HUMAN EVOLUTION

Australopithecus afarensis "Lucy" skeleton (AL 288-1).
Institute of Human Origins:
https://iho.asu.edu/about/lucy's-story

Ardipithecus ramidus "Ardi" skeleton (ARA-VP-6/500). Science October 2009, 326 (5949): 36-40.
http://www.sciencemag.org/content/326/5949/36

THE OHIO STATE UNIVERSITY

Human Evolution

Lucy is 3.2 million year old fossil that could walk on two legs and Ardi is a 4.4 million year old fossil that could walk on two legs and climb trees. Both were discovered in Africa and provide a great deal of insight into human evolution on Earth.

Watch/read the following:

1. Watch "Finding Lucy" (scientific name is *Australopithecus afarensis)*, Dr. Donald Johanson describes the discovery of Lucy. PBS.

   http://www.youtube.com/watch?v=SPit_Mca8dM

2. Watch "Ancient Human Ancestors: Walking in the Woods" (walking on two legs makes humans unique). PBS. Two anthropologists, Dr. Tim White and Dr. Owen Lovejoy, describe "Ardi" (scientific name is *Ardipithecus ramidu*s) a early hominid that made the transition to bipedalism.

   http://www.youtube.com/watch?v=CrebQed8b2Q

3. Watch "An Interview with Tim White", a paleoanthropologist that help discover the 4.4 million year old fossil named Ardi.

   http://www.youtube.com/watch?v=k0jtu6JHwn0

4. Read the article "Ardi, Oldest Human Ancestor, Unveiled" written by Jennifer Viegas for Discovery News and published on November 27, 2012. This article is provided on the following pages.

5. Watch "Discovering Ardi" from Discovery. Watch the five videos (a-e) below. There are eight video clips at this site, feel free to watch all eight, but at the very least you need to watch these five video clips:

   a. Discovering Ardi: Bringing Ardi to Life

   b. Discovering Ardi: Bringing Ardi Back

   c. Discovering Ardi: How Old is Ardi?

   d. Discovering Ardi: How Ardi Walked

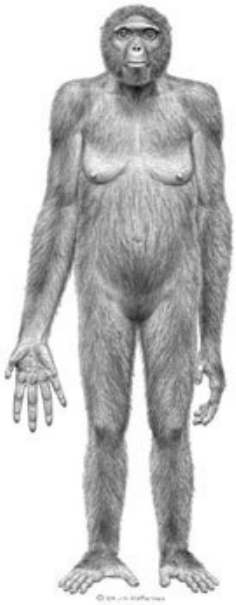
   e. Discovering Ardi: Ardi's Feet

   http://www.discovery.com/tv-shows/other-shows/videos/other-shows-discovering-ardi-videos.htm

'Ardi,' Oldest Human Ancestor, Unveiled

By Jennifer Viegas / November 27, 2012 / Discovery News
http://news.discovery.com/history/archaeology/ardi-human-ancestor.htm

This is a drawing of what *Ardipithecus ramidus* ("Ardi") likely looked like. The 4.4 million-year-old hominid opens up a new chapter on human evolution because, as the lead researcher says, "it is as close as we have ever come to finding the last common ancestor of chimpanzees and humans." Drawing by Jay H. Matternes/Science/AAAS.



"Ardi" dates to 4.4. million years and may be the oldest human ancestor ever found.

The world's oldest and most complete skeleton of a potential human ancestor -- named "Ardi," short for *Ardipithecus ramidus* -- has been unveiled by an international team of 47 researchers.

Their unprecedented, 17-year investigation of Ardi is detailed in a special issue of the journal Science.

The 4.4 million-year-old hominid opens up a new chapter on human evolution because "it is as close as we have ever come to finding the last common ancestor of chimpanzees and humans," project co-director Tim White told Discovery News.

"This is not an ordinary fossil," added White, a paleontologist in the University of California at Berkeley's Human Evolution Research Center. "It's not a chimp. It's not a human."

Instead, he said, "It shows us what we used to be."

Placement on the Human History Timeline

The actual last common ancestor of chimps and humans probably lived between five and 10 million years ago, based on genetic and other estimates, so Ardi falls somewhere between this still unknown species and "Lucy," the famous 3.2 million-year-old "ape-man" hominid, also found in Ethiopia, belonging to the genus Australopithecus.

"If you dig up in younger time horizons at the site where *Ardipithecus* was found you have Australopithecus, so we feel that we are in a position to say that *Ardipithecus* may have given rise to Australopithecus, which in turn gave rise to Homo (sapiens)," White said.

Ardi, who was a female, may or may not have had any direct descendants. Her species may have given rise to Lucy's species, Australopithecus.

Bones Reveal Appearance and Behavior

Gen Suwa, one of the project's paleoanthropologists, spotted the very first *Ardipithecus* fossil in 1992 while conducting a foot survey in the Afar Rift in northeastern Ethiopia. Since that time, a total of 110 specimens representing a minimum of 36 different individuals of Ardi's species have been found within a sediment layer at the site that was precisely dated using multiple established techniques.

Ardi is the most complete of these individuals, as the skeleton includes her skull, teeth, arms, hands, pelvis, legs and feet. Based on these findings, the researchers know that she and others in her species were both tree- and land-dwelling omnivores. They had a relatively small, chimp-sized brain, long arms and short legs.

The scientists suspect Ardi used simple tools, such as twigs and leaves, but no stone tools were found at the dig site.

"Believe me, we've looked for them," said White, who added that the earliest known stone tools date to 2.6 million years ago.

The First Key Differences Between Hominids and Apes

Ardi could climb trees, using lengthy fingers and big toes for grasping, but she could also walk on the ground on two feet. Detecting that latter ability was critical for the scientists, as it appears two key features distinguished the very first hominid from other apes: walking with two feet on the ground and a reduction in the size of the canine teeth.

Both of these characteristics provide clues as to what might have caused the last common ancestor to diverge from other apes.

The Making of Families, Not War

"We now believe that social, instead of environmental, change, led to the species division," White explained. "Natural selection involves reproductive success, so Professor Owen Lovejoy of the project suspects that *Ardipithecus* males were probably pair-bonded to specific females, and may have aided them by gathering and carrying foods."

Such provisioning by males would have favored those males who could best walk on two feet, according to the researchers, allowing them free hands for carrying food. Provisioned females could have "intensified their parenting" and carried their infants, which is easier to do in woodland environments when the forelimbs are free.

The reduction in canine teeth, which Lovejoy called "weapons of aggression," further suggests that *Ardipithecus* males were not as physically hostile with each other as larger-canined chimpanzees are today.

Myth Busted: Humans Never Evolved From Chimpanzees

Although chimpanzees remain our closest living primate relatives, there is now no evidence that Homo sapiens somehow evolved from chimpanzee-like individuals, losing chimp characteristics over time. Instead, after the chimp/hominid split, the two groups appear to have gone their separate evolutionary ways, developing the unique traits seen in each today.

Alan Walker, a professor of biological anthropology at Pennsylvania State University who did not work on the project, said that the *Ardipithecus* fossils "tell us that the anatomy of closely related living species cannot predict the anatomy of their ancestors very accurately."

Walker said, "It now seems, from the analyses carried out by the discoverers and their colleagues, that the last common ancestor of chimpanzees and humans was much less chimpanzee-like than previously thought."

He concluded that the unveiling of the new hominid "is certain to cause considerable rethinking of not only our evolutionary past, but also that of our living relatives the great apes."