

## SEGMENT THREE LECTURE EIGHT: EVOLUTION OF HOMININS

Hominin adaptations evolve as correlated characters.

1) Bipedalism characterizes hominins as old as *A. anemensis* (~4 mya) and possibly others even older (to 7 mya); Fossil evidence for bipedalism indicates that this characteristic arose early. Fossil hominin tracks (> 3.5 mya) from Laetoli were fortuitously preserved in volcanic ash (Fig. 34.41b). Fossil footprints of *Homo ergaster*, dated at 1.5 mya from Ileret, Kenya, resemble modern footprints in the position of the big toe, extent of the arch, and length of the toes.

2) Language - The *FOXP2* gene is essential for language. Many people with language handicaps have been found to have a mutant copy of *FOXP2*. The change in *FOXP2* that associated it with sophisticated language is estimated to have occurred about 200,000 years ago.

3) Art and technology (Fig. 34.45).

4) Adult Cranium (Brain) Size (adaptive value) in hominins ranges from: ~400-550 cc to ~1200-2000 cc.

Selected significant hominin fossils (Fig. 34.40)

"Herto hominins" (*Homo sapiens*) lived 154,000 - 160,000 years ago & are the oldest fossils of our species (Fig. 34.44);

"Turkana Boy" (*H. ergaster*) lived 1.7 million years ago (mya) and is the most complete fossil of *H. ergaster* (Fig. 34.42);

"Taung Child" (*Australopithecus africanus*) lived ~2-3 mya and was the first specimen of *Australopithecus* discovered (by Raymond Dart);

"Lucy," (*A. afarensis*), 3.24 mya (Fig. 34.41a); a well preserved, fairly complete specimens of *A. afarensis*.

"Toumai" (*Sahelanthropus tchadensis*) lived 6-7 mya—can only be roughly dated by "faunal associations" —is the oldest hominin species.

Although thousands of hominin fossils have been found, those on this list are especially complete or the oldest example of a species.

Note that two forms of humans co-existed in western Europe for at least 40,000 years: "Modern" *H. sapiens* (*H. sapiens sapiens*) and Neanderthals (*H. sapiens neanderthalensis*). However, phylogenetic analysis of mitochondrial DNA sequences from fossil Neanderthals and living anthropoids indicates that Neanderthals contributed little to the gene pool of *H. sapiens* (Fig. 34.43).

Fig. 34-43

## EXPERIMENT

**Hypothesis: Neanderthals gave rise to European humans.**

**Expected phylogeny:**



## RESULTS

**Summary: Neanderthals did not give rise to Europeans, and contributed little to the *H. sapiens* gene pool.**

**Actual phylogeny:**

