

A Brief History of Primates

Erika Bauer, PhD



Smithsonian
National Zoological Park

Cenozoic Era (post-dinosaur)

- Oligocene Epoch, 37.5 mya – Old & New World monkeys
 - Eye-sockets enclosed in bone
 - Shorter snouts
- Miocene Epoch, 22.5 mya – The earliest apes appear
 - Most were quadrupeds, rather than brachiators or knuckle-walkers
 - Ancestors of apes and gibbons diverged from Old World Monkeys in Africa

4

What did the first primate look like?



Purgatorius

2

Cenozoic Era (post-dinosaur)

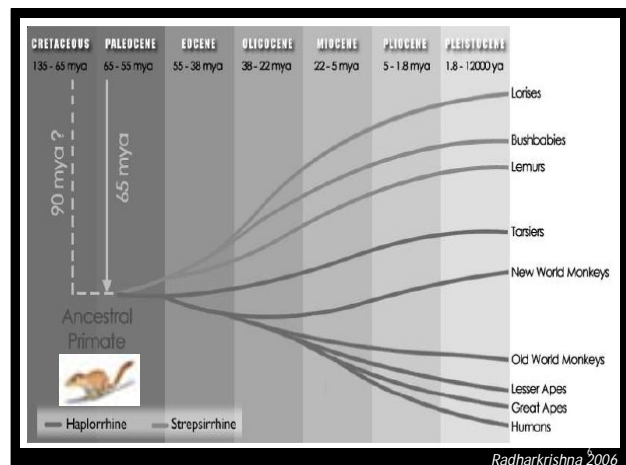
- Pliocene, 5.5 mya – Human-like apes emerged
 - Bipedal
 - Use tools to obtain food
 - Ancestors of humans diverged from chimpanzee and gorilla ancestors in the African savannas
 - Homo sapiens appeared 2 mya

5

Cenozoic Era (post-dinosaur)

- Paleocene Epoch, 65 mya – The earliest primates appear
 - Small, most likely terrestrial
 - Insectivores... then seeds, fruits, nuts & leaves
- Eocene Epoch, 53.5 mya – Prosimians
 - Primates diversified and some become arboreal
 - Prehensile hands and feet, opposable thumbs and toes with nails
 - Longer lower limbs
 - Frontally oriented eye sockets, stereoscopic vision

3



Theories of Primate Evolution

Arboreal Theory

G. Elliot Smith (1912) & Wood Jones (1916)

Primate adaptations arose in response to an arboreal way of life

- forelimbs developed for climbing and vision became stereoscopic, resulting in improved hand-eye coordination
- reduction in olfaction, shortened snouts

BUT many animals are well adapted for arboreal life yet do not possess characteristic primate traits

7

What does it mean to be a primate?



10

Theories of Primate Evolution

Visual Predation Theory

M. Cartmill (1972)

Primate adaptations arose from nocturnal, visually-oriented predation of insects in terminal branches

- grasping hands and feet for foraging for insects from terminal branches of trees and shrubs
- optic convergence for detecting insect prey

BUT most primates are omnivorous, and nocturnal primates depend more on hearing and olfaction than vision to catch insects

8

What does it mean to be a primate?



- Shortened snout
- Several types of teeth
- Forward-facing eye orbs & Stereoscopic vision
- Clavicles
- Two separate bones in forearms and lower legs
- Nails rather than claws
- Increased thumb mobility
- Grasping feet (lost in humans)

11

Theories of Primate Evolution

Angiosperm Exploitation Theory

Robert R. Sussman (1991)

Primate adaptations arose in response to feeding on fruits in terminal branches

- evolution of modern primates parallels the rapid diversification of angiosperms (flowering plants), co-evolutionary relationship

PERHAPS all three theories are interdependent and can be used together to explain primate origins

Arboreal-Predation-Angiosperm Exploitation Theory

9

What does it mean to be a primate?



- Trend toward more vertical posture
- Trend toward different use of forelimbs and hindlimbs
- Trend toward longer life spans, slow rate of reproduction and delayed maturity
- Trend toward larger brain size

12

What does it mean to be a primate?

- Complex social lives
- Tend to be very vocal and communicative

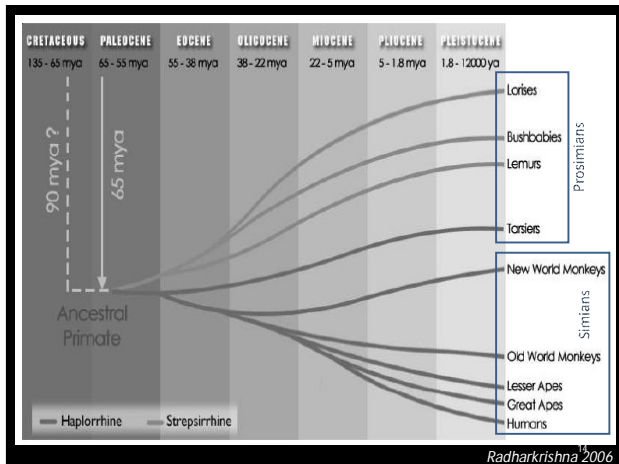


13



Aye-aye

16



Aye-aye

17

The Prosimians

- Well-developed sense of smell
- Prominent snout, larger olfactory bulbs
- Partial binocular vision, often nocturnal vision
- Some digits have claws instead of nails
- Developed manual dexterity
- Immobilized upper lips, which are joined to a wet patch of skin around the nostrils

15



Slender Loris

18



Lesser Bushbaby, Galago

19



Sifaka

22



Red-Ruffed Lemur

20



Sifaka

23



Ring-Tailed Lemur

21



Sifaka

24



Sifaka

25



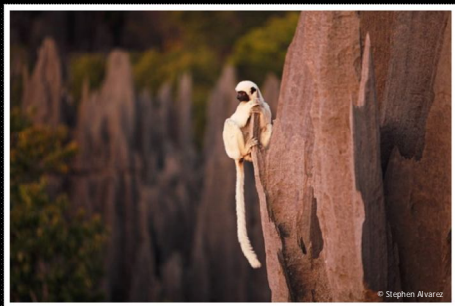
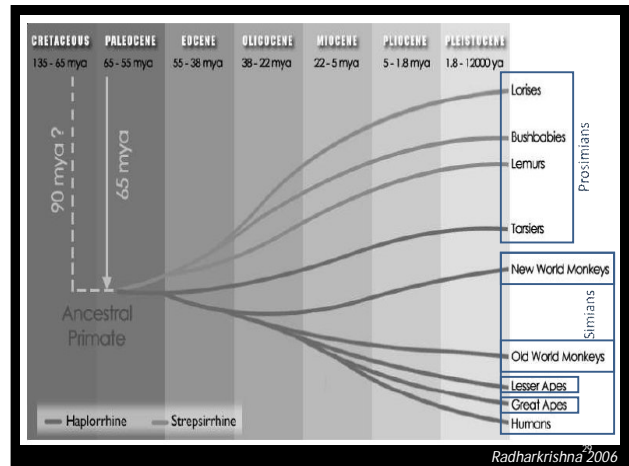
Tarsier

28



Sifaka

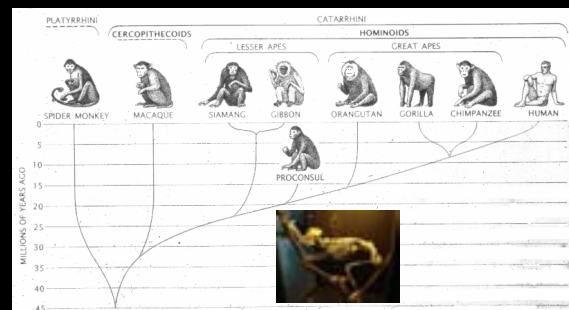
26



Sifaka

27

Simians



30

New World Monkeys *Platyrrhines*

- Neotropical forest habitats of Central and South America
- Small (6" pygmy marmoset) to medium sized (3' howler monkeys)
- Wide, circular nostrils which are spaced apart
- Long tails, which are sometimes prehensile
- No buttock pads (ischial callosities)
- No cheek pouches

31



Emperor Tamarin

34



Pygmy Marmoset

32



Golden Lion Tamarin

35



Cotton-Top Tamarin

33



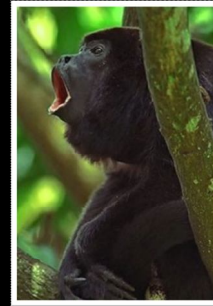
Squirrel Monkey

36



Red Uakari Monkey

37



Howler Monkey

40



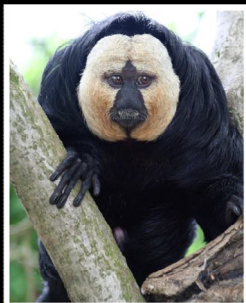
Spider Monkey

38

Old World Monkeys *Catarrhines*

- Live in Africa and Asia
- Larger than New World Monkeys
- Narrow and downward pointing nostrils
- Longer hind legs than forearms
- Flattened nails
- Prominent buttock pads, ischial pads
- Tails (not prehensile)

41



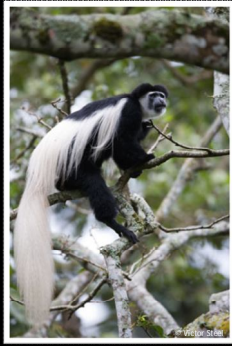
White-Faced Saki Monkey

39

Old World Monkeys *Catarrhines*

- Subfamily: Colobines
 - Long tails, diverse coloration
 - The coloration of nearly all the young animals differ remarkably from the adults
 - Almost exclusively herbivores
 - Have a large, complex stomach to aid in digestion of leaves
 - No cheek pouches

42



Black & White Colobus Monkey

43



Tonkin Snub-Nosed Monkey

46



Douc Langur

44

Old World Monkeys *Catarrhines*

- Subfamily: Cercopithecines
 - Arboreal species have long tails, but tail is small or nonexistent on terrestrial species
 - Well-developed thumbs
 - Ischial callosities may change color during mating period
 - Omnivorous
 - Cheek pouches

47



Proboscis Monkey

45



De Brazza's Guenon

48



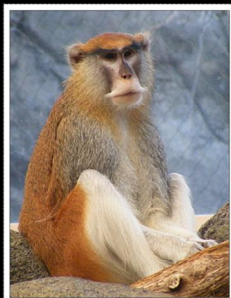
Diana Guenon

49



Lion-Tailed Macaque

52



Patas Monkey

50



Sulawesi Macaque

53



Japanese Macaque

51



Mandrill

54



Gelada Baboon

55



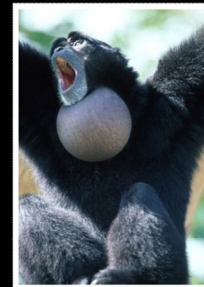
White-Cheeked Gibbon

58

The Lesser Apes

- Live in small, monogamous groups
- The adult female is the dominant individual in the group
- Renowned for their complex vocalizations
- Long arms for climbing, swinging and hanging

56



Siamang

59



White-Cheeked Gibbon

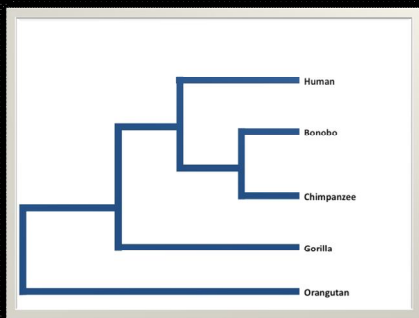
57

The Great Apes

- The largest and heaviest primates
- Upright body posture, able to walk on 2 legs
- No tails
- Broad-chested
- Short noses
- Large brain to body size ratio
- Live in Africa and Asia

60

The Great Apes

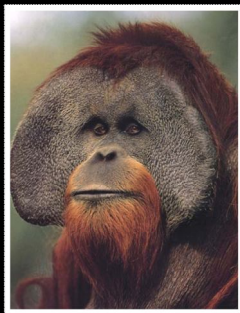


61



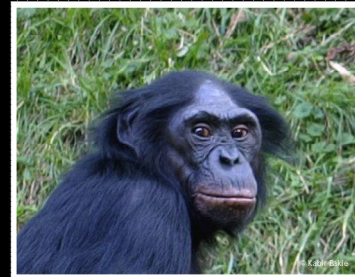
Chimpanzee

64



Orangutan

62



Bonobo

65



Gorilla

63

Bonobos and Chimpanzees



Common traits

- Multi-male, multi-female fission-fusion communities
 - Male philopatry, female dispersal
 - Promiscuous mating habits

66

Bonobos and Chimpanzees



Bonobos

- Female-dominant
- Make love, not war
- Egalitarian dominance style



Chimpanzees

- Male-dominant
- Comparatively more aggressive
- Despotic dominance style

67



68



Any Questions?

69