Skeletons Reveal Human and Chimpanzee Evolution

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Below are the transcripts for the videos found in the *Skeletons Reveal Human and Chimpanzee Evolution* Click & Learn.

SLIDE 3

...Something happened by the 1960s: a completely independent line of evidence opened up, became available, and we began to be able to explore the relationships among these living primates using biomolecules. And it turns out that we are more closely related to chimpanzees; now we have their whole genome. Gorillas, little more distantly. Orangutans, little more distantly. Gibbons, and then monkeys, and lemurs, and your cat, and a fish, and so forth. And that's basically the tree of life as we understand it today.

SLIDE 4

Now, Darwin appreciated very clearly that chimpanzees did not evolve into humans. He appreciated common ancestry. In fact, if you go to his notebook in 1837, this is his depiction of the process. The terminal things that we call species today are all linked through a series of common ancestors as we go into the past. Unfortunately, Darwin got it, but a lot of his contemporaries didn't. Darwin appreciated that a common ancestor must have given rise to the line that ended up with a common chimpanzee and the line that ended up with a human.

Now, what about that line that ended up on the human side? Well, Darwin didn't address that question until 1871 in *The Descent of Man*, and he warned us; he was very, very cautious. He said, we have to, we must not fall into the error of supposing that the early progenitor of the whole simian stock, including humans, was identical with or even closely resembled any existing ape or monkey. Darwin knew we didn't evolve from living primates.

SLIDE 5

Now, you're going to hear this family referred to a couple different ways. I'll use the term hominid; other people use hominin. They're effectively synonymous, means exactly the same thing. It means everything on our side of this flip point, the last fork in our little twig of the family tree.

But we're not the only ones there. We're going to meet, in these lectures, a creature known as *Australopithecus*. It's a funny creature. It's all gone, or maybe not, because its genes in altered form are in you and in me. That's a fantastic thing that we'll get to with the fossil record.

That fossil record is really an amazing thing. It's pretty good the younger you get. Like at the Emeryville Shellmound, the last 3000 years, we can do pretty good. But as we go back in time, the record gets poorer and poorer because we basically lose paleobiological evidence.

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...Late in the afternoon in 1994; that's a long time ago. Yohannes Haile-Selassie was a graduate student, Ethiopian fellow who was at the University of California, Berkeley. He was crawling across this landscape seeing eroding sediments very much like this. And here is a case, a fantastic case in science of the right person being at the right place at the right time, not stumbling across a fossil. This is not chance, this is not luck. This is paleoanthropology, modern paleoanthropology.

And he finds these two fragments. And he recognizes them right away as bones from the palm of the hand of a hominid, except we're missing the middle piece. So what do we do? Well, you know the pipeline, you know the drill: we've got to excavate, we've got to sieve. So we start sieving, we sieve some more, and we start finding other pieces. Yohannes is getting pretty happy now. Another piece. Could it be the same individual? We start an excavation. We mark these fossils with a yellow flag, so we maintain their position. The base of the yellow flag is actually the horizon, the level the fossil is found at.

So, here's this little hill. We've got to keep it wet because if we don't keep it wet, the clay expands and contracts. These are floodplain sediments, and it'll shatter the bones inside. If it rained on this little hill for another ten years, we would have a handful of isolated teeth. That's the timing. Amazing. This thing has been in the deposit 4.4 million years old, and Yohannes comes around just at the time that these things are coming out of the ground? Wow.

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What we're talking about here is a creature that is at the beginning of bipedality. It's not a full adaptation like in *Australopithecus*. It doesn't have the honing canine. That may be a signal that the males in this species are not competing over estrous female. It may be a signal that this ovulatory crypsis is very deep in human evolution. It's a fundamental part of our biology; maybe it started off way back then. Maybe it has something to do with bipedality. We can generate hypotheses; more fossils can test them.

So *Ardipithecus*: a woodland hominid, not a savannah chimp, not a link between modern apes and modern people, but it really reveals chimpanzee evolution. It shows how specialized these apes are. After all, they've been evolving for the same seven million years since we split from them: chimpanzee evolution in one trajectory, human in another.