

Last class

- What species of hominid are found in the early Pliocene?
- Where are they found?
- What are their distinguishing anatomical characteristics?
- How do the Australopithecines differ from the possible hominids?

Taxonomy

- Superfamily: Hominoidea
 - Family: Hominidae
 - Subfamily: Homininae
 - Tribe: Australopithecini

Cast of Characters

Orrorin tugenensis
Sahelanthropus tchadensis
Ardipithecus kadabba
Ardipithecus ramidus

Australopithecus anamensis
Australopithecus afarensis
Kenyanthropus platyops
Australopithecus bahrelghazli

Australopithecines

- What are the common characteristics of the early Australopithecines?
- How do the species differ from one another?
- When does each fall in time and space?
- What are the possible phylogenies of these species?

Australopithecus afarensis

- 3.9-2.9 mya
- Short, broad pelvis
- tilted femurs
- In-line big toe
- Sagittal crest
- Sexually dimorphic
- Small bodied
- Small brain

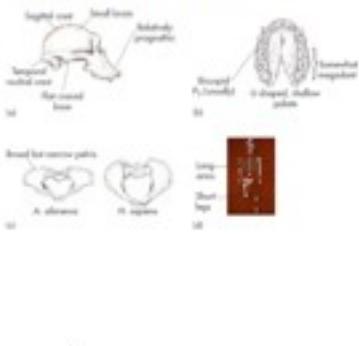


TABLE 11.2 Comparisons of *A. afarensis*, Great Apes, and Modern Humans

	Cranial Capacity (cc)	Sexual Dimorphism (Males X Percent Heavier)
<i>A. afarensis</i>	450	56%
Chimpanzee	400	15%
Gorilla	500	50%
Orangutan	400	Nearly 100%
Early genus Homo	400	63%
Modern human	1,400	15%

Australopithecus bahrelghazali

- 3.5-3.0 mya
- Western Africa - Chad
- Same as *A. afarensis*?



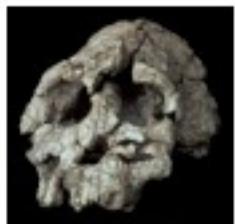
Kenyanthropus platyops



Kenyanthropus lateral



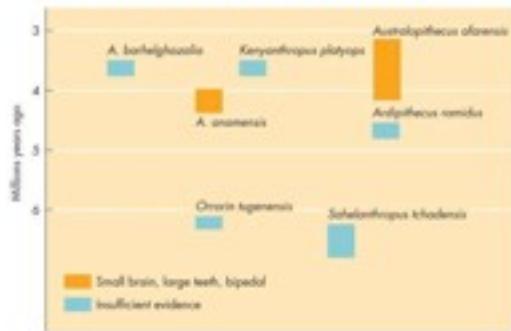
A. afarensis and *K. platyops*

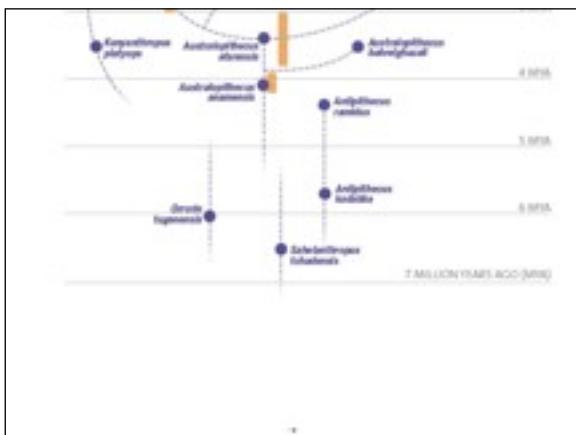
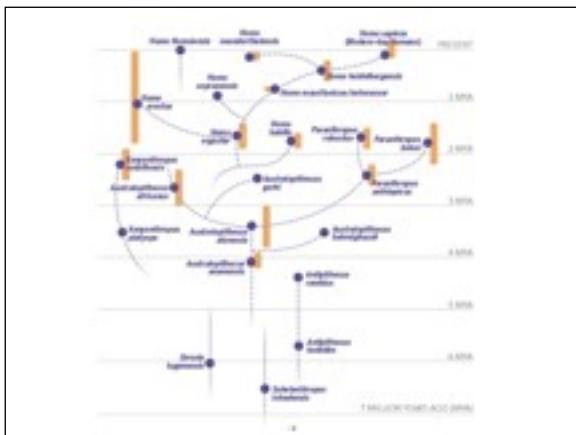


Kenyanthropus platyops

- 3.5 mya
- Flat face
- Small molars
- Australopithecus? Even *A. afarensis*?

Evolutionary Relationships





Pliocene Hominids

Early

- Australopithecus anamensis*
- Australopithecus afarensis*
- Kenyanthropus platyops*
- Australopithecus bahrelghazali*

Gracile

Robust

Australopithecus africanus *Australopithecus (P.) aethiopicus*
Australopithecus bahrelghazali *Australopithecus (P.) boisei*
Australopithecus sediba *Australopithecus (P.) robustus*

Later Australopithecines

Gracile Australopithecines

Australopithecus



Robust Autocorrelation

Robust Australopithecines
Australopithecus aethiopicus
 Australopithecus boisei
 Australopithecus robustus

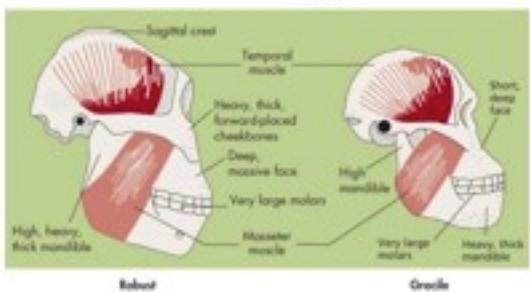


The Robust Australopithecines

- AKA Paranthropus
- Hard object feeding
 - Sagittal crest
 - Large cheek teeth
 - Flared zygomatic arch
 - Dished Face
 - Extreme postorbital constriction
- Woodland and open woodland habitat



Robust and gracile



Kenyanthropus - robust?



Australopithecus aethiopicus
2.7-2.3 mya



Australopithecus boisei
2.3-1.3 mya



Australopithecus robustus
2-1 mya

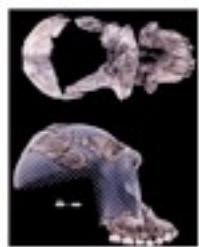


Gracile Australopithecines

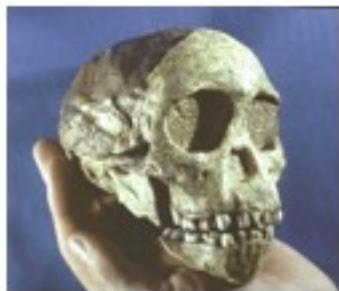
- Slight brain size increase
- Rounded Vault
- No crests
- Less projecting face
- Bipedal anatomy
- 3.5-<2.0 mya



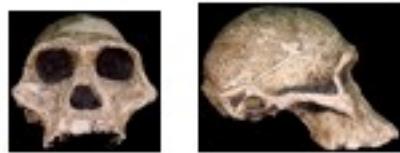
Australopithecus gahri
2.5 mya



Taung



Australopithecus africanus
3-2.4 mya



Reconstruction



Australopithecus sediba

- dates to right around 1.9 mya - no older than that
- brain size (95% adult size) ~ 420 cc
- maximum height 1.3 m
- smaller teeth and cheekbones than *A. africanus*
- longer legs and pelvic changes more like *Homo*

Australopithecus sediba



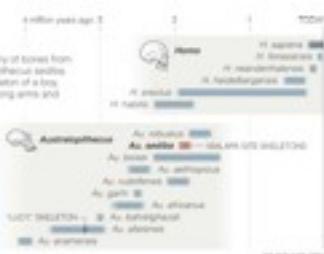
Australopithecus sediba



FIG. 4. Anatomically modern human-like skeletal traits in australopithecines. Credit: Nature 462, 320–326 (2009); doi:10.1038/nature08323.

A New Hominid

Scientists announced the discovery of bones from a new hominid species, *Australopithecus sediba*. The bones include the partial skeleton of a boy who walked upright but retained long arms and hands for climbing trees.



Contemporaneous?

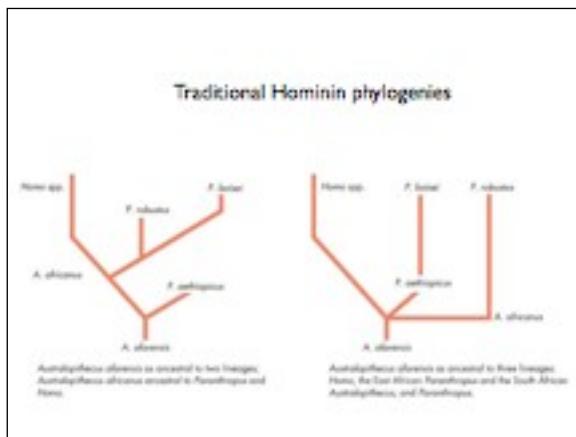
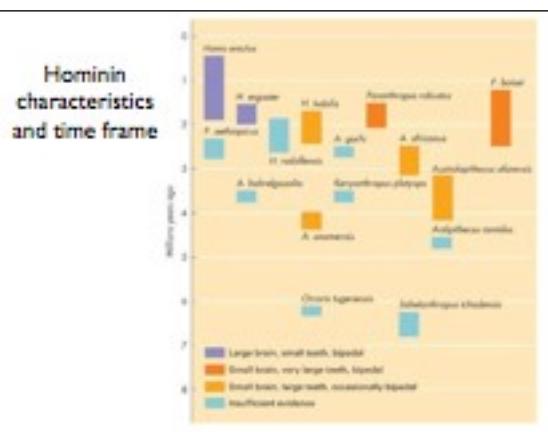
TABLE 11.3 Examples of Potentially Contemporaneous Hominids by Region

Age (MYA) ^a	West Africa	East Africa	South Africa
~4	<i>Sahelanthropus tchadensis</i>	<i>Orrorin tugenensis</i>	
2.9		<i>Australopithecus afarensis</i> , <i>A. anamensis</i>	
2.5	<i>A. bahrelghazali</i>	<i>A. afarensis</i> , <i>Kenyapithecus pliopeplus</i>	<i>A. africanus</i>
2.5		<i>A. garhi</i> , <i>A. anamensis</i>	<i>A. africanus</i>
2.5–2		<i>A. boisei</i> , <i>A. garhi</i>	<i>A. africanus</i> , <i>A. robustus</i>
2–1.5		<i>A. boisei</i> , <i>Homo sp.</i>	<i>Homo sp.</i> , <i>A. robustus</i>

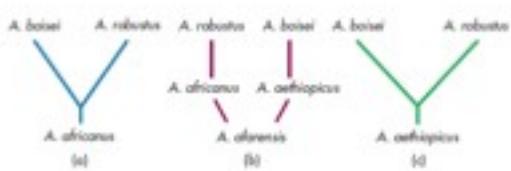
^aMYA = millions of years ago.

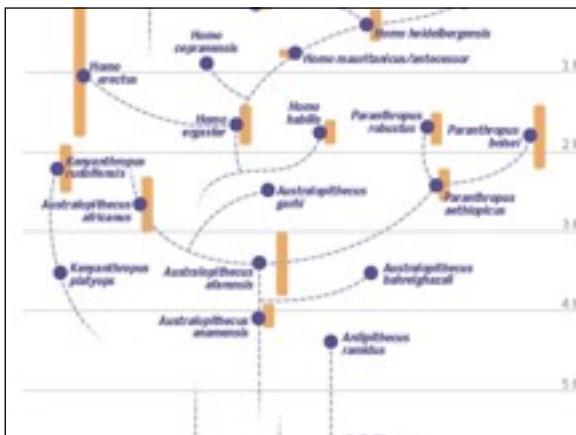
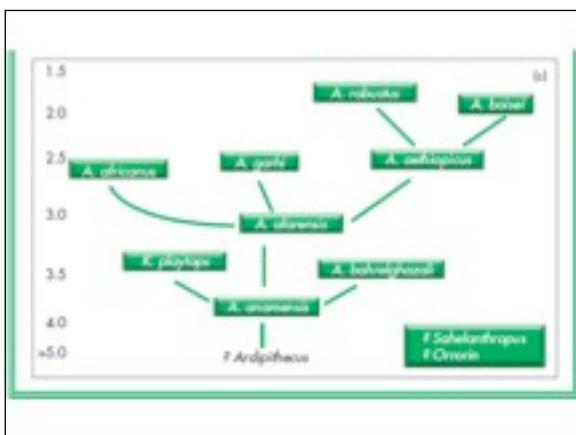
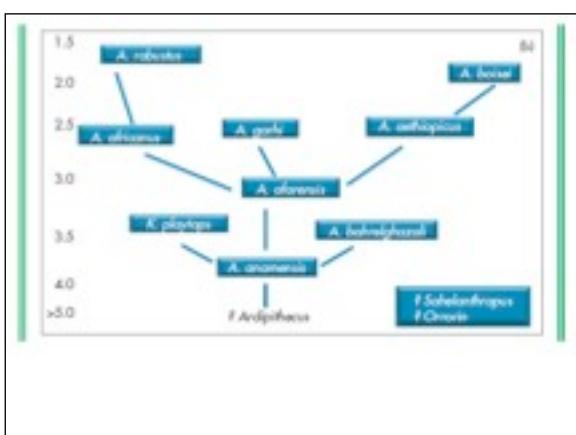
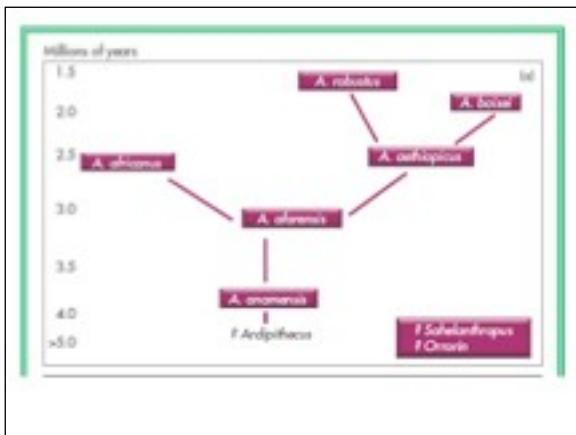
Brain and body sizes

<i>Sahelanthropus</i>		~350cc
<i>A. afarensis</i>	29 kg f / 45 kg m	~375-550
<i>A. africanus</i>	30 kg f / 40 kg m	~530
<i>A. aethiopicus</i>		~415
<i>A. sediba</i>		~420
<i>A. boisei</i>	34 kg f / 49 kg m	~530 cc
<i>A. robustus</i>	32 kg f / 40 kg m	~590 cc
<i>Homo habilis</i>	32 kg f / 52 kg m	500-800 cc



Phylogenies?







A. afarensis?



Australopithecus africanus

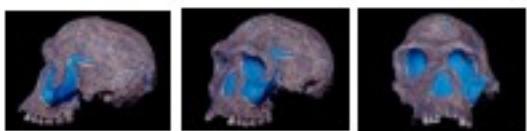


Robust Australopithecus?

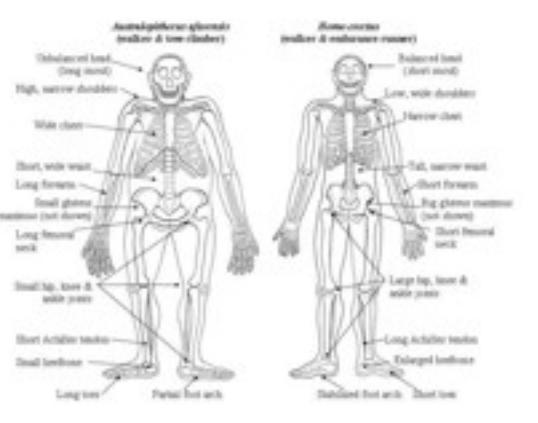
Defining *Homo*

- Rasmussen: Primate genus containing species of relatively small-toothed, big-brained, stone-tool-making hominids
- Walker: relatively large brain cases, completely modern limb proportions, and relatively small teeth
- Wolpoff: expanded cranial capacity, reduced canine size, precision grip

Homo habilis



Australopithecus v. Homo habilis



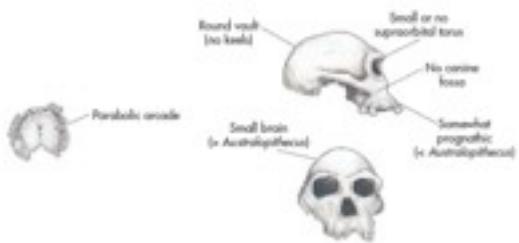
Homo

- brain size greater than 500 cc
- smaller, less prognathic face
- smaller teeth than the australopithecines
- more efficient bipedalism

Homo species

- *Homo habilis*
- *Homo erectus*
- *Homo rudolfensis*
- *Homo ergaster*
- *Homo floresiensis*
- *Homo heidelbergensis*
- *Homo rhodesiensis*
- *Homo antecessor*
- *Homo neandertalensis*
- *Homo sapiens*

Homo habilis



Homo habilis



Homo rudolfensis



Homo rudolfensis

- *Homo habilis* or something different?
- larger body than *H. habilis*
- larger brain than *H. habilis*
 - but smaller EQ
- bigger teeth than *H. habilis*

Savanna-Woodland



Oldowan Chopper

