

FAQ ABOUT THE RELATIONSHIP BETWEEN HUMANS, APES, AND OTHER PRIMATES

Questions:

- How are we related to the other great apes?
- What makes humans unique compared to the other great apes?
- What is the relationship between primates, monkeys, and apes?
- How do apes differ from monkeys?

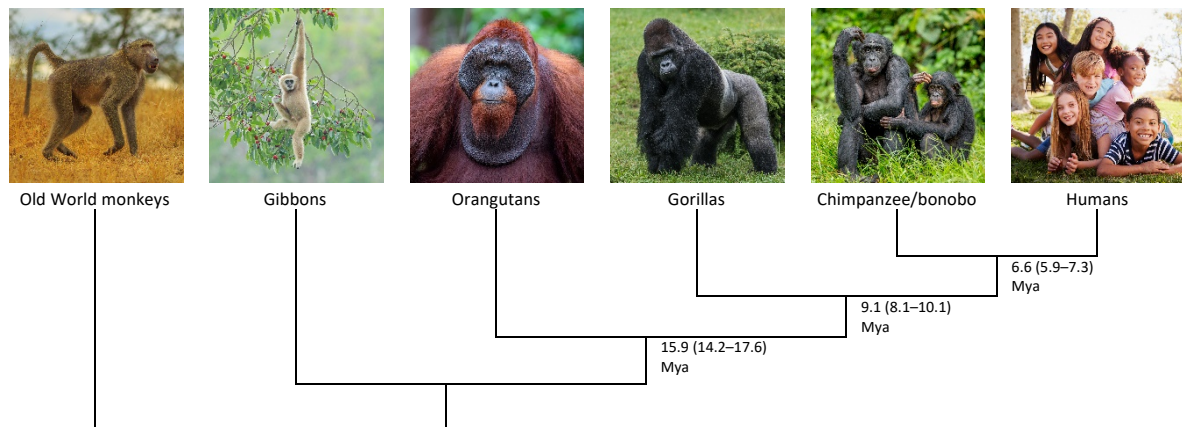
How are we related to the other great apes?

We humans belong to the same family as the great apes. This specifically includes chimpanzees and bonobos (genus *Pan*), gorillas (genus *Gorilla*), and orangutans (genus *Pongo*). Our shared family is called Hominidae, and members of this family are referred to as hominids.

Gibbons are also apes, but they belong to their own family (Hylobatidae), so they are not classified as great apes. They are also known as small apes.

In Figure 1, you can see the evolutionary tree of apes and humans. It shows that our closest relatives are chimpanzees and bonobos (to which we are equally closely related), followed by gorillas and then orangutans. This also means that chimpanzees and bonobos are more closely related to us than they are to gorillas.

Figure 1. The family tree of apes and humans. The estimated ages of our shared ancestors are shown below the splits. Old World monkeys are the monkeys of Africa and Asia that the apes descended from. (Mya=million years ago) (Photos: Orangutan Mogens Trolle, the rest Shutterstock.)



It is important to understand that humans did not evolve from chimpanzees or bonobos. Instead, we share a common ancestor from which all of us evolved. Researchers have calculated that this common ancestor lived approximately 6.6 million years ago. Similarly, our most recent common ancestor with gorillas lived about 9.1 million years ago, and our common ancestor with orangutans lived around 15.9 million years ago.

The split times (i.e., when the branches of the evolutionary tree diverged) mentioned above are based on a Danish-led study published in Nature in 2019: www.nature.com/articles/s41559-018-0778-x

What makes humans unique compared to the other great apes?

We are hairless

Other great apes have fur. To compensate for our lack of fur, which would otherwise retain body heat, humans have developed a thicker fat layer under the skin compared to other great apes. Additionally, humans have more developed sweat glands, enabling efficient cooling through our bare skin.

We walk upright

While other great apes are able to walk on two legs for short distances, only humans move and travel long distances exclusively on two legs.

The human body is adapted for walking and running in several ways:

- Strong knees that can support the body's weight on one leg at a time while walking.
- Long femurs (thigh bones) that allow for long strides.
- The size and broad shape of our hip bones.
- A curved spine that absorbs shock when walking.
- In chimpanzees, the opening for the spinal cord is located at the back of the skull, as an adaptation for walking on all fours with the head held forward. In humans, this opening is located underneath the skull, facilitating upright walking and sitting.

We have an unusually large brain

- Chimpanzee: Average brain weight of 384 grams.
- Human: Average brain weight of 1352 grams.

For more information, visit The Smithsonian Institution's Human Origins Program:

<https://humanorigins.si.edu/human-characteristics>

What is the relationship between primates, monkeys, and apes?

Mammals are divided into several orders, such as carnivores (Carnivora), whales (Cetacea), elephants (Proboscidea), bats (Chiroptera), and rodents (Rodentia). One of these mammal orders is the primates (Primates).

In Figure 2, you can see the evolutionary tree of primates.

The primate order is divided into two suborders:

- Strepsirrhines (wet-nosed primates): Lemurs, galagos (bush babies), lorises, and pottos.
- Haplorrhines (dry-nosed primates): Monkeys, apes, humans, and tarsiers.

Thus, monkeys, apes, and humans are all primates.

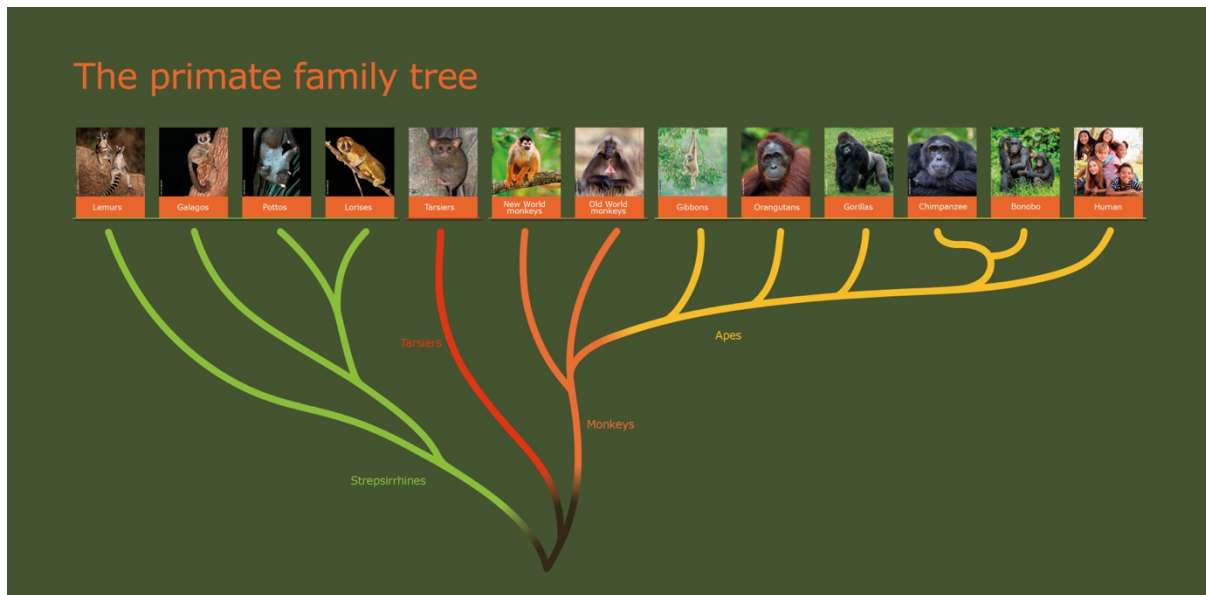
The monkeys are further divided into two subgroups:

- New World monkeys: Monkeys from Central and South America.
- Old World monkeys: Monkeys from Africa and Asia.

Around 30-25 million years ago, a side branch of the Old World monkeys split off and over time evolved into the apes and humans. To put it into perspective, it was around the same time, approximately 27 to 25 million years ago, that sea lions and seals branched off from the ancestors of bears. Thus, great apes have had just as

much time to evolve into something unique compared to true monkeys as sea lions and seals have had compared to bears.

Figure 2. The primate family tree. (Photos: Tarsier, gelada, orangutan, and chimpanzee Mogens Trolle, the rest Shutterstock.)



How do apes differ from monkeys?

Apes evolved from the Old World monkeys, i.e., the monkeys of Africa and Asia. The ape branch split from the Old World monkeys around 30-25 million years ago. Over this long period, apes have undergone an independent evolution, resulting in many significant differences from Old World monkeys. Here are some key differences between the two groups:

	Menneskeaber (Hominoidea)	Østaber (Cercopithecoidea)
Størrelse	Great apes are much larger than Old World monkeys (20-200 kg), while gibbons are mid-sized (4-12 kg).	0,8 - 35 kg.
Tail	Apes lack tails.	Monkeys have tails.
Arms vs. legs	Apes have relatively longer, stronger, and more mobile arms than monkeys. Orangutans and gibbons have arms about 1.5 times longer than their legs.	Monkeys have arms and legs that are roughly equal in length, or with longer legs.
Climbing	Apes rely on their arms for propulsion while climbing, similar to having "front-wheel drive".	Monkeys rely more on their hind legs for propulsion while climbing, similar to having "rear-wheel drive".
Nose	Apes have broader noses broader than monkeys.	Monkeys have narrower noses
Brain	Apes have relatively larger brains compared to their body size.	Monkeys have relatively smaller brains.