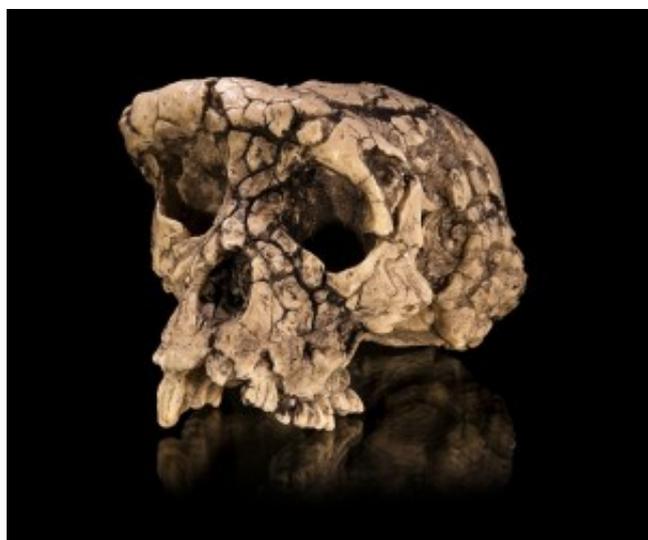


Brain Shape Confirms Controversial Fossil as Oldest Human Ancestor

[Kate Wong](#) April 4, 2013



Sahelanthropus tchadensis, also known as Toumaï, had a tiny brain, but one that had nonetheless undergone some reorganization toward the human condition. Image: Didier Descouens, via Wikimedia Commons

HONOLULU--A seven-million-year-old skull found in the Djurab Desert in Chad may indeed represent the earliest known member of the human family. Researchers unveiled the specimen back in 2002 and made quite a splash with their claim that the ancient fossil was our ancestor. They assigned it to a new species, [Sahelanthropus tchadensis](#) (nickname: Toumaï) and said it was very close to the point at which the human lineage diverged from that of our closest living relative, the

chimpanzee. Critics, however, countered that the skull was probably an ape's instead of that of a hominin (a creature on the line leading to us), given its primitive features. But a new analysis of the skull—specifically, its braincase—supports the discoverers' claim that Toumaï is a hominin.

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Thibaut Bienvenu of the Collège de France and his colleagues reconstructed Toumaï's endocast—a cast of the interior of the braincase, which reveals the shape of the brain. Because the fossil skull is distorted and filled with a highly mineralized matrix, they had to do their reconstruction virtually, which meant imaging it with 3D X-ray synchrotron microtomography and then feeding that data into a program that allowed them to remove the matrix and correct the distortion on

screen.

The resulting virtual reconstruction of the endocast reveals that Toumaï had a cranial capacity of 378 cubic centimeters—consistent with earlier estimates. This puts it within the range of chimp cranial capacity. In comparison, modern humans have brains around three times larger than that. But though Toumaï's brain was apelike in its small size, it was apparently homininlike in other ways. In a presentation given on April 2 at the annual meeting of the Paleoanthropology Society, Bienvenu reported that the endocast shows strongly posteriorly projecting occipital lobes, a tilted brainstem, and a laterally expanded prefrontal cortex, among other hominin brain characteristics.

Previously, Michel Brunet of the Collège de France, whose team discovered Toumaï*, and his colleagues argued that Toumaï was a hominin on the basis of traits including his relatively small canine teeth, which are associated with reduced aggression, and the forward position of his foramen magnum (the spinal cord opening in the base of the skull), which is associated with upright walking. Both of these characteristics are considered hallmarks of humanity. But skeptics argued that other features, such as the hulking brow ridge and aspects of the rear and base of the skull, signaled that the fossil represents an ape. The endocast traits bolster the original interpretation.

Bienvenu said that Toumaï's endocast offers "a unique window on the first stage of human brain evolution" and shows evidence of brain reorganization toward the human condition well before brain size had begun to expand. He added that this early brain reorganization was probably a consequence of the shift to upright walking.

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