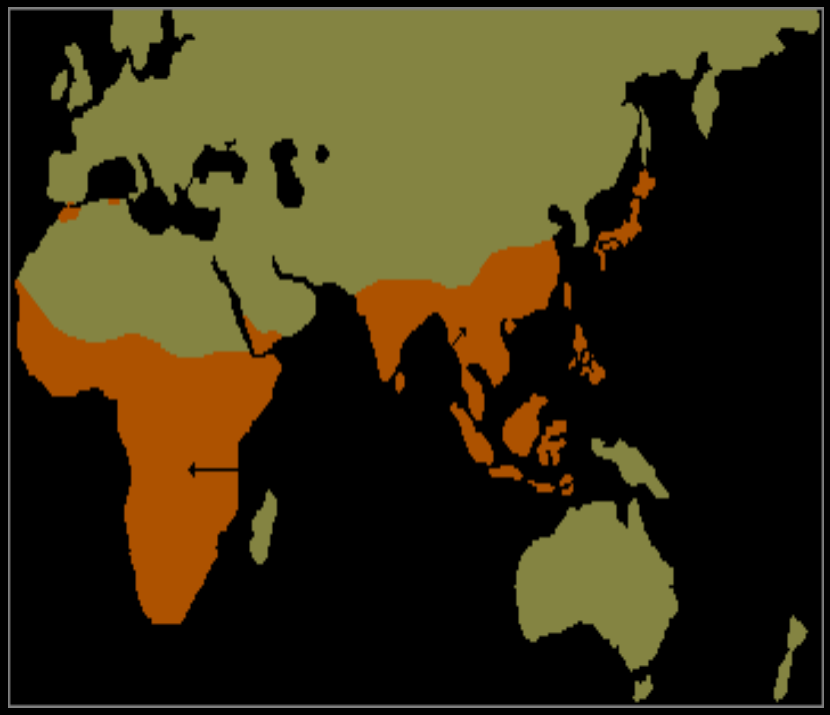
- Most primitive monkeys
  - Retain claws instead of nails (used like squirrels to climb trees)
  - Twins rather than single births
  - Family groups
    - Mated pair
    - 2 males & 1 female
    - Males very much involved in infant care

Cebids

- Larger than callitrichids
- 30 species
- Diet varies with combo of fruits & leaves
- Most are quadrupedals
- Spider monkeys are semibrachiators

Old World Monkeys

Found in South and East Asia, the Middle East, Africa, and even Gibraltar at the southern tip of Spain. Some species inhabit tropical forests, while others live on arid grasslands and even mountainous areas with heavy winter snows.



- One family: Cercopithecidae

- Two subfamilies:

  Cercopithecines and Colobines

Cercopithecines

- More generalized than Colobines
- More omnivourous
  - Cheek pouches to store food
  - Most found in Africa
  - Althogh, a number of macaques are found in Asia

Macaque (Japan)

Hamadryas baboon (Africa)

Colobines

- Have **sacculated stomachs**. Their stomachs have "saccules," or sack-like compartments, in which bacteria and unusual combinations of enzymes break down plant cellulose.
- The *Colobinae* have unusually long intestines that increase the absorption of nutrients.
- These are all adaptations to a predominantly low protein, fibrous leaf diet.

Colobines

- Colobus monkey exclusive to Africa
- Langurs found in Asia
- Probiscus in Borneo

Juvenile colobus (Africa)

Francois's langur (South Asia)

Male proboscis monkey

Old World monkeys

- Variety of locomotion
- Guenons, macaques, langurs: arboreal
- Baboons, patas, macaques: terrestrial quadrupeds
- Colobus: semibrachiation and leaping

- Significant sexual dimorphism, esp. in terrestrial quadrupeds (baboons)

  -adult males are large as females and much more aggressive. Eg. male savana baboons have powerful jaws with long canine teeth

- Females of several have genitalia that changes according to reproductive cycle

- Estrus (recurring period of sexual receptivity/ desire)– hormonally induced cycle

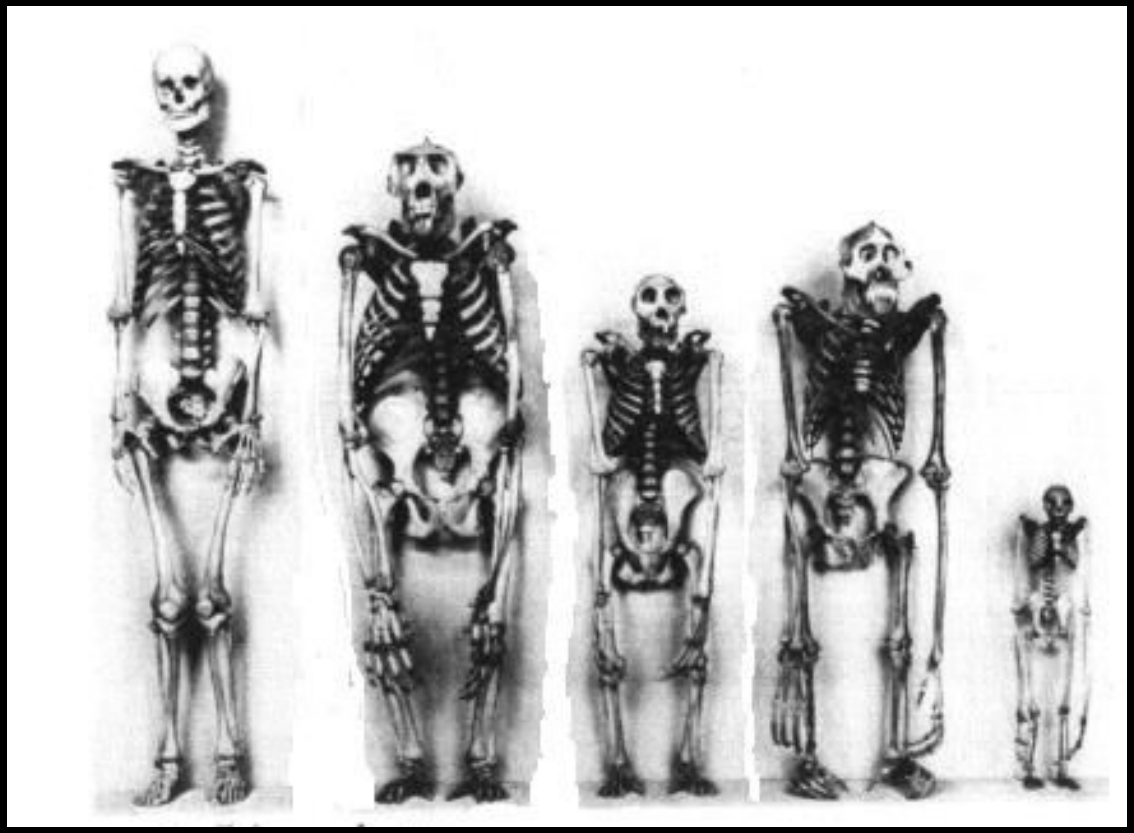
Hominoids (apes & humans)

- Super-family includes:
  - Less apes: gibbons and siamangs
  - Great apes: gorillas, orangutans, chimps
  - Humans (family Hominidae)

Hominoid traits

- Lack of tail
- Larger body size (except in lesser apes)
- Shortened trunk (short neck, small chest and protruding abdomen)
- Different musculature in shoulder joint
- More complex behavior
- Longer infant development & dependence
- More complex brains

Hominoids



Gibbons & Siamangs

- Tropical SE Asia
- Extremely long arm limbs
- Curved fingers
- Reduced thumbs
- Powerful shoulder muscles
- Most efficient brachiator

Gibbons & Siamangs

- Monogamous pairs
- Lack of sexual dimorphism
- Males share equally in child care
- Mated pairs are very territorial

Orangutans

- Borneo & Sumatra
- Almost completely arboreal
- Solitary animals
- Mainly frugivorous
- Very large
  - (males = 200 lbs, females = 100 lbs)

Gorillas

- Larges of living primate
- Knuckle walkers
- Exclusively vegetarianism
- Marked sexual dimorphism
- Males = 400 lbs, females 200 lbs.
- Family group: Silverback male & harem (a group of female animals sharing a single mate)

Chimps

- Equatorial Africa
- Also knuckle walkers
- Large social groups with no single,dominant male
- Sexually dimorphic, but not as pronounced as gorillas and organutans
- Omniverous

Chimps

- Large social groups of up to 50
- Fluid membership
- Males form the core of the community, females leave, often during estrus