

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 bahrelghazali

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

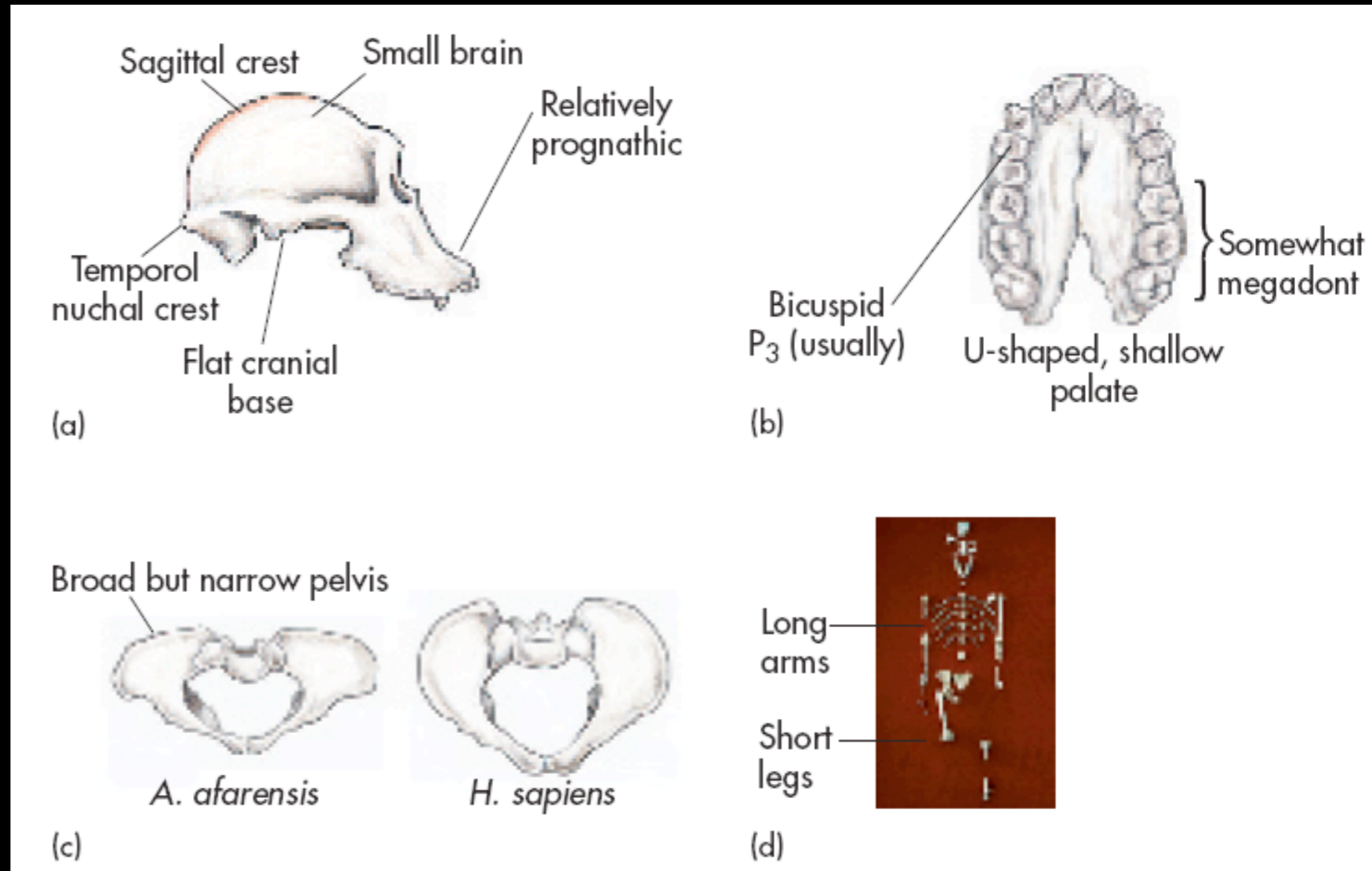


TABLE 11.2 Comparisons of *A. afarensis*, Great Ape, and Modern Humans

	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 <i>Homo</i>	600	63%
Modern human	1,400	15%

Australopithecus bahrelghazali

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



Kenyanthropus platyops



Kenyanthropus lateral



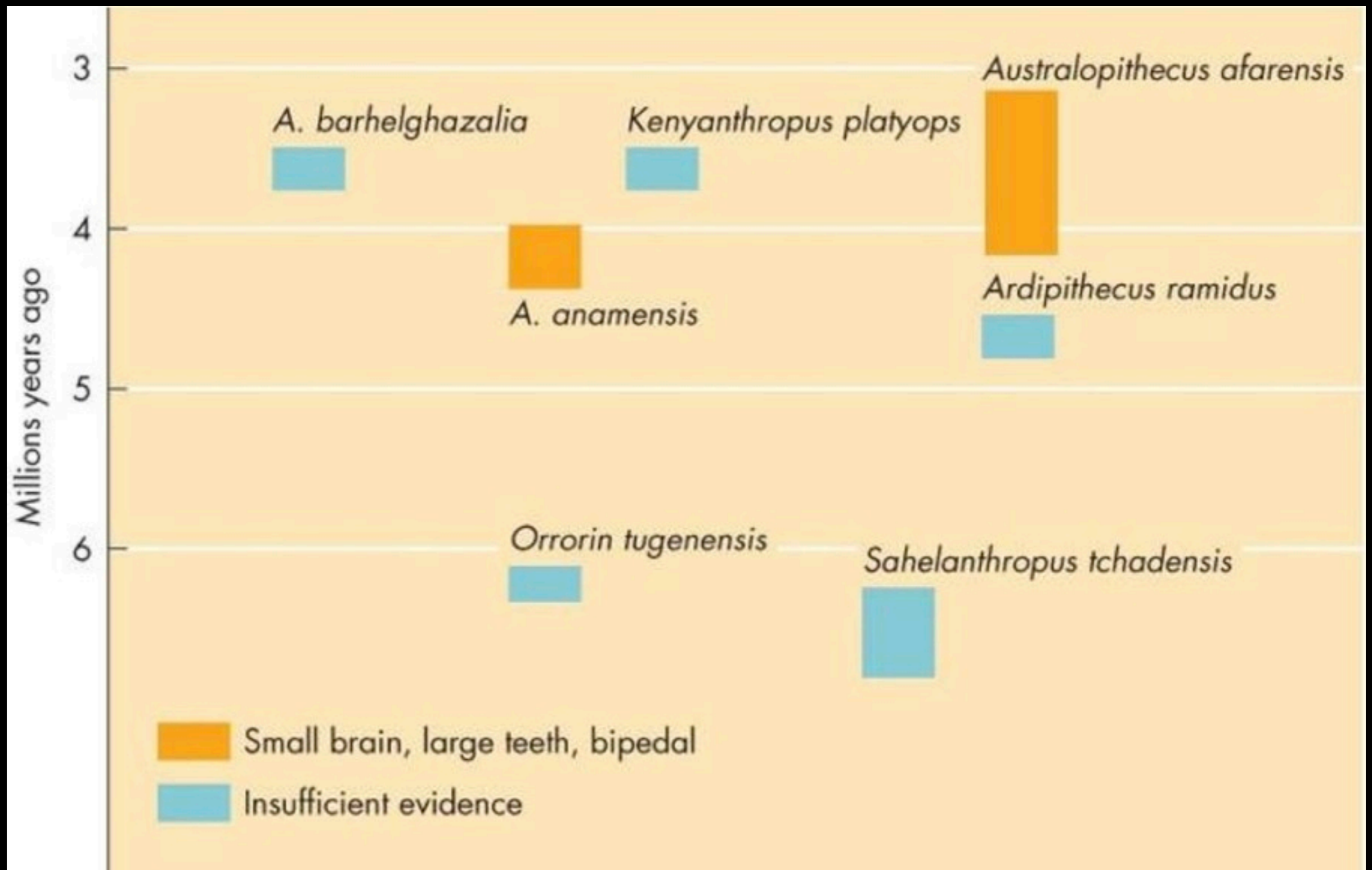
A. afarensis and *K. platyops*

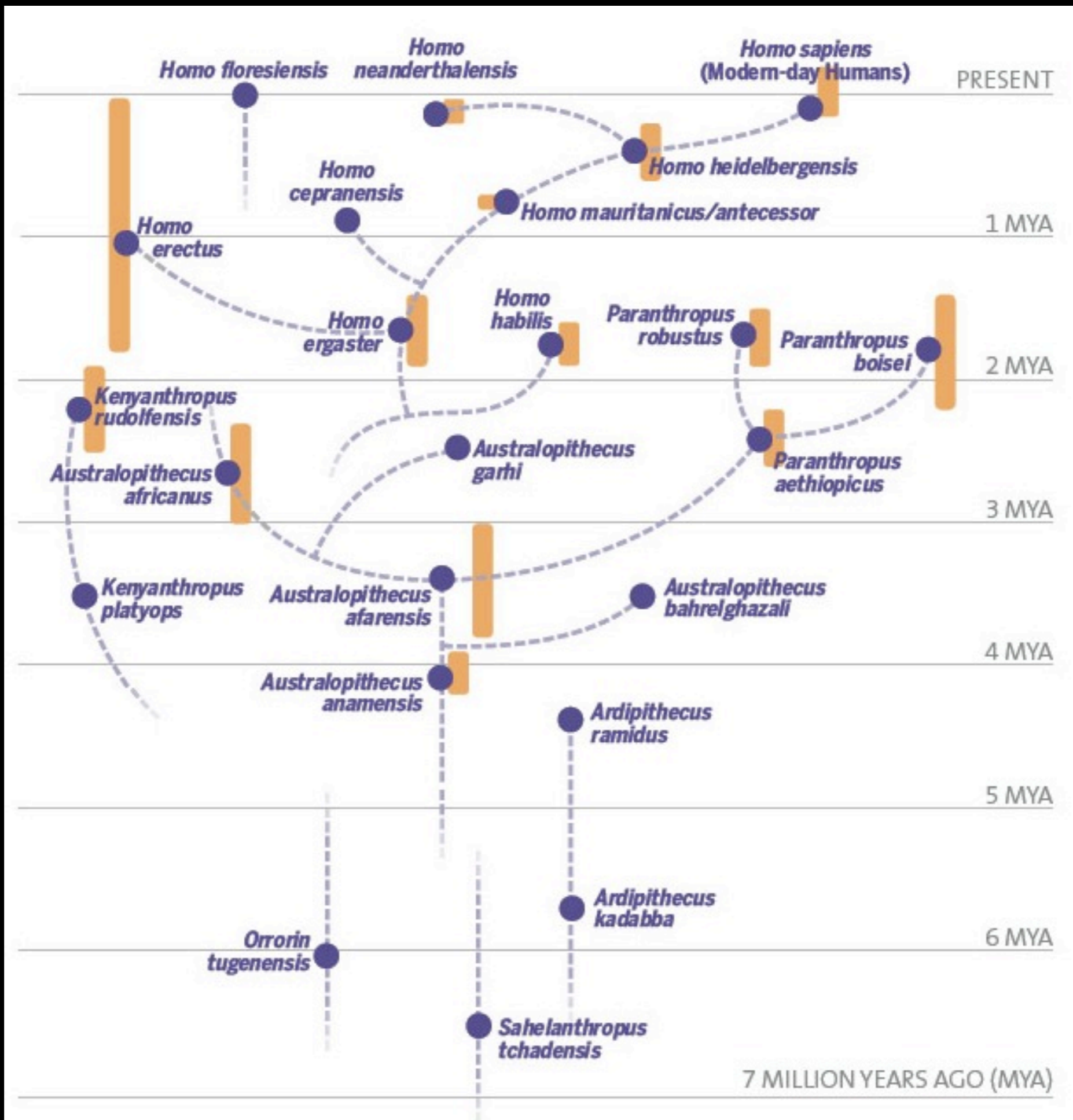


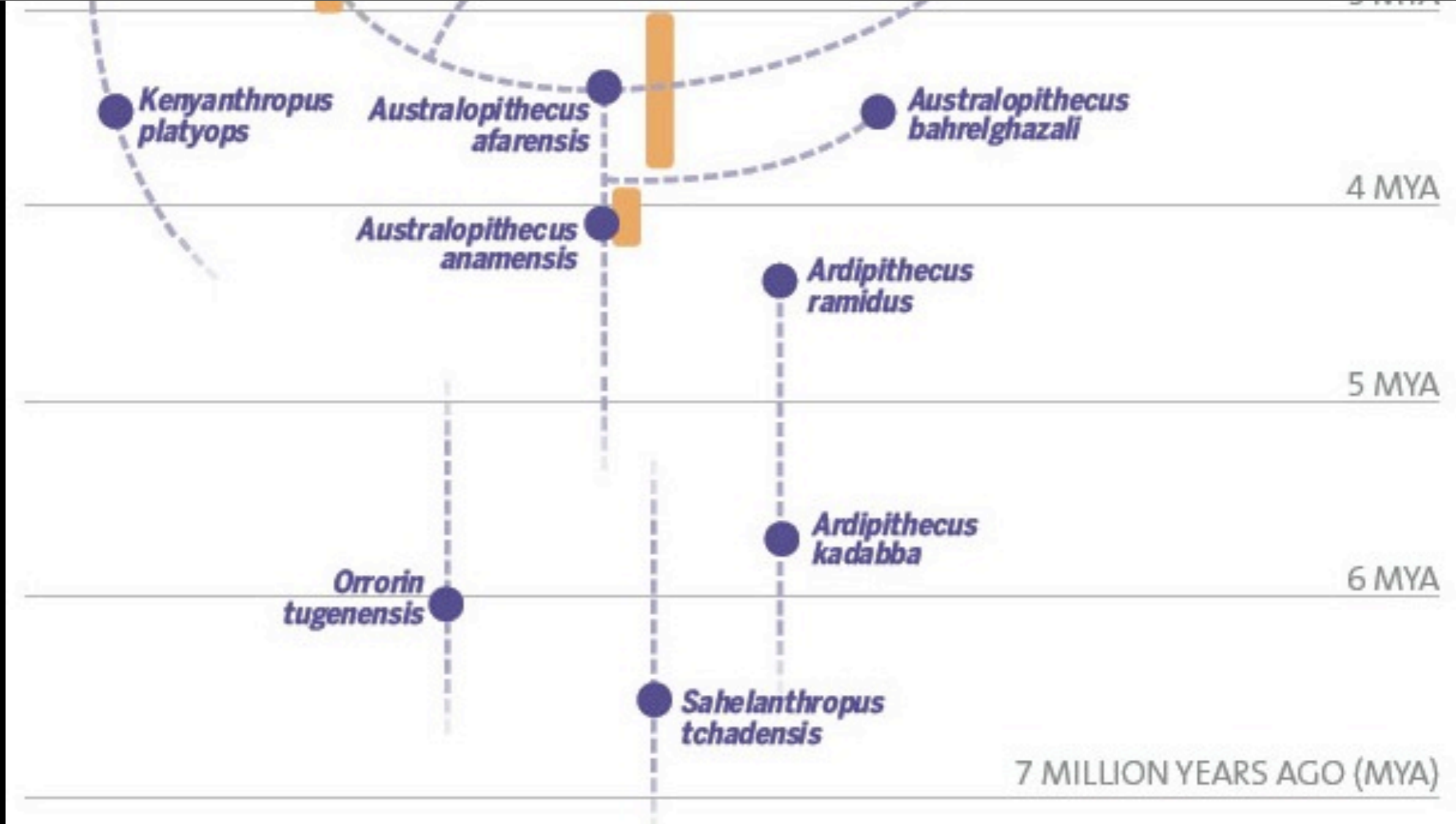
Kenyanthropus platyops

- 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

Australopithecus africanus
Australopithecus gahri
Australopithecus sediba

Robust

Australopithecus (P.) aethiopicus
Australopithecus (P.) boisei
Australopithecus (P.) robustus

Later Australopithecines

Gracile Australopithecines

Australopithecus gahri

Australopithecus africanus

Australopithecus sediba

Robust Australopithecines

Australopithecus aethiopicus

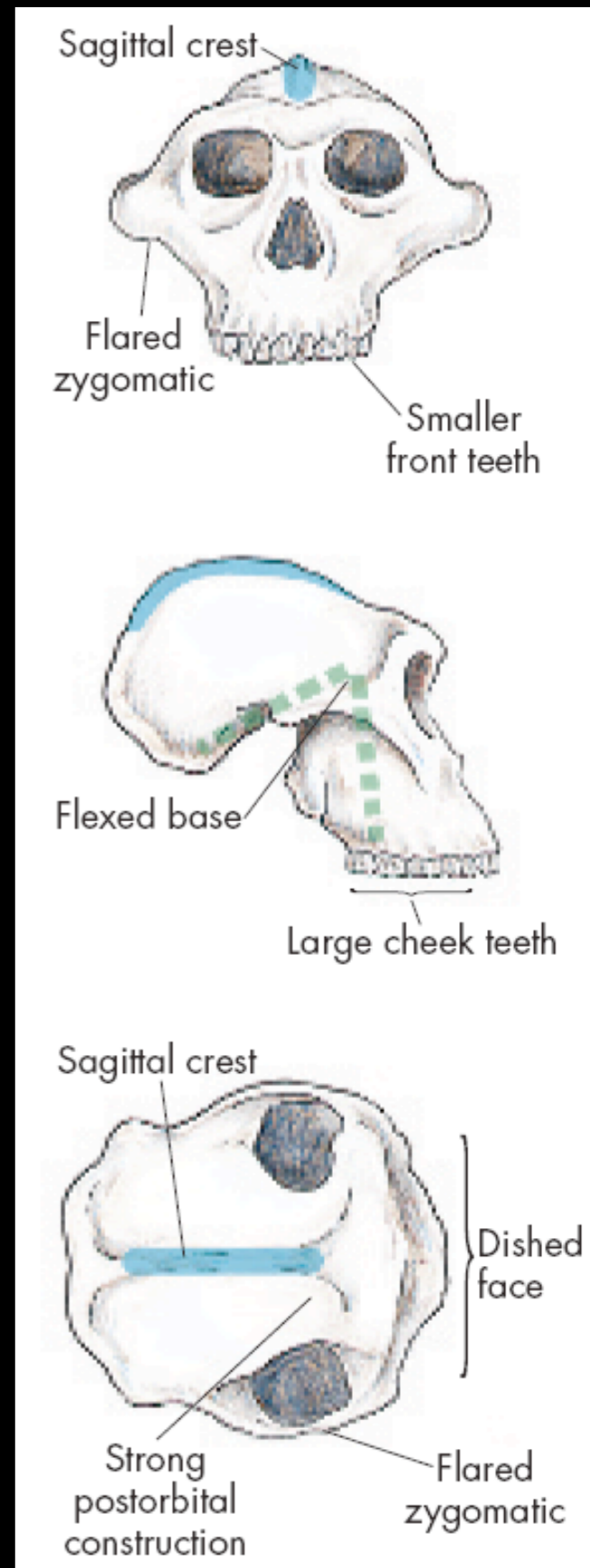
Australopithecus boisei

Australopithecus robustus

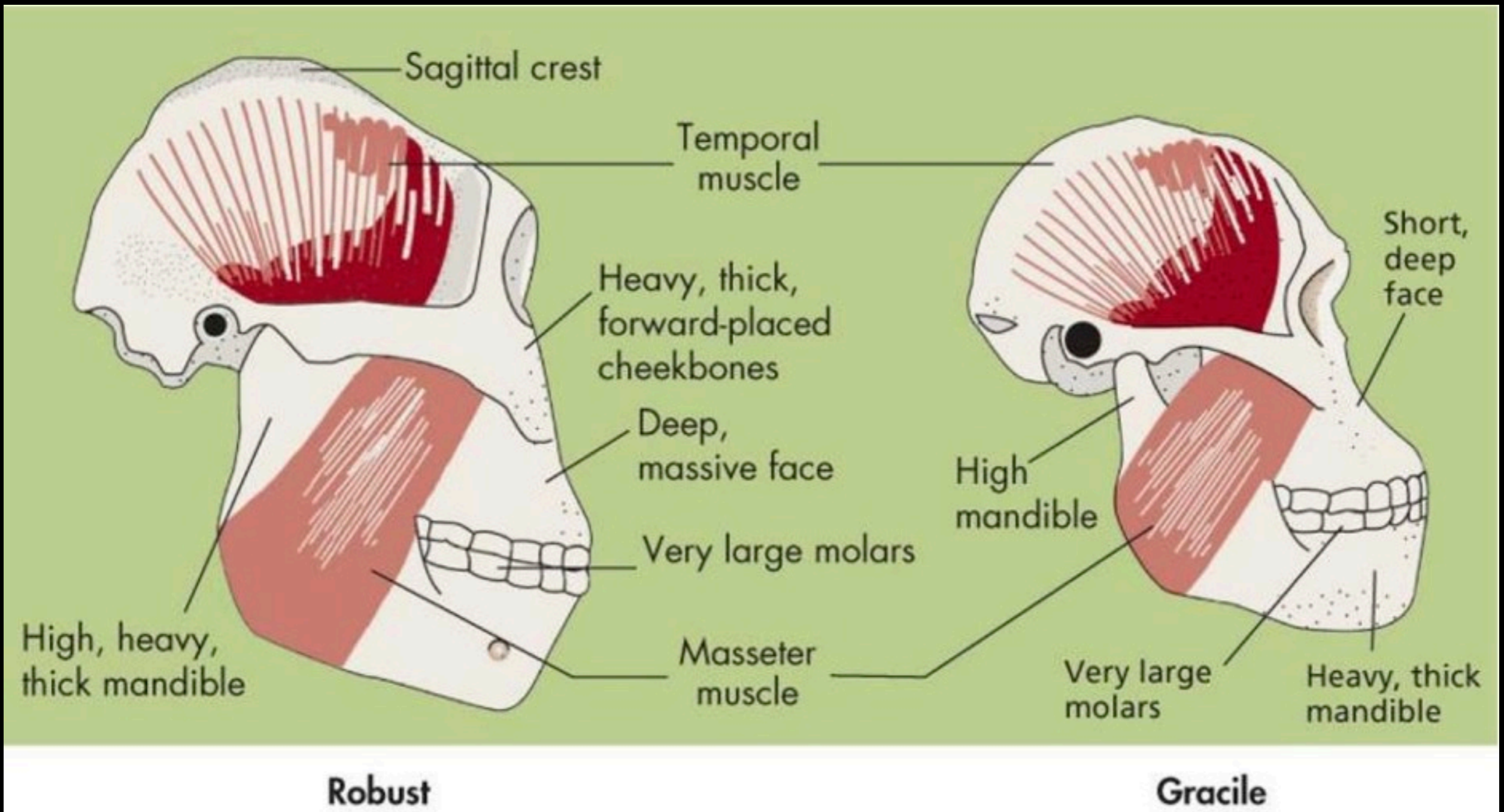


The Robust Australopithecines

- 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



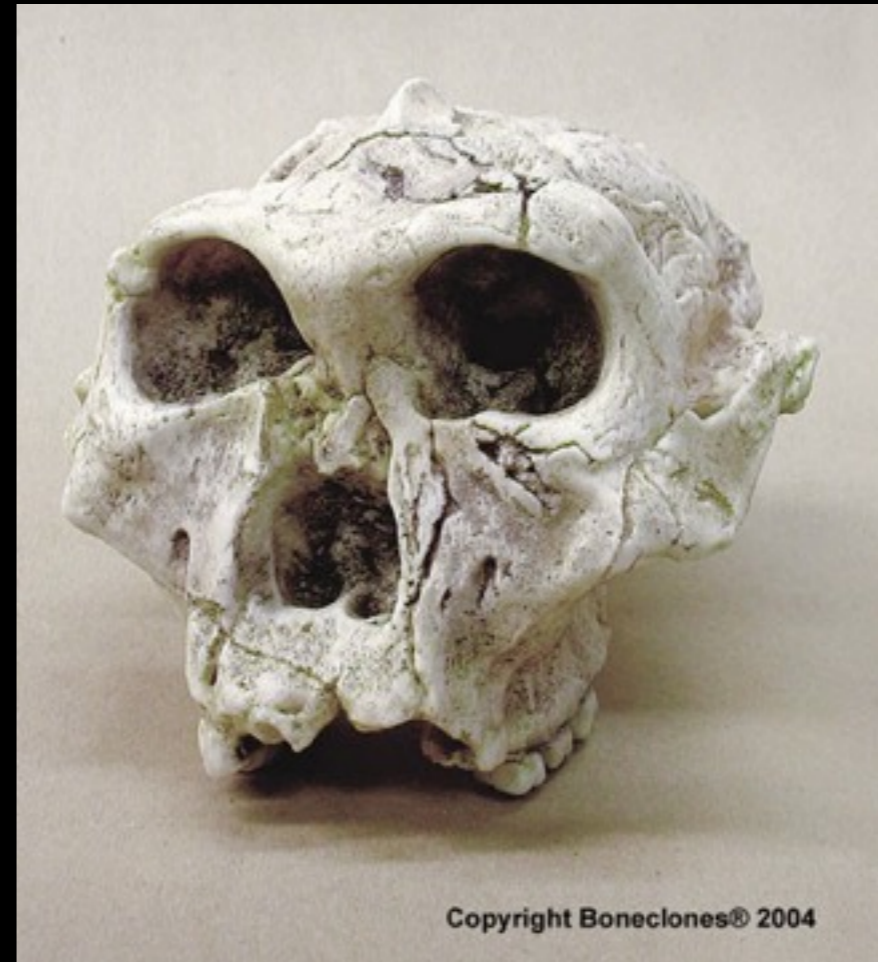
Australopithecus boisei
2.3-1.3 mya



Australopithecus robustus 2-1 mya



Science



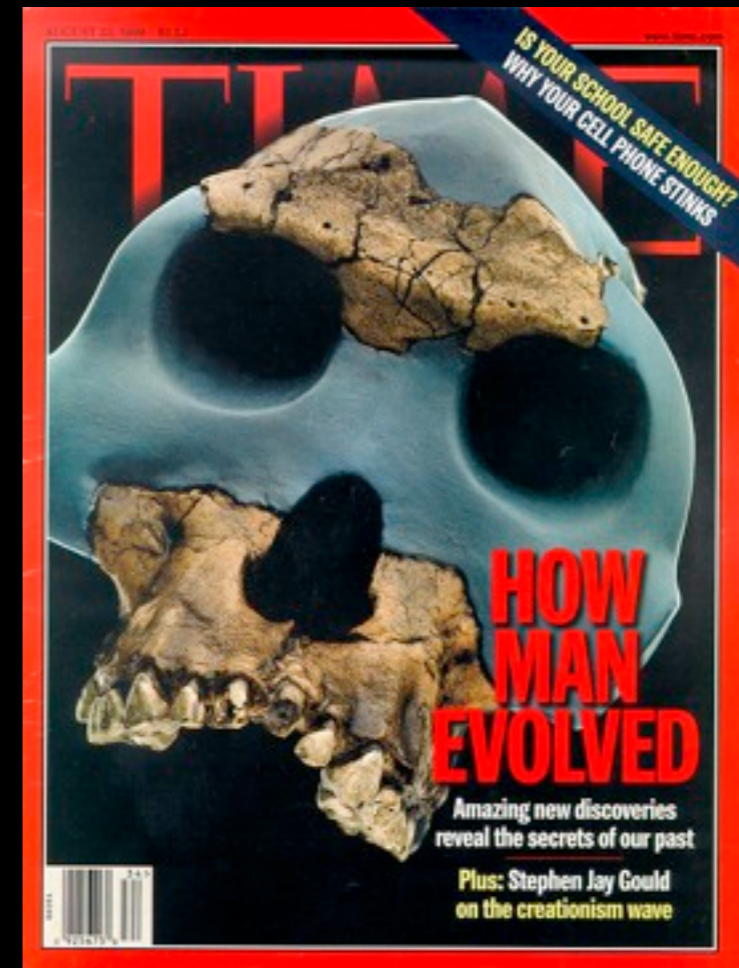
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Gracile Australopithecines

- 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

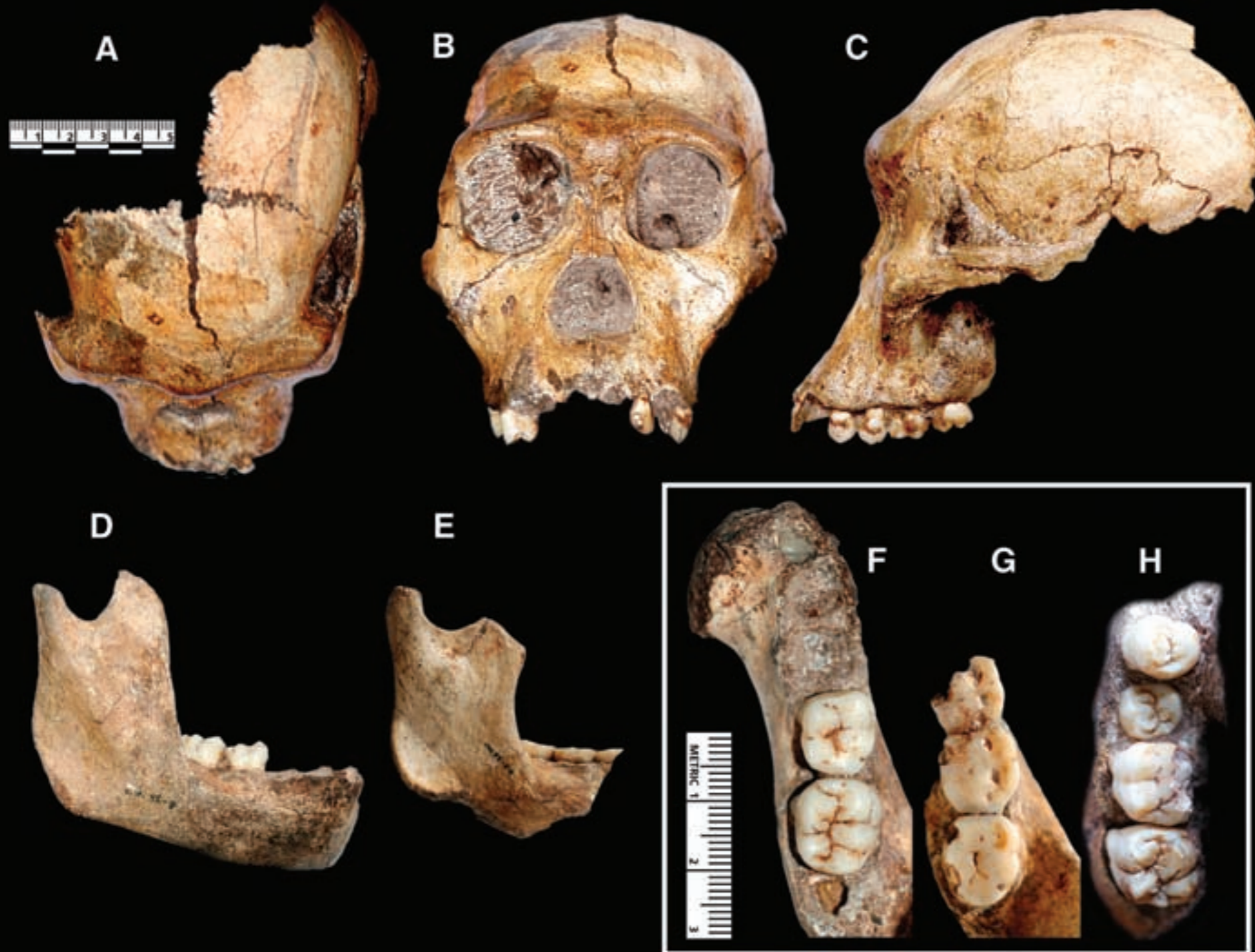


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Australopithecus sediba

- 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

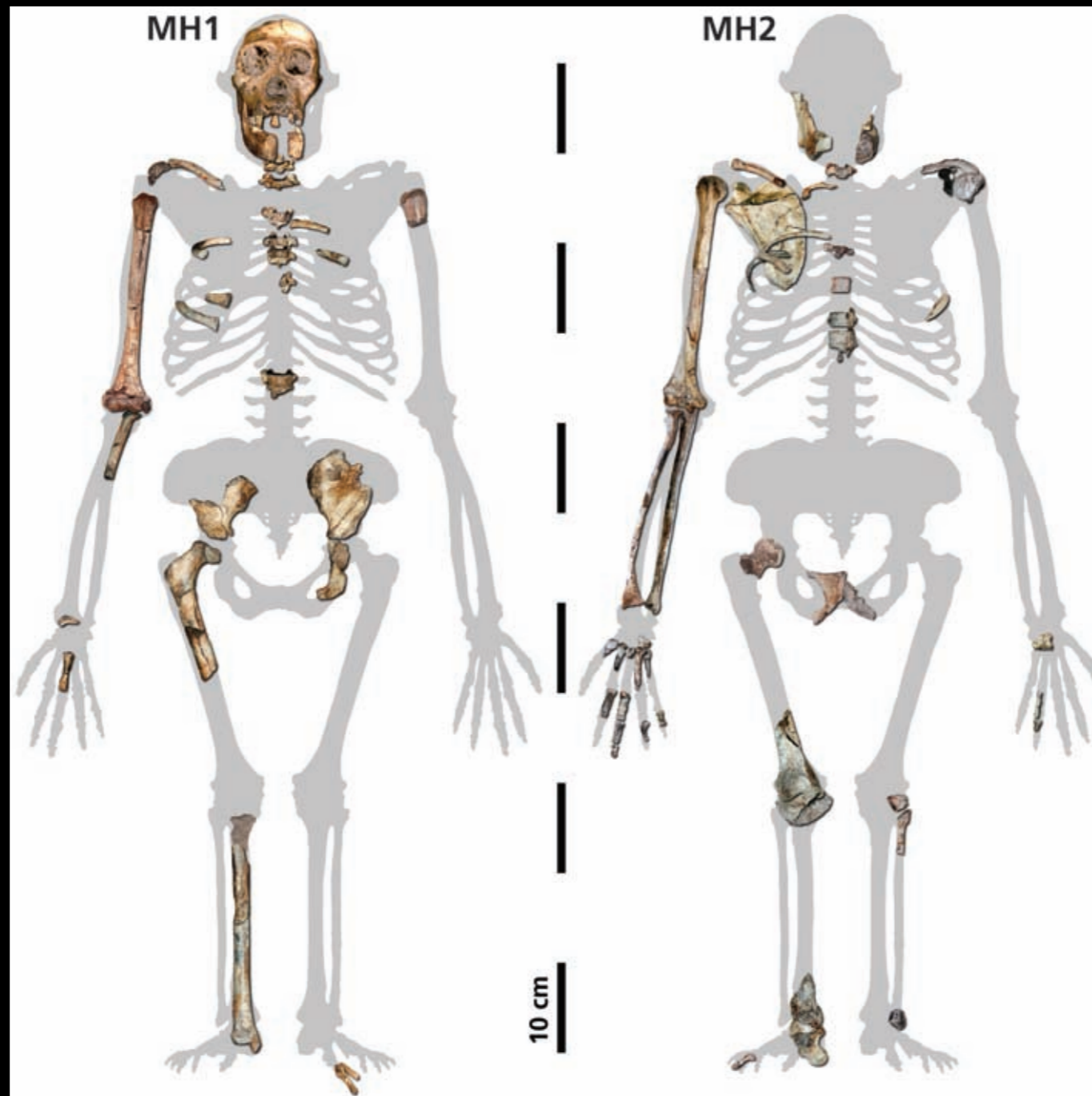


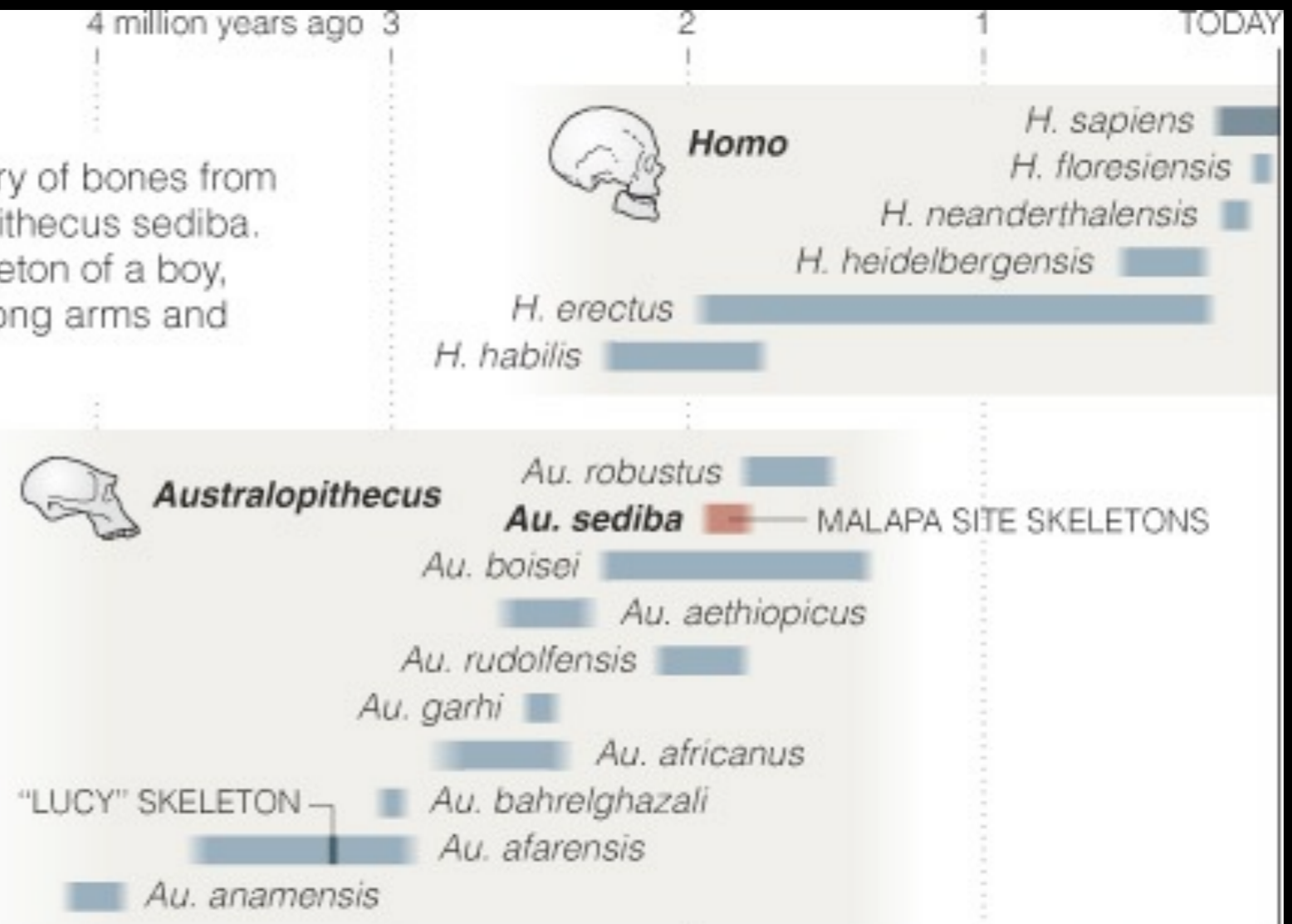
Fig. 2. Associated skeletal elements of MH1 (left) and MH2 (right), in approximate anatomical position, superimposed over an illustration of an idealized *Au. africanus* skeleton (with some adjustment for differences in body proportions). The proximal right tibia of MH1 has been reconstructed from a natural

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.



Source: Science



THE NEW YORK TIMES

Contemporaneous?

TABLE 11.3 Examples of Potentially Contemporaneous Hominids by Region

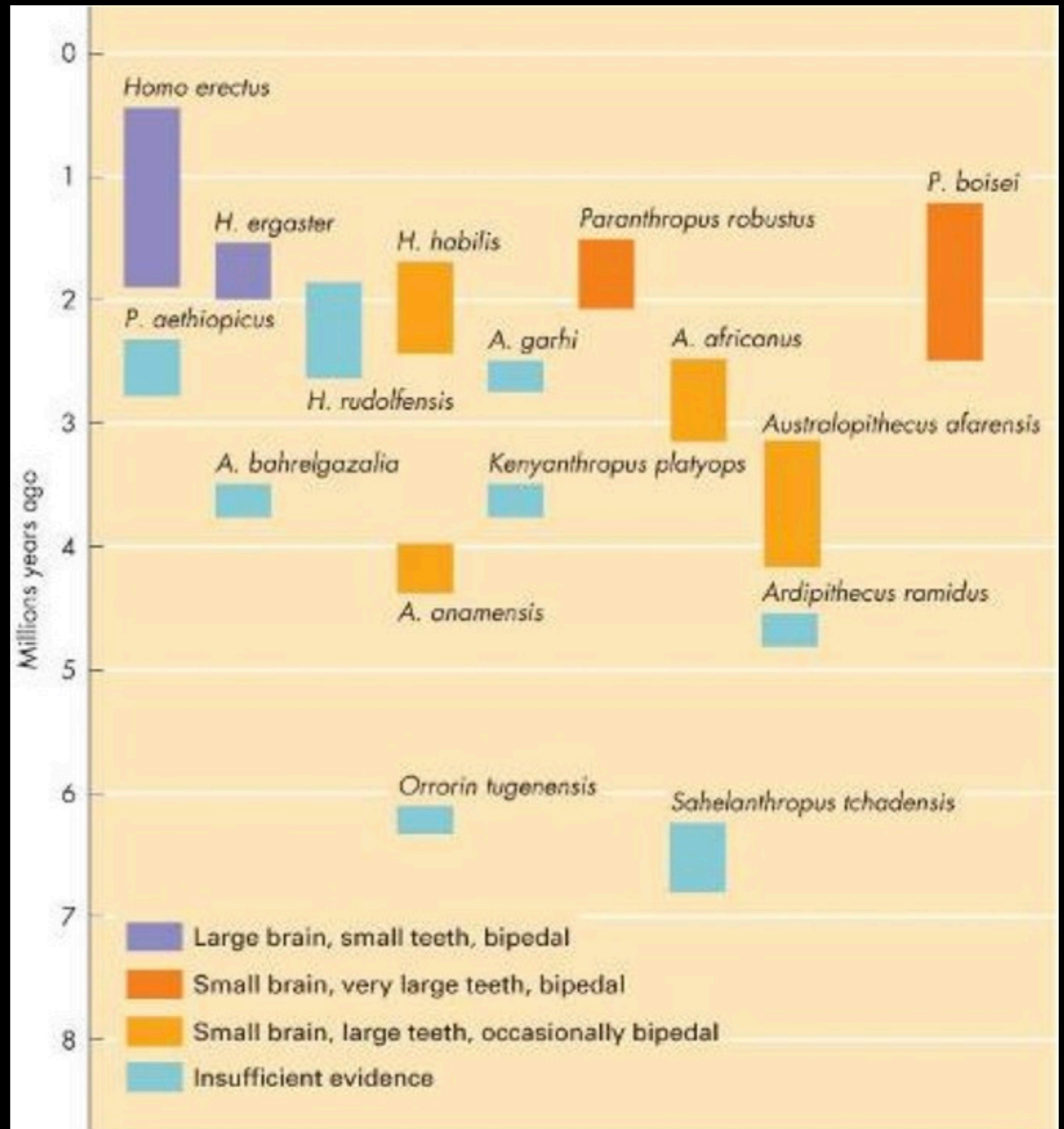
Age (MYA)*	West Africa	East Africa	South Africa
~6	<i>Sahelanthropus tchadensis</i>	<i>Orrorin tugenensis</i>	
3.9		<i>Australopithecus afarensis</i> , <i>A. anamensis</i>	
3.5	<i>A. bahrelghazali</i>	<i>A. afarensis</i> , <i>Kenyanthropus platyops</i>	<i>A. africanus</i>
2.5		<i>A. garhi</i> , <i>A. aethiopicus</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>

*MYA = millions of years ago

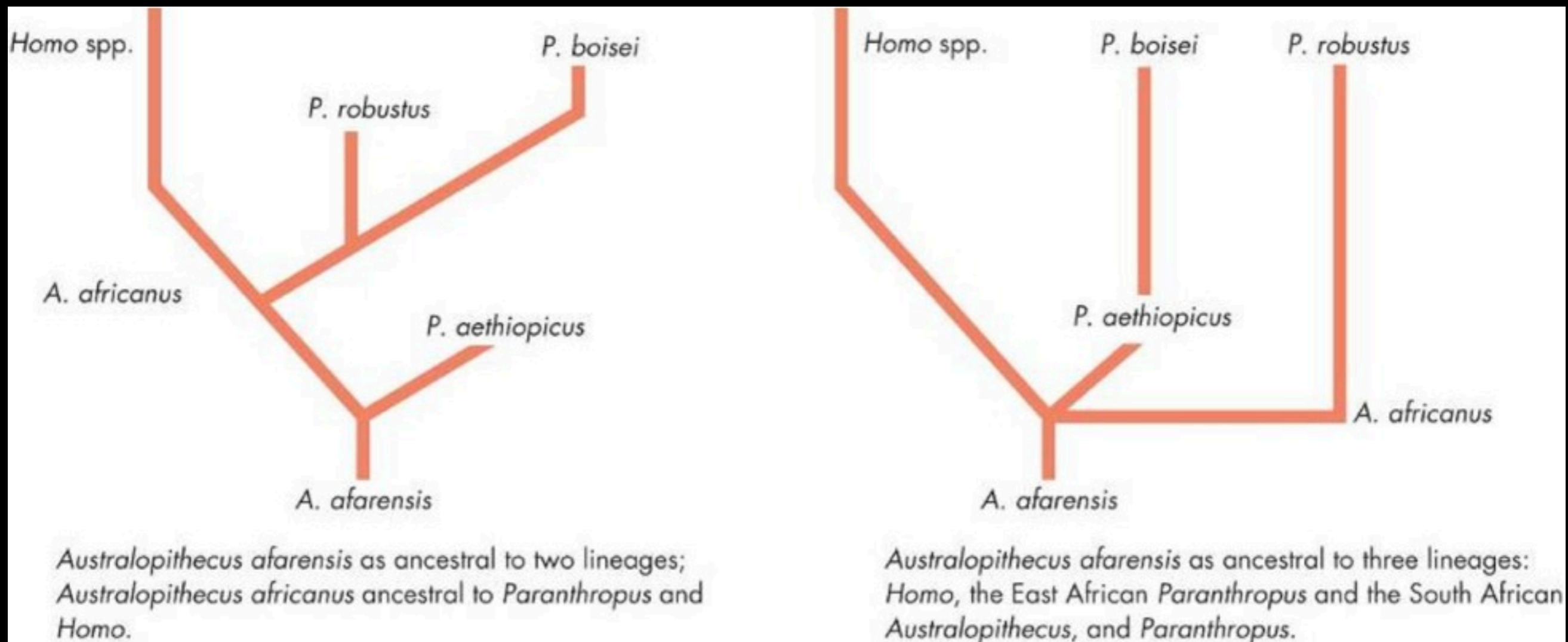
Brain and body sizes

<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

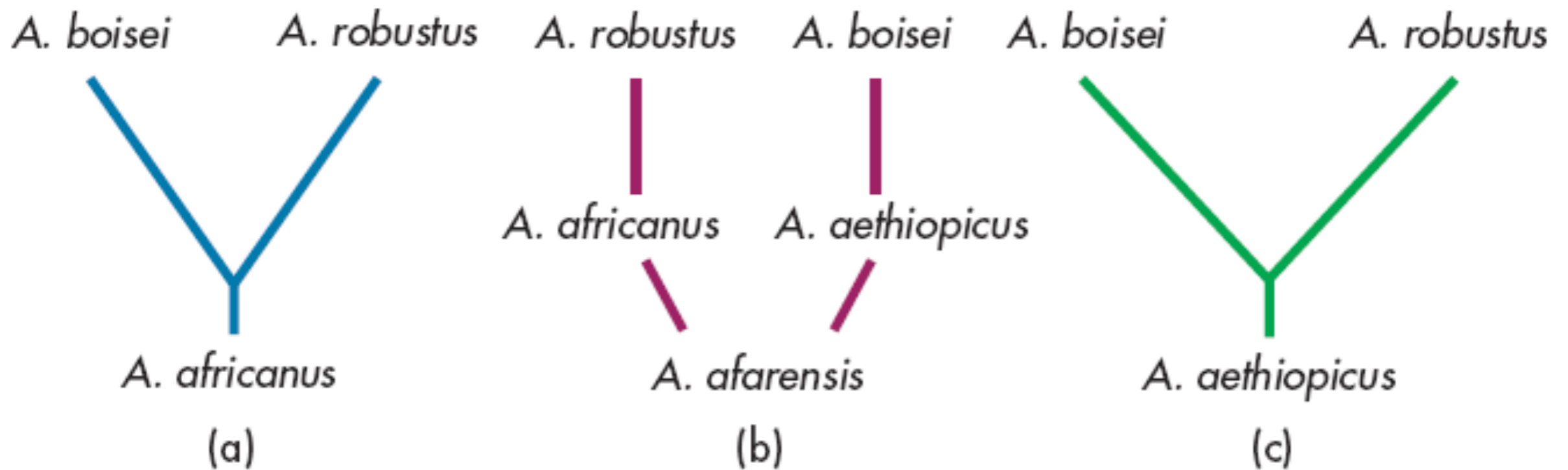
Hominin characteristics and time frame



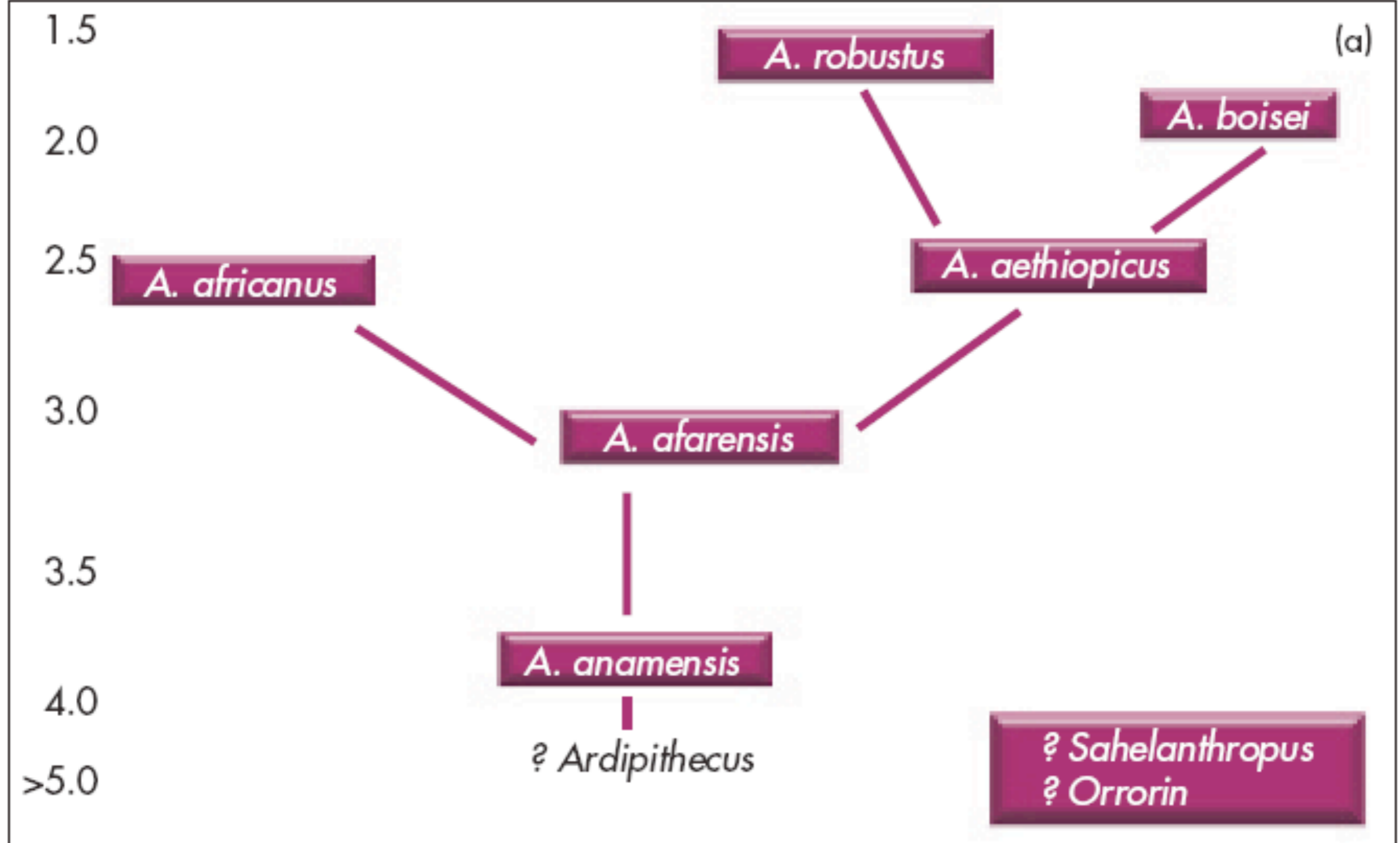
Traditional Hominin phylogenies

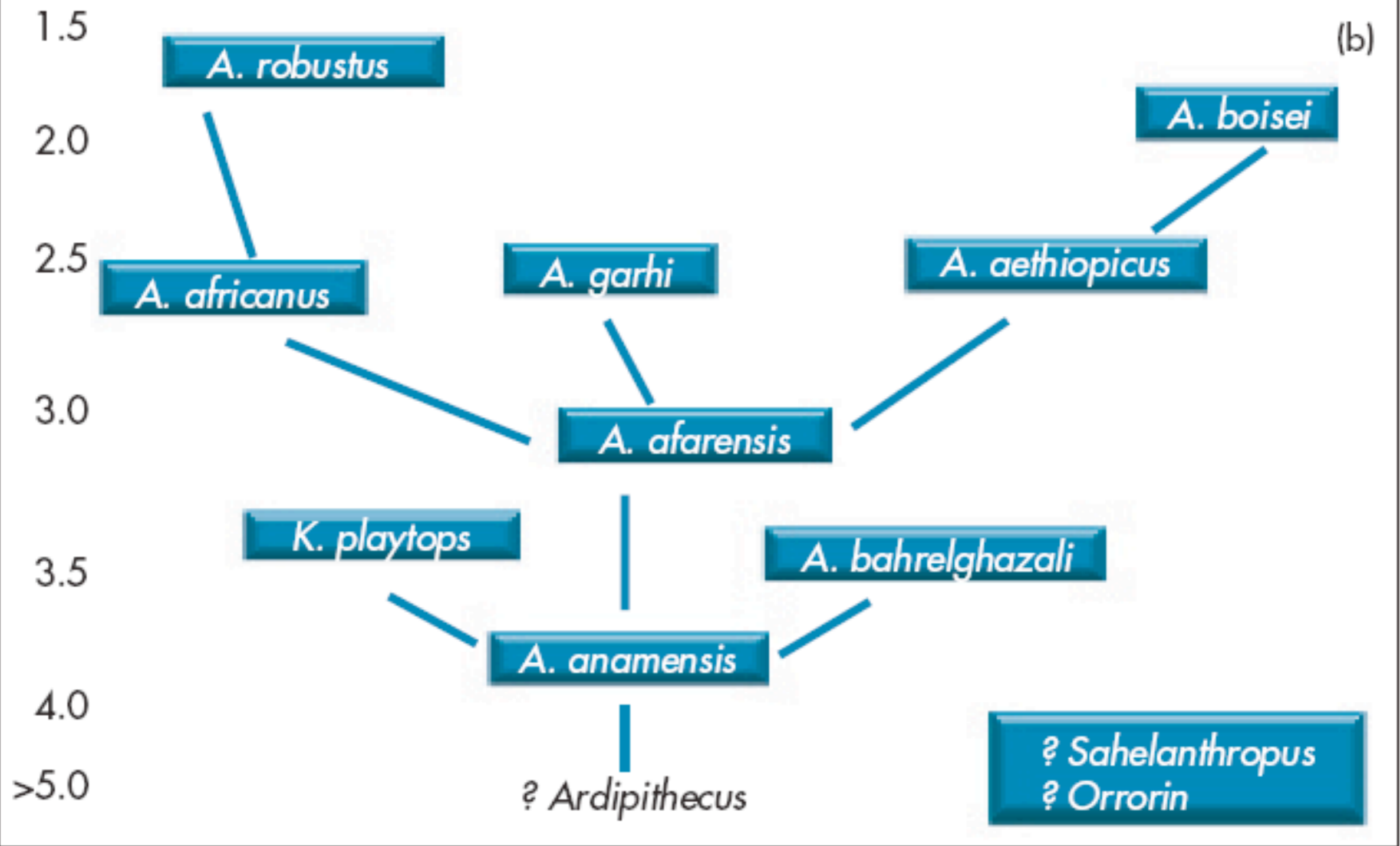


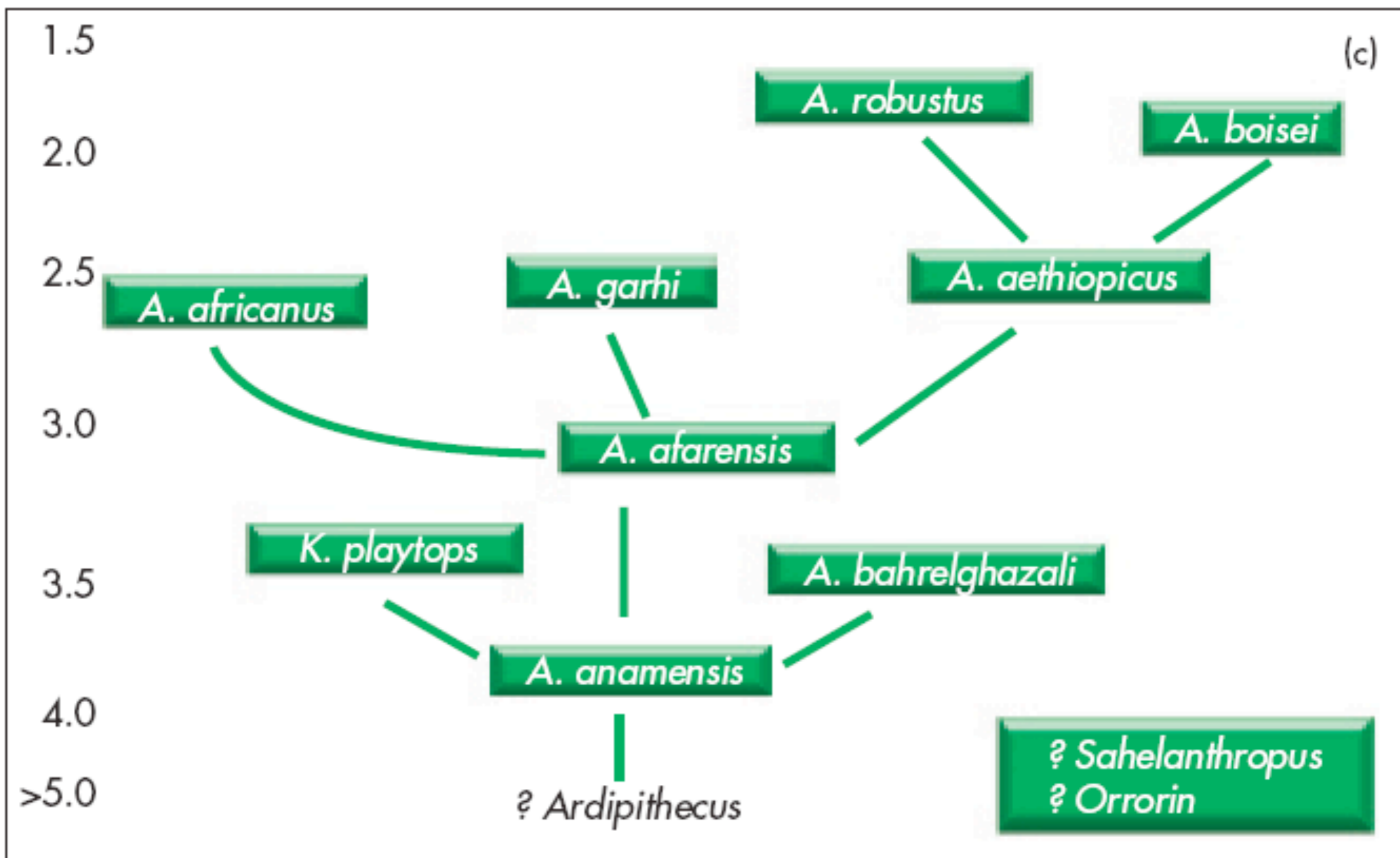
Phylogenies?

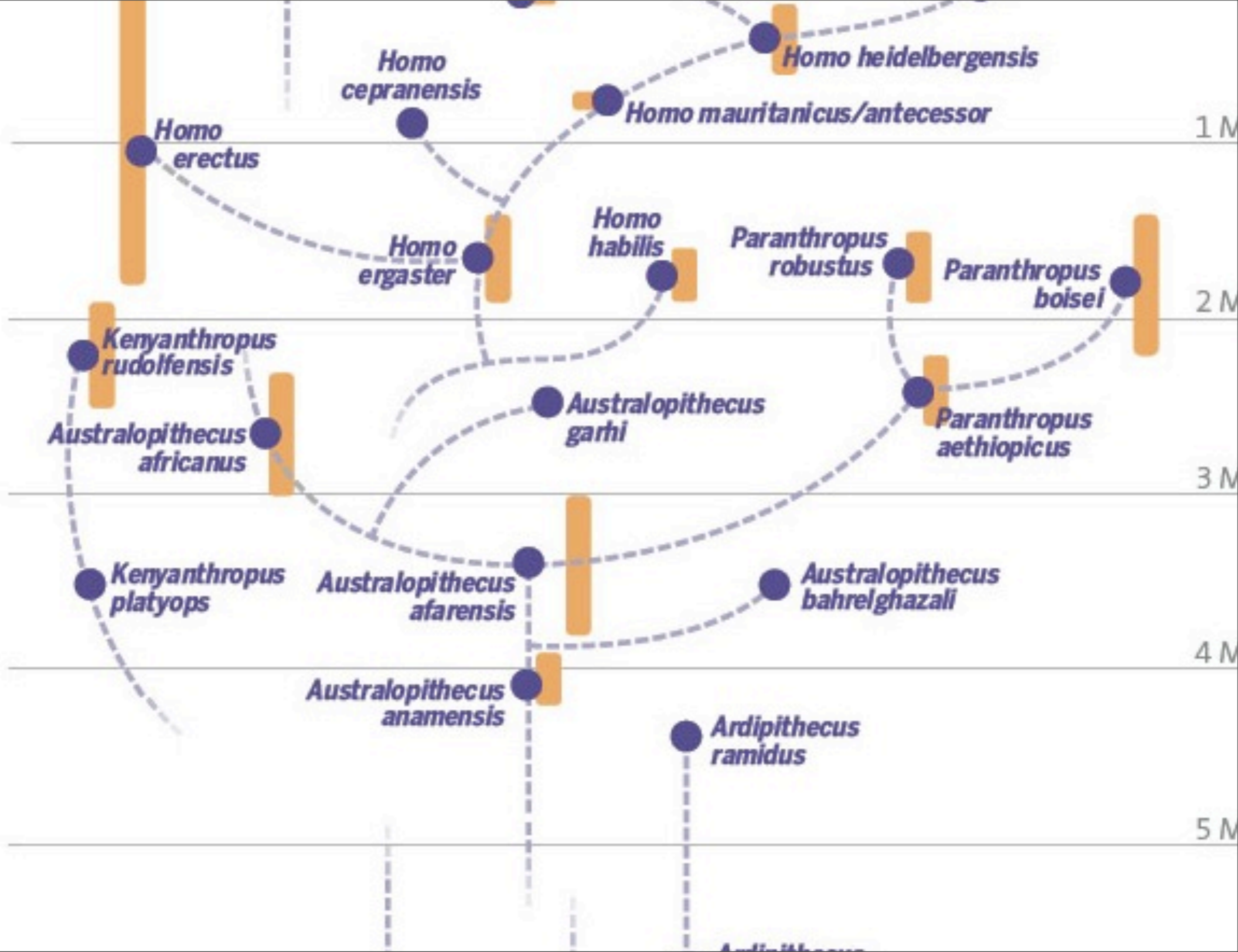


Millions of years











A. afarensis?



Australopithecus africanus





Robust *Australopithecus*?

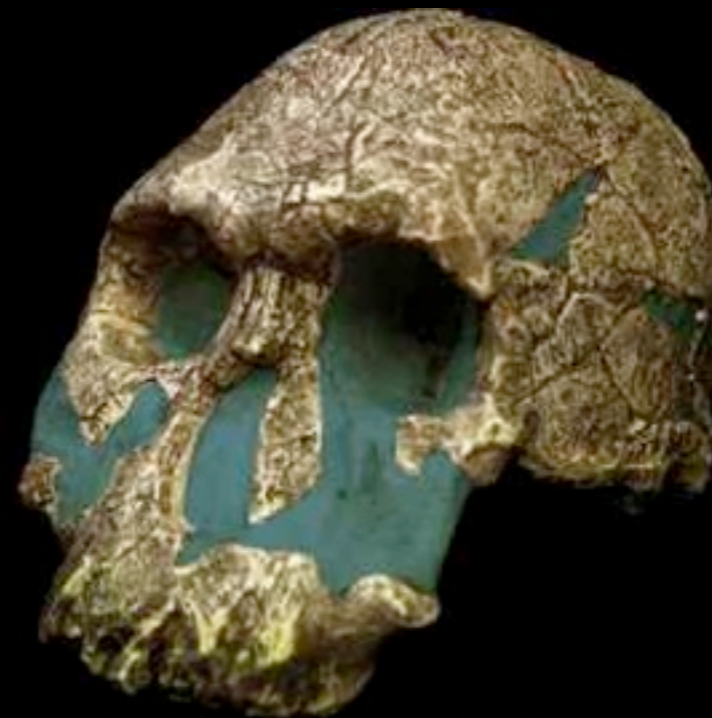
Defining *Homo*

- 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

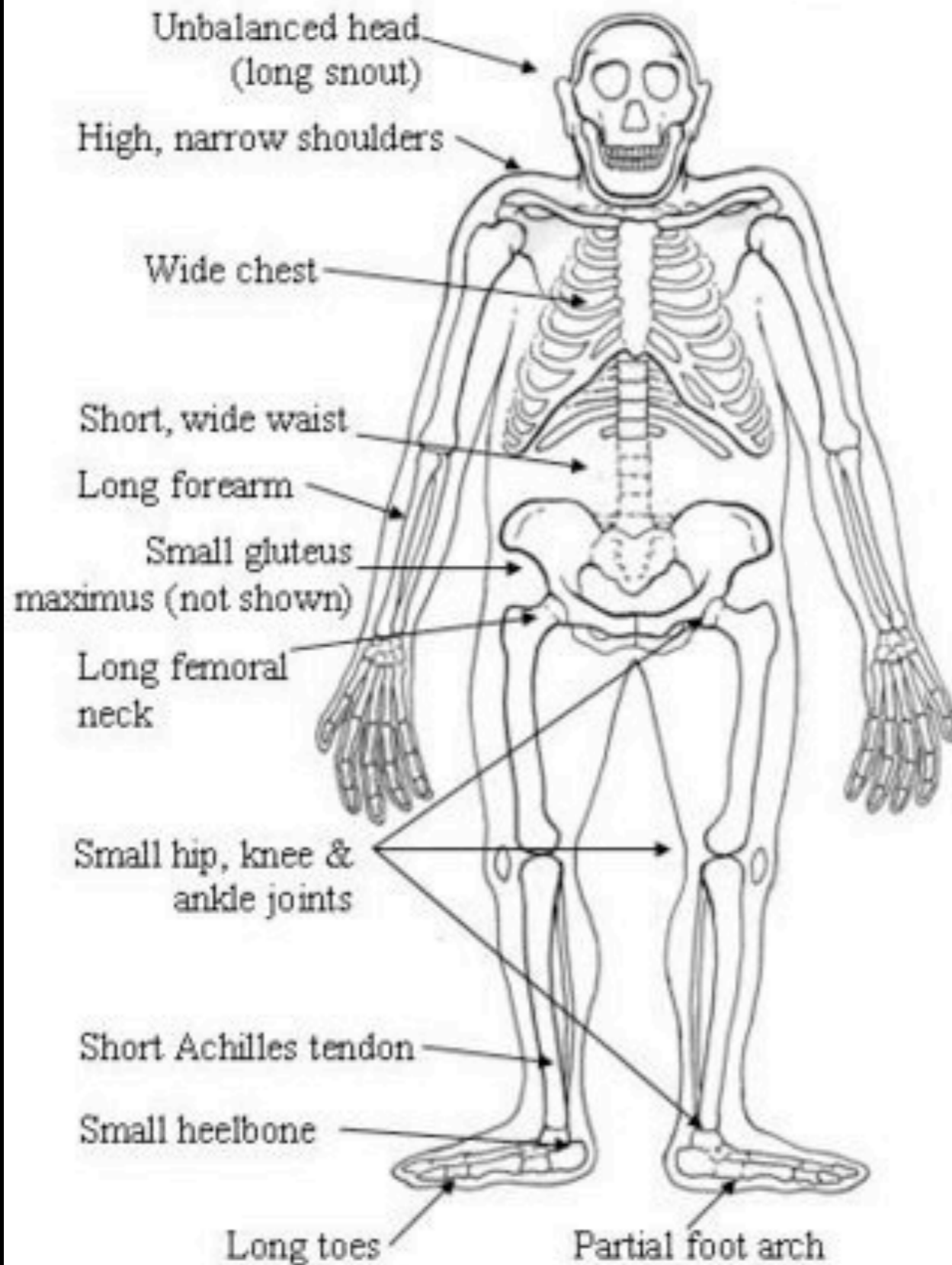


Australopithecus v. *Homo habilis*

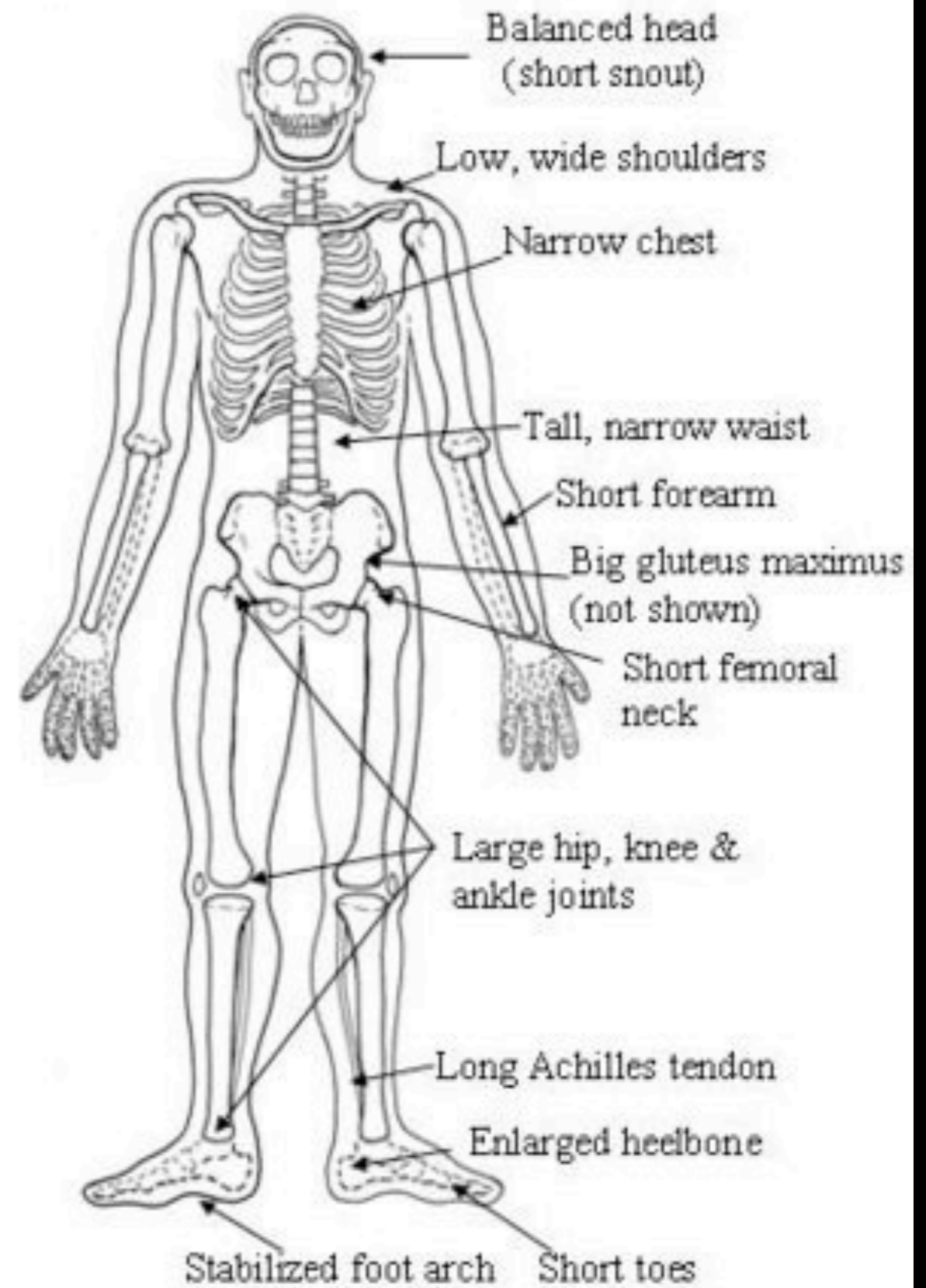


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Australopithecus afarensis
(walker & tree climber)



Homo erectus
(walker & endurance runner)



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



Parabolic arcade

Round vault
(no keels)



Small or no
supraorbital torus

No canine
fossa

Small brain
($>$ *Australopithecus*)



Somewhat
prognathic
($<$ *Australopithecus*)

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





Olduwan Chopper

