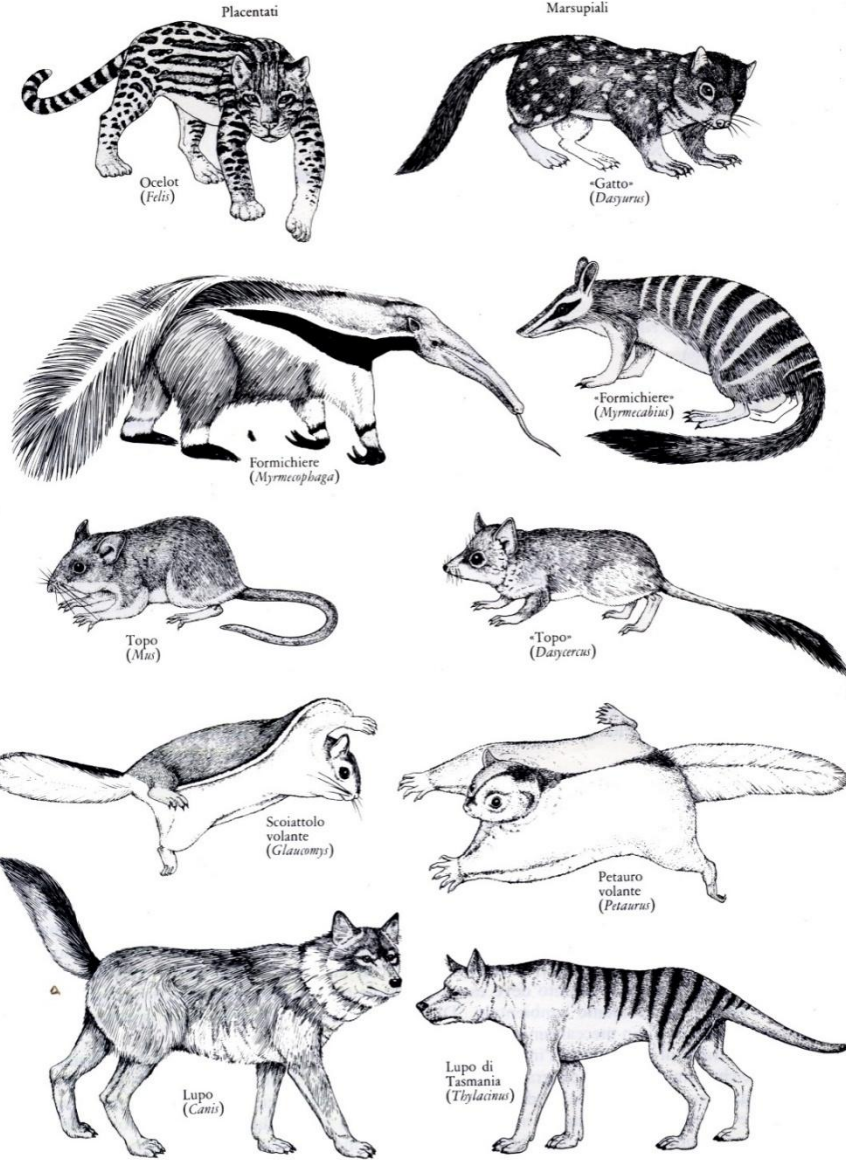
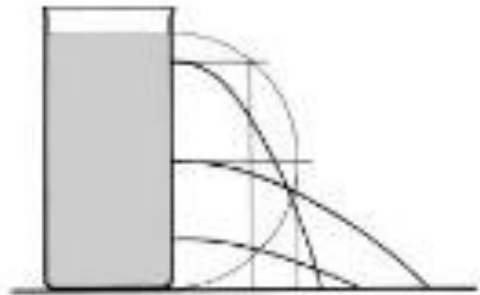
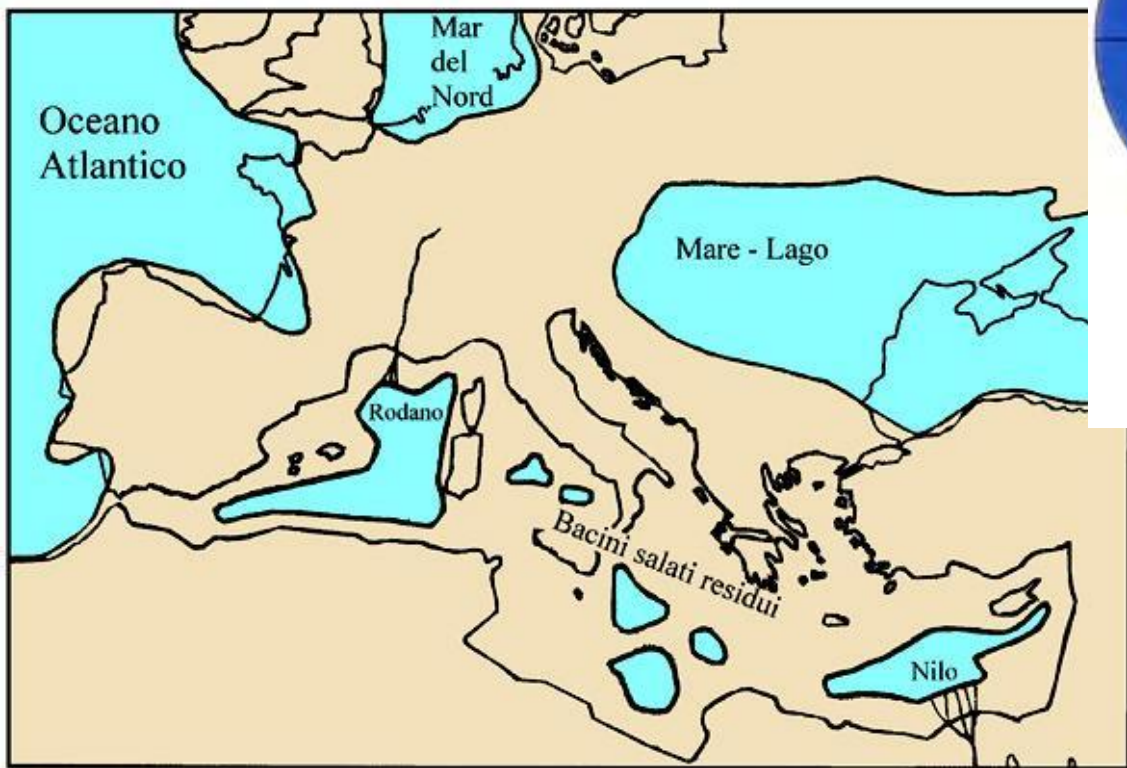


EVOLUZIONE UOMO |

METODO SCIENTIFICO O METODO STORICO ?



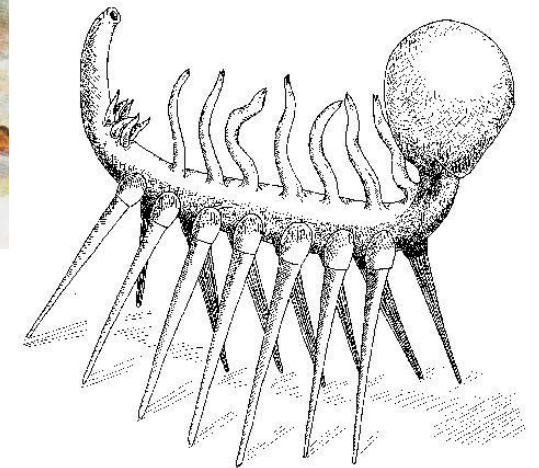
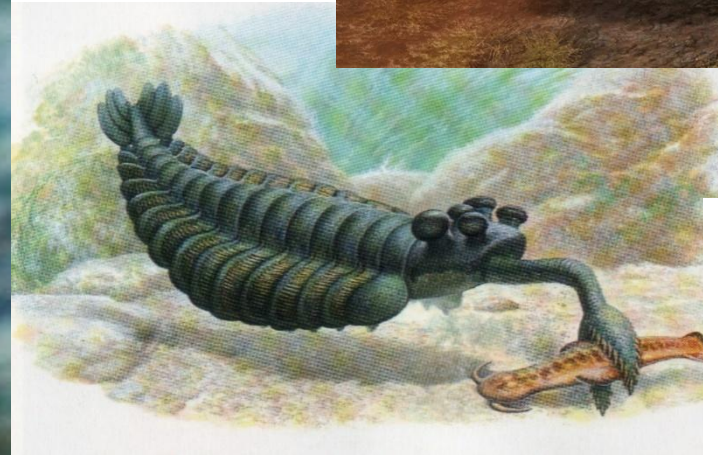
LA TERRA IN TRASFORMAZIONE



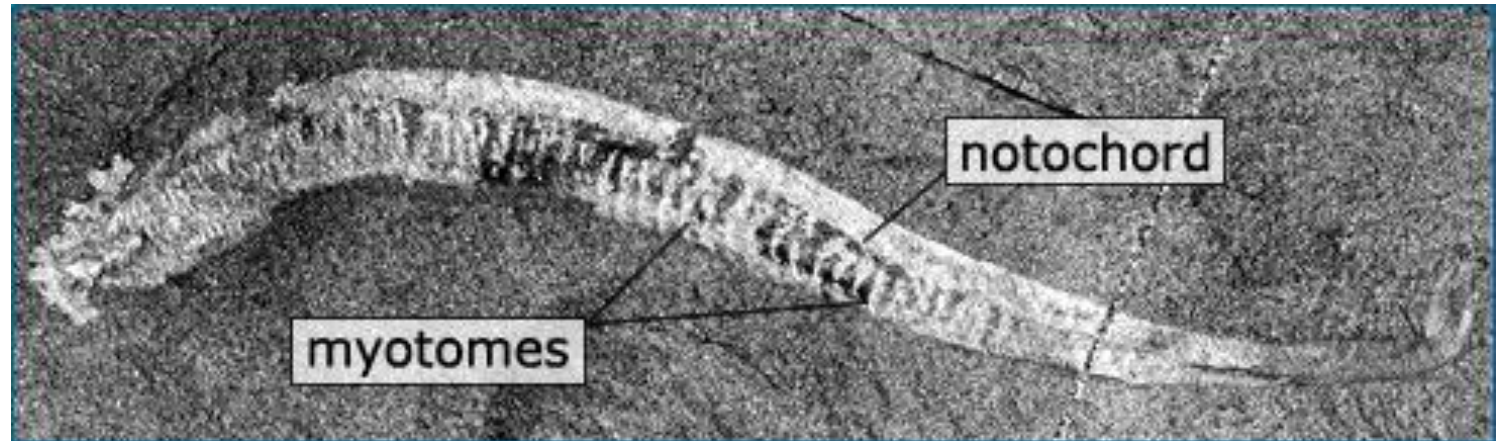
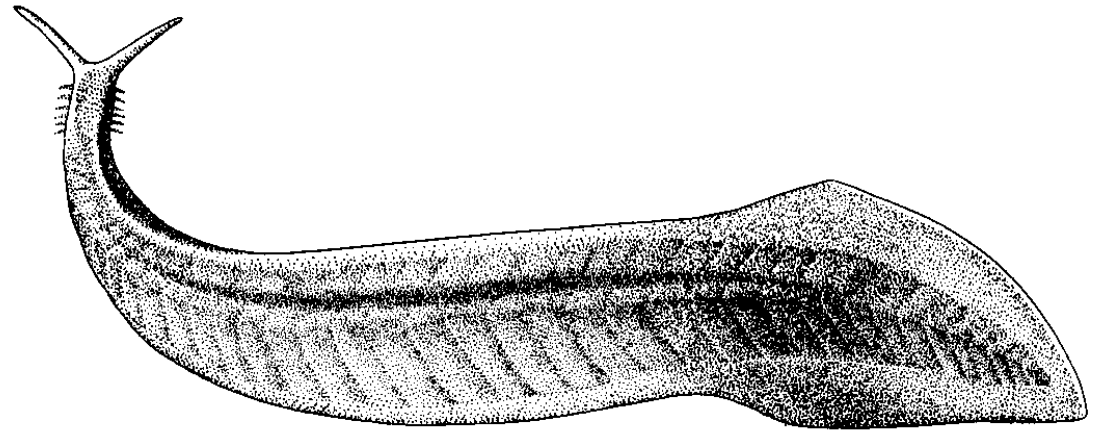
RITORNO AL FUTURO



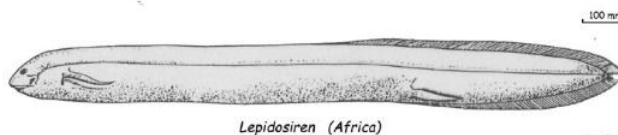
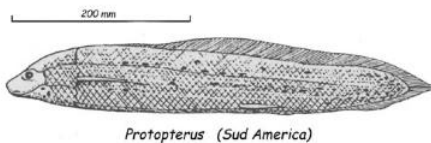
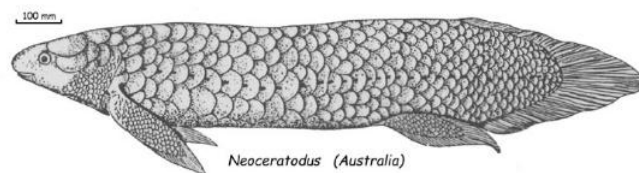
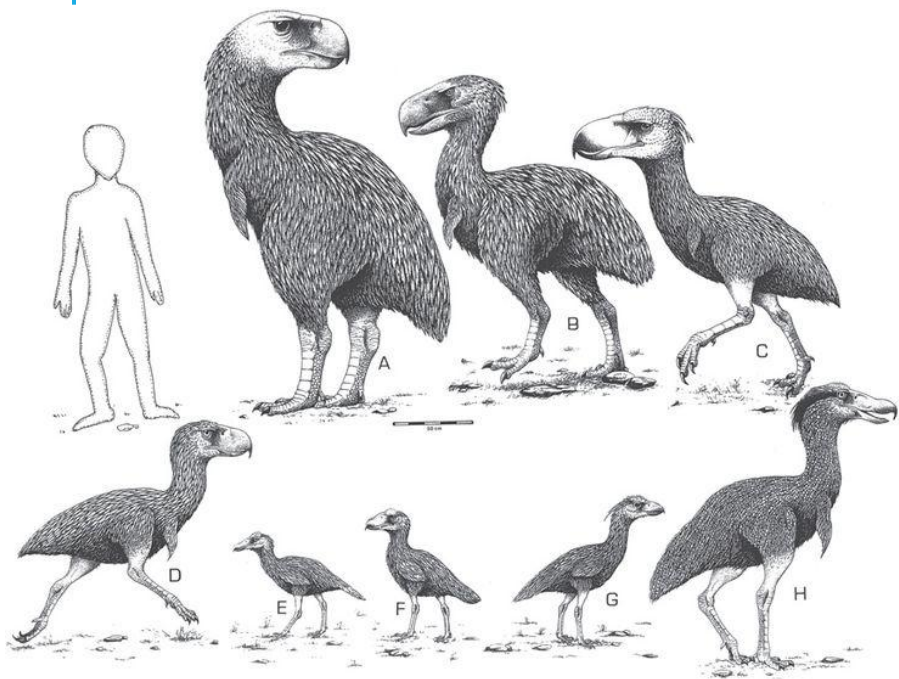
ORIGINE DELLA VITA



PIKAIA GRACILENS



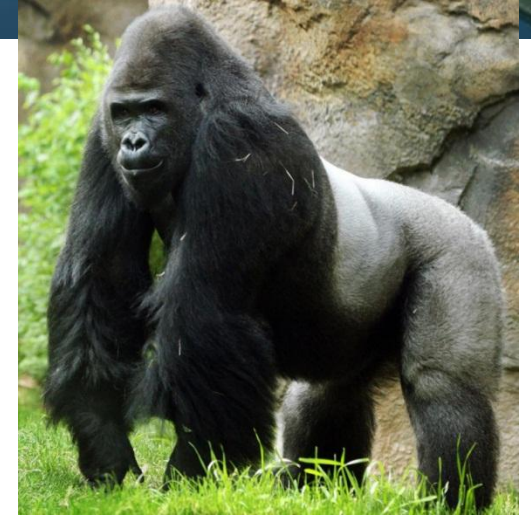
CONTINGENZA



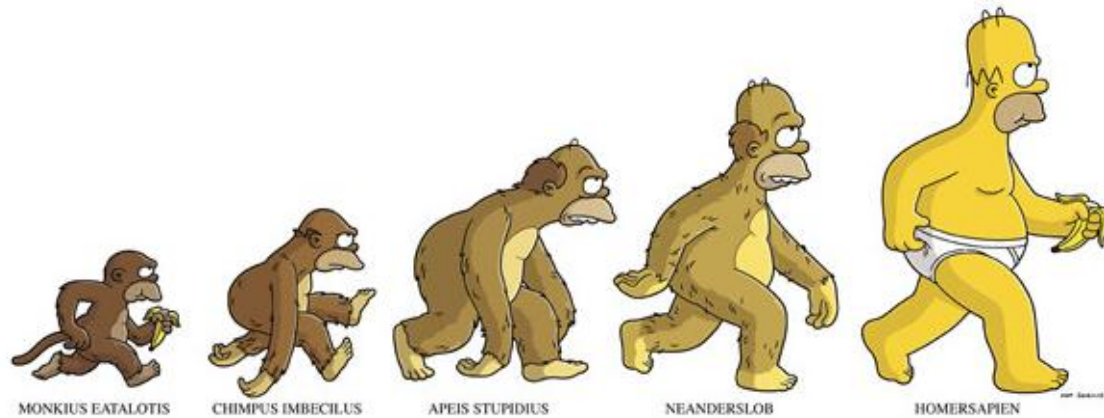
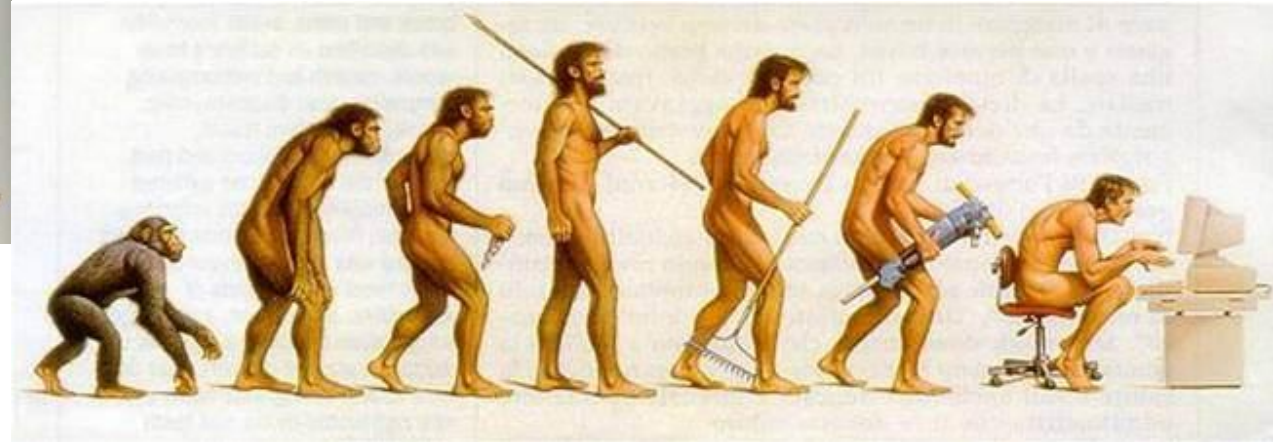
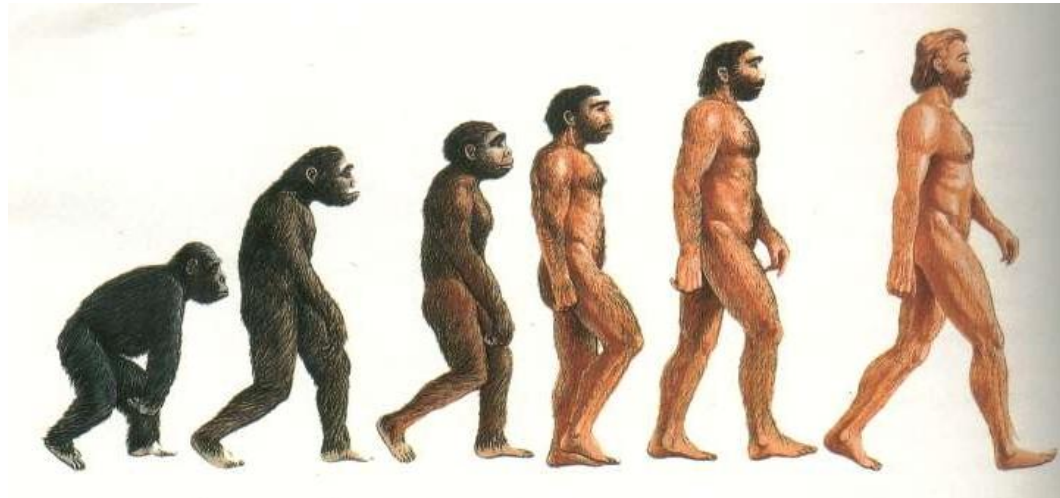
CASO O CONTINGENZA ?



COMPARSA O PROTAGONISTA ?



ICONOGRAFIA DELLA SPERANZA?



MONKIUS EATALOTIS

CHIMPUS IMBECILUS

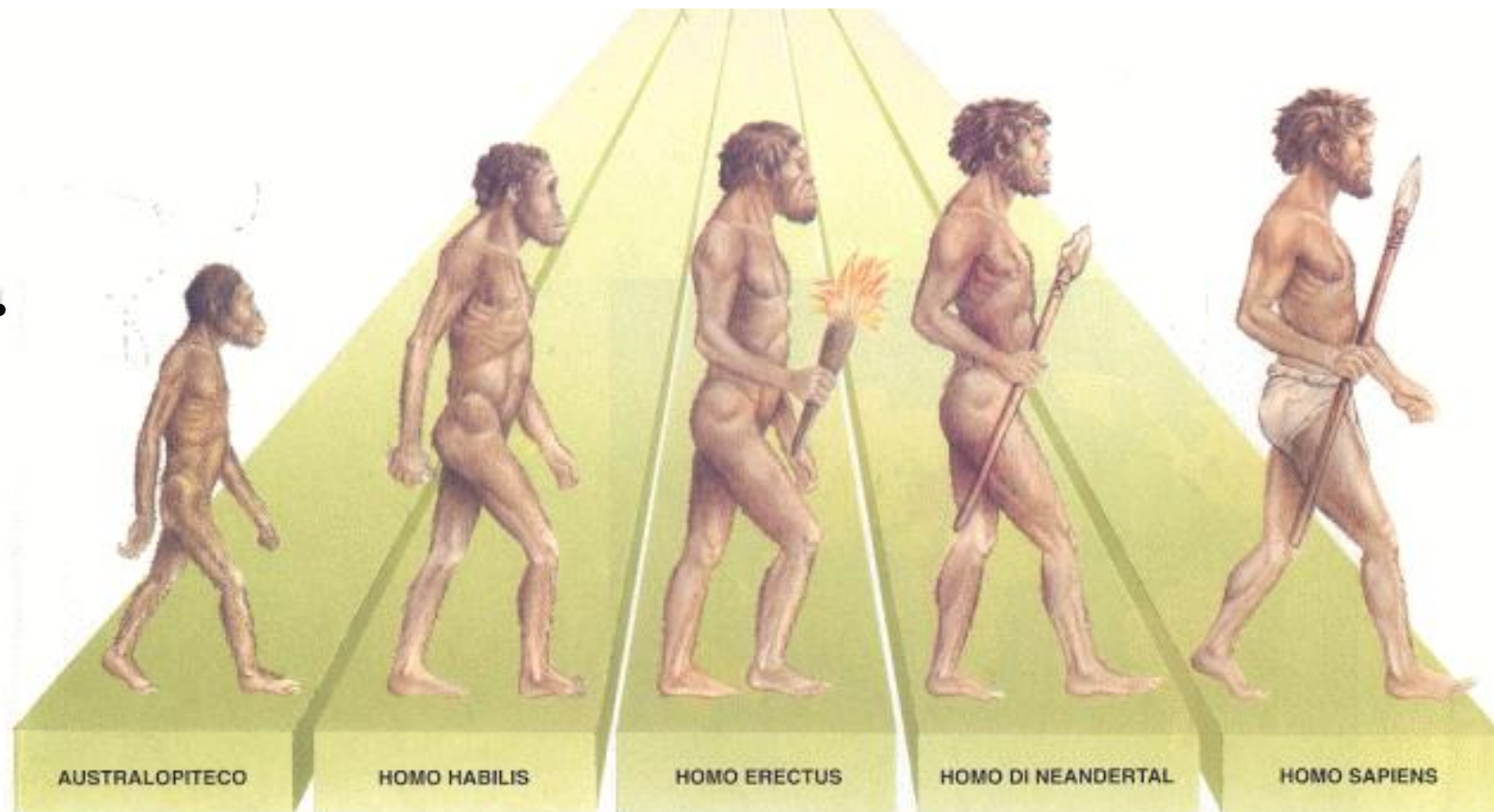
APEIS STUPIDIUS

NEANDERSLOB

HOMERSAPIEN

HOMERSAPIEN

La scala dell'evoluzione...



- OGGI -

3.7 MILIONI
DI ANNI FA

2.2 MILIONI
DI ANNI FA

1 MILIONE
DI ANNI FA

-200.000 ANNI
FA AD OGGI



SCHIMPANZE'



AUSTRALOPITECUS
AFRICANUS



HOMO ABILIS

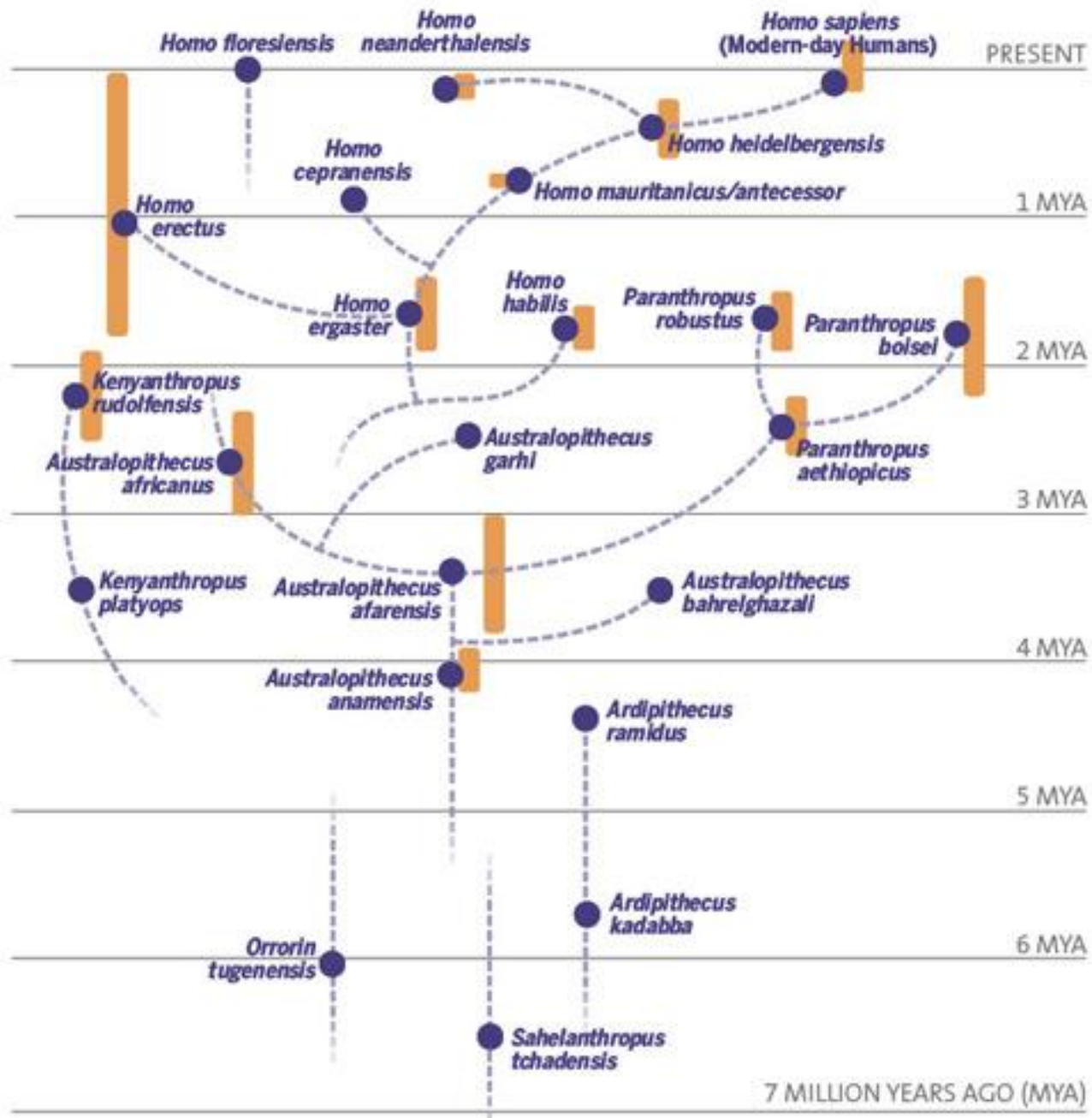


HOMO HERECTUS

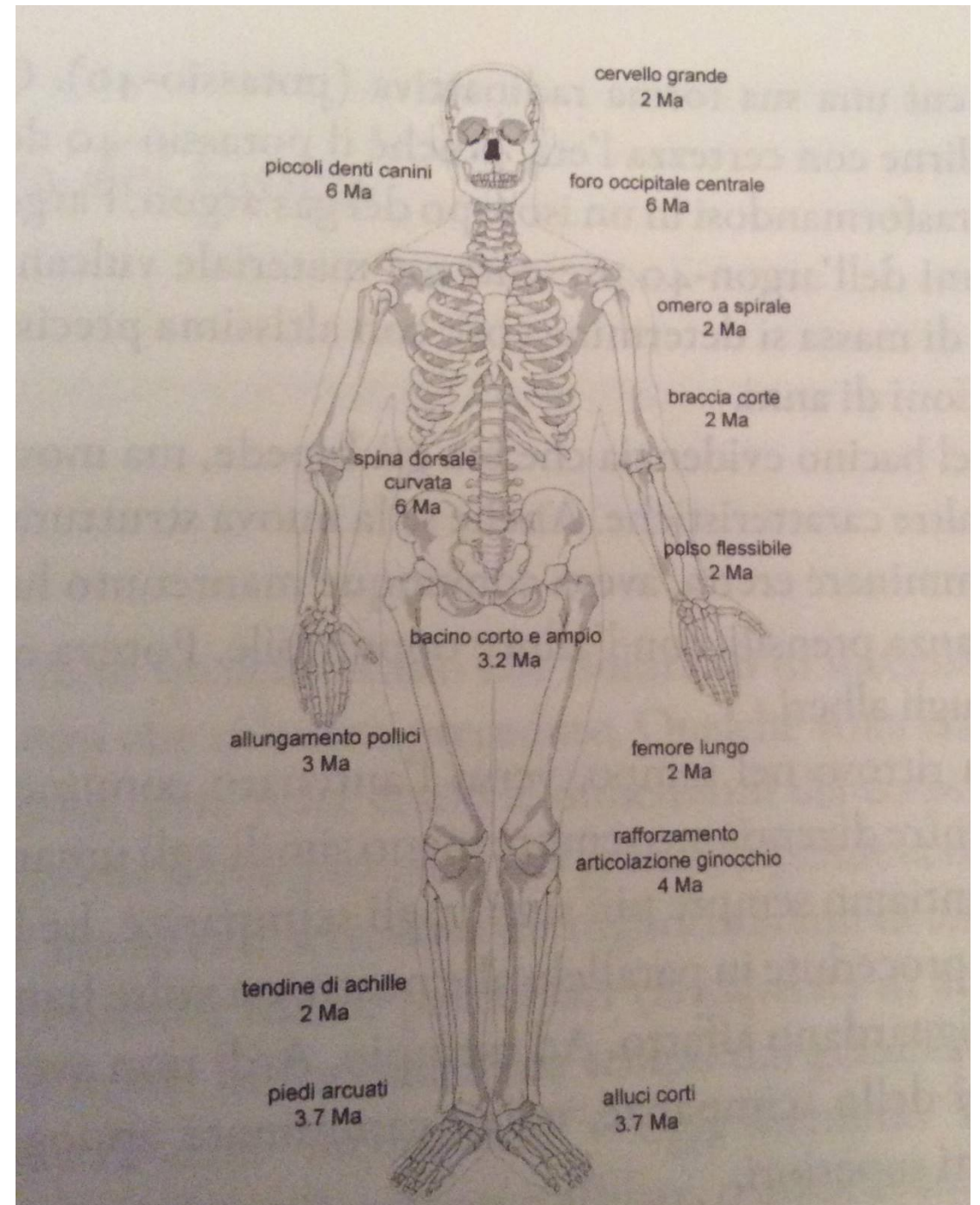


HOMO SAPIENS

Il cespuglio dell'evoluzione



MODIFICHE ANATOMICHE...



SCALA PROGRESSO E RAZZISMO



Apollo Belvedere



Negro



Young chimpanzee



Greek



Creole Negro



Young chimpanzee

OROLOGIO NUCLEARE E OROLOGIO MOLECOLARE

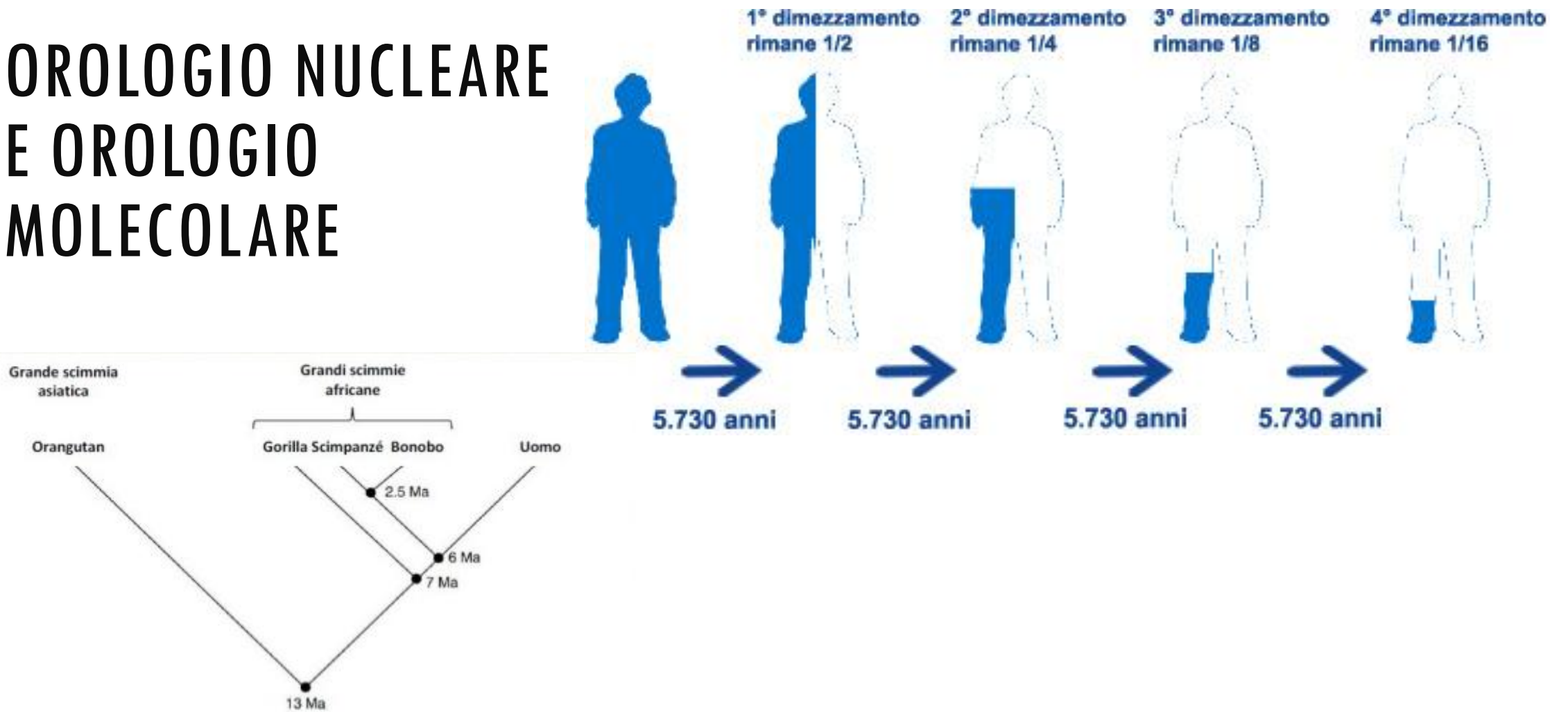
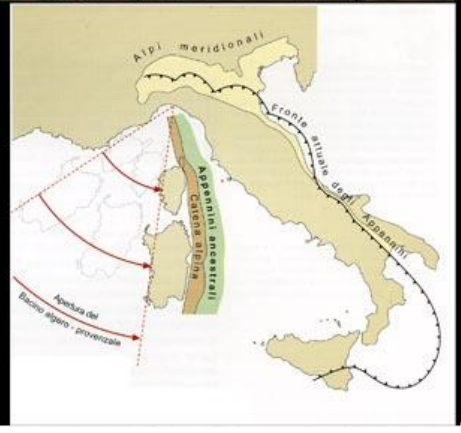
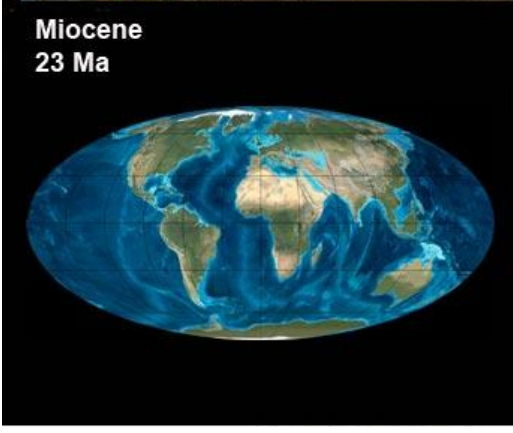
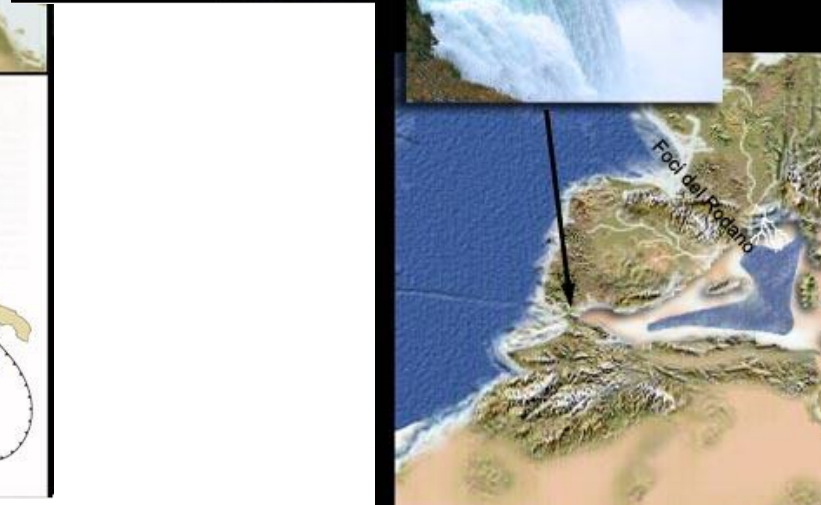
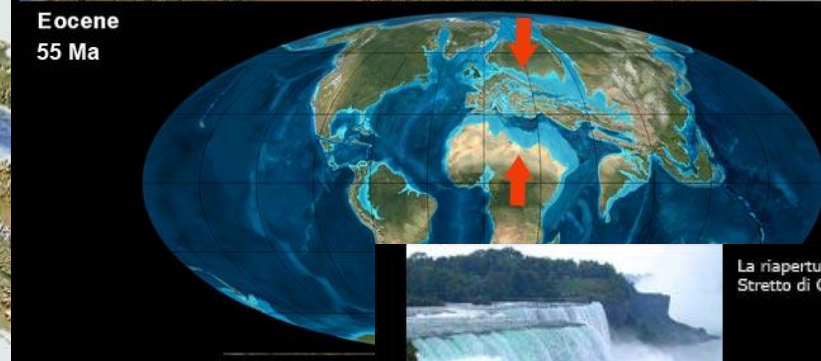


FIGURA 4.3 Relazioni evolutive e date stimate delle divergenze fra le grandi scimmie e l'uomo basate sui dati di DNA. Le datazioni delle divergenze si basano sulle sequenze di DNA nucleare e mitocondriale (Glazko e Nei 2003), eccetto la separazione di scimpanzé e bonobo, basata sui DNA mitocondriale (Gagneux e altri 1999). Questa genealogia mostra che l'uomo e le scimmie africane sono imparentati fra loro più strettamente che con la grande scimmia asiatica, l'orangutan. Ed è anche chiaro che l'uomo è un parente un po' più stretto dello scimpanzé e del bonobo che non del gorilla.

CONTINGENZE GEOLOGICHE



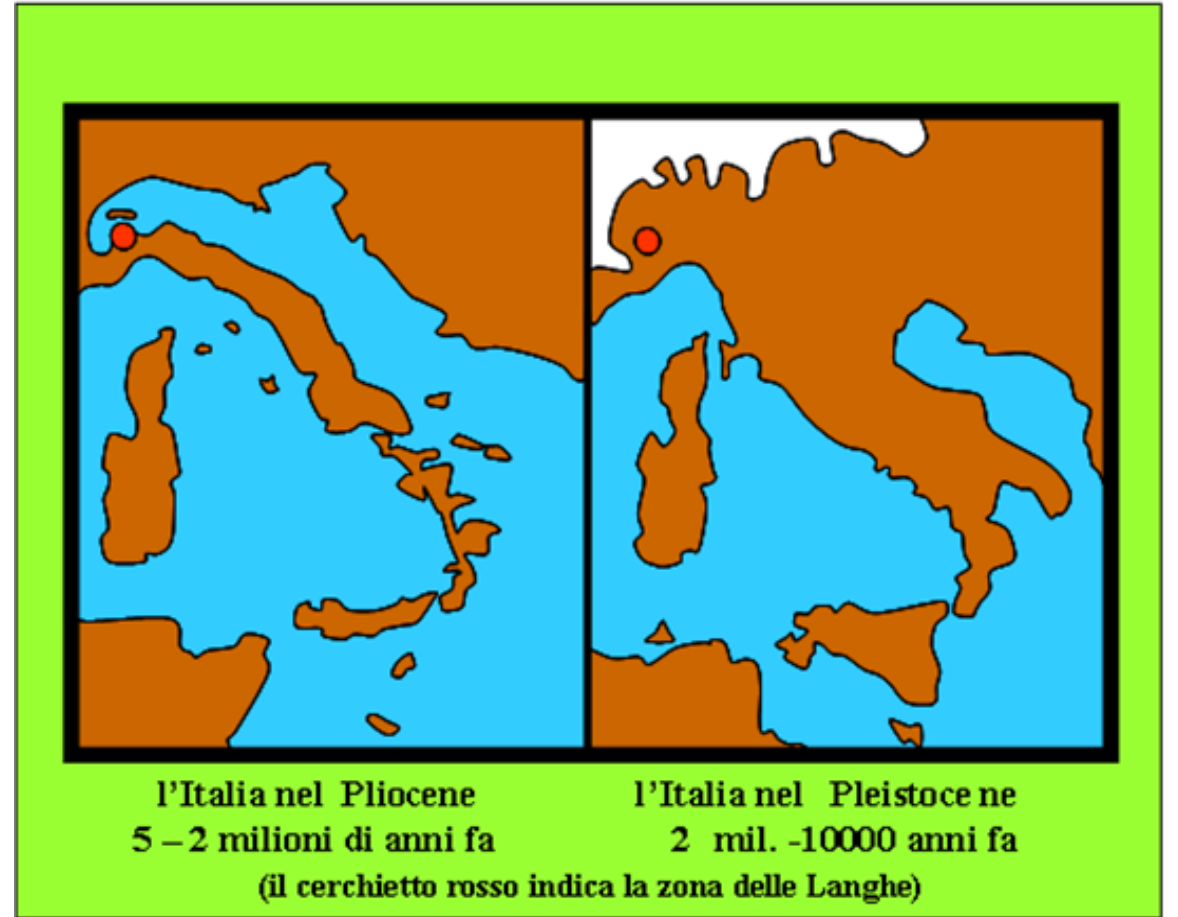
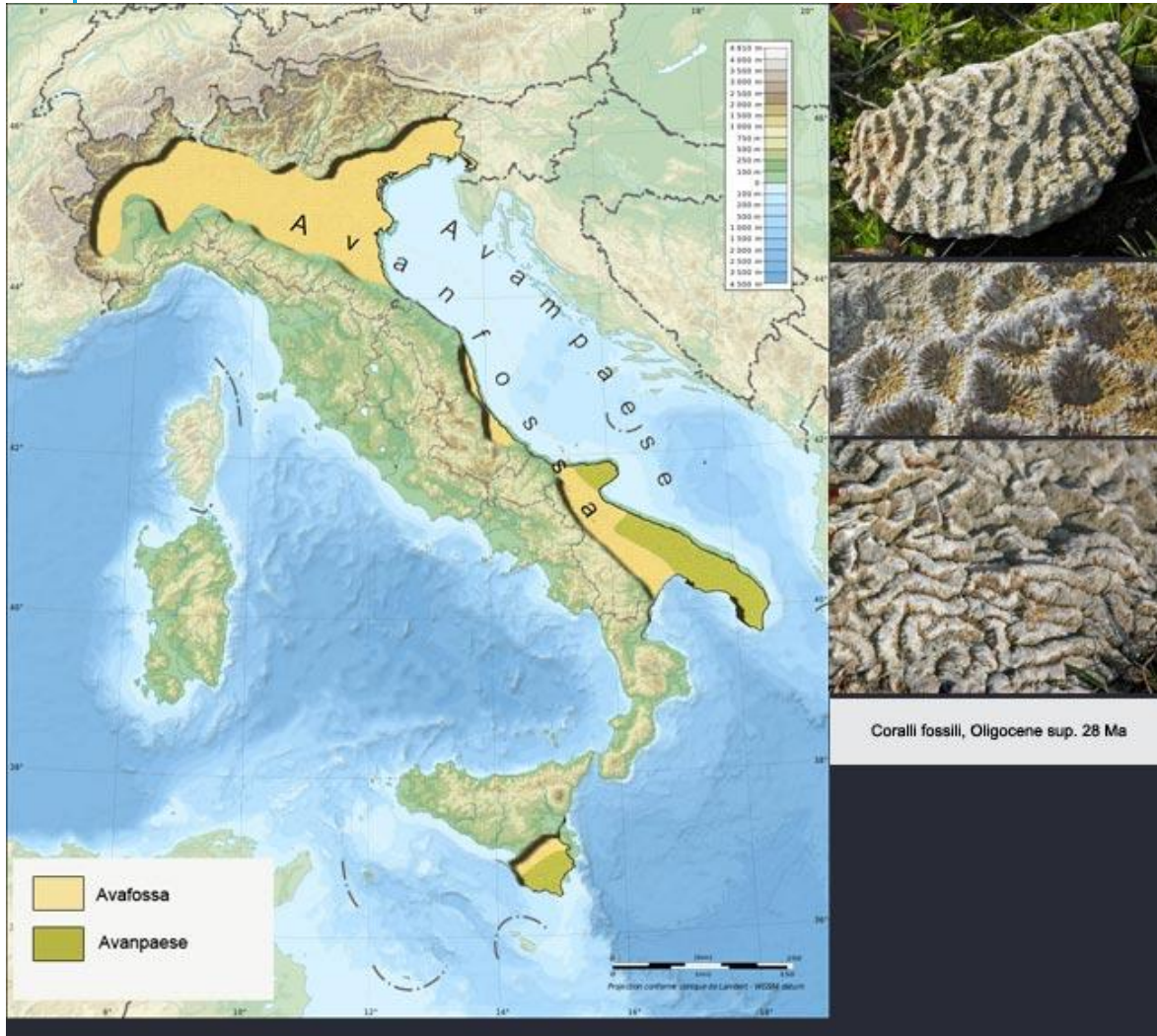
La riapertura dello Stretto di Gibilterra.



Il disseccamento del Mediterraneo: una distesa di sale e terra.

Messiniano 7 Ma

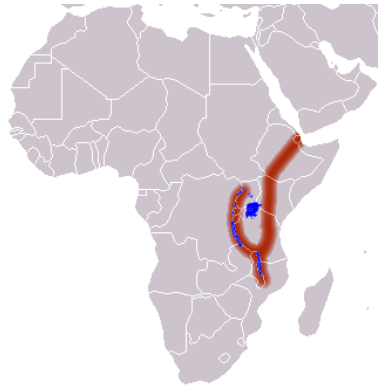
ITALIA



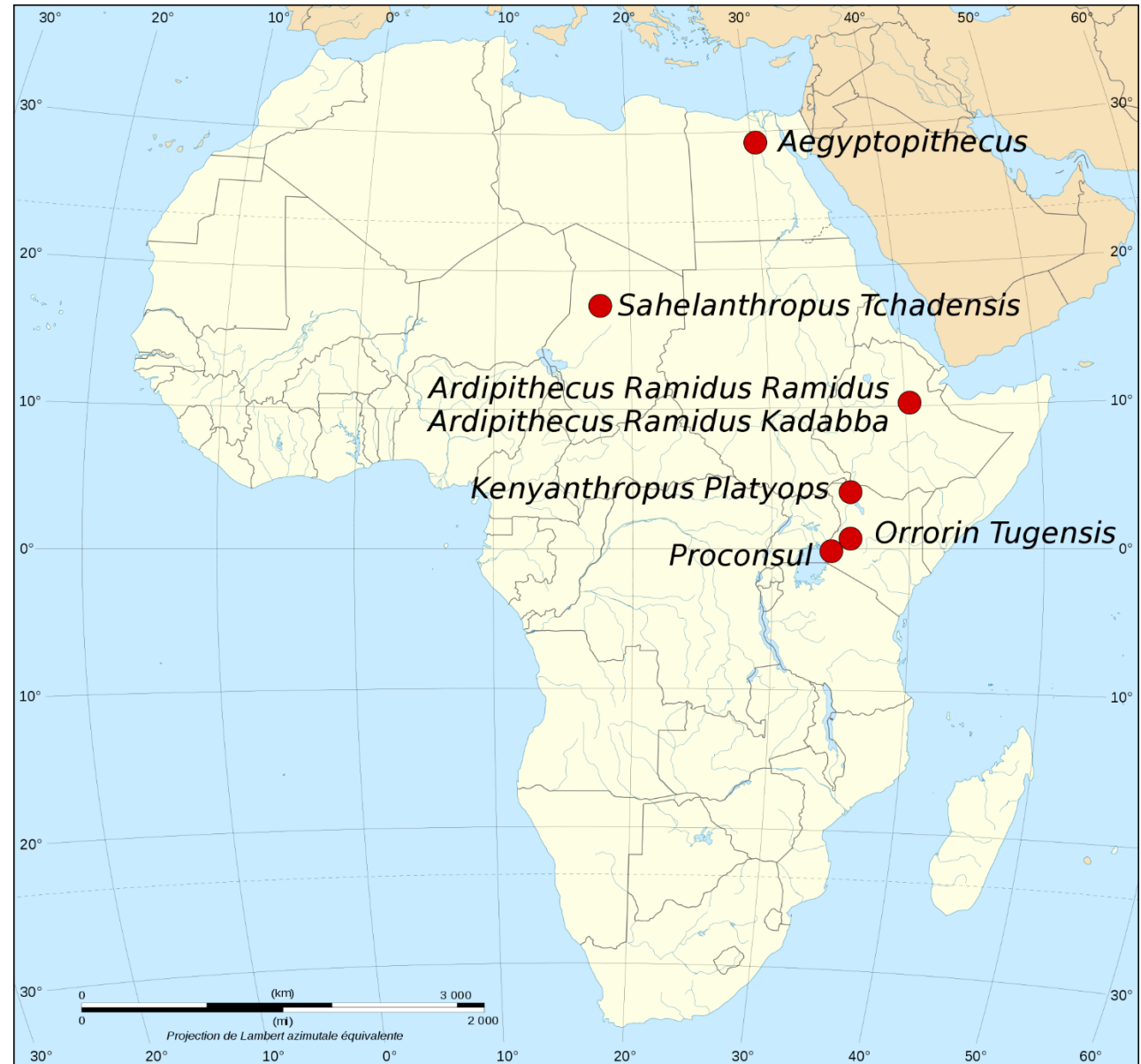
PLESIADAPIS E ARCHICEBUS



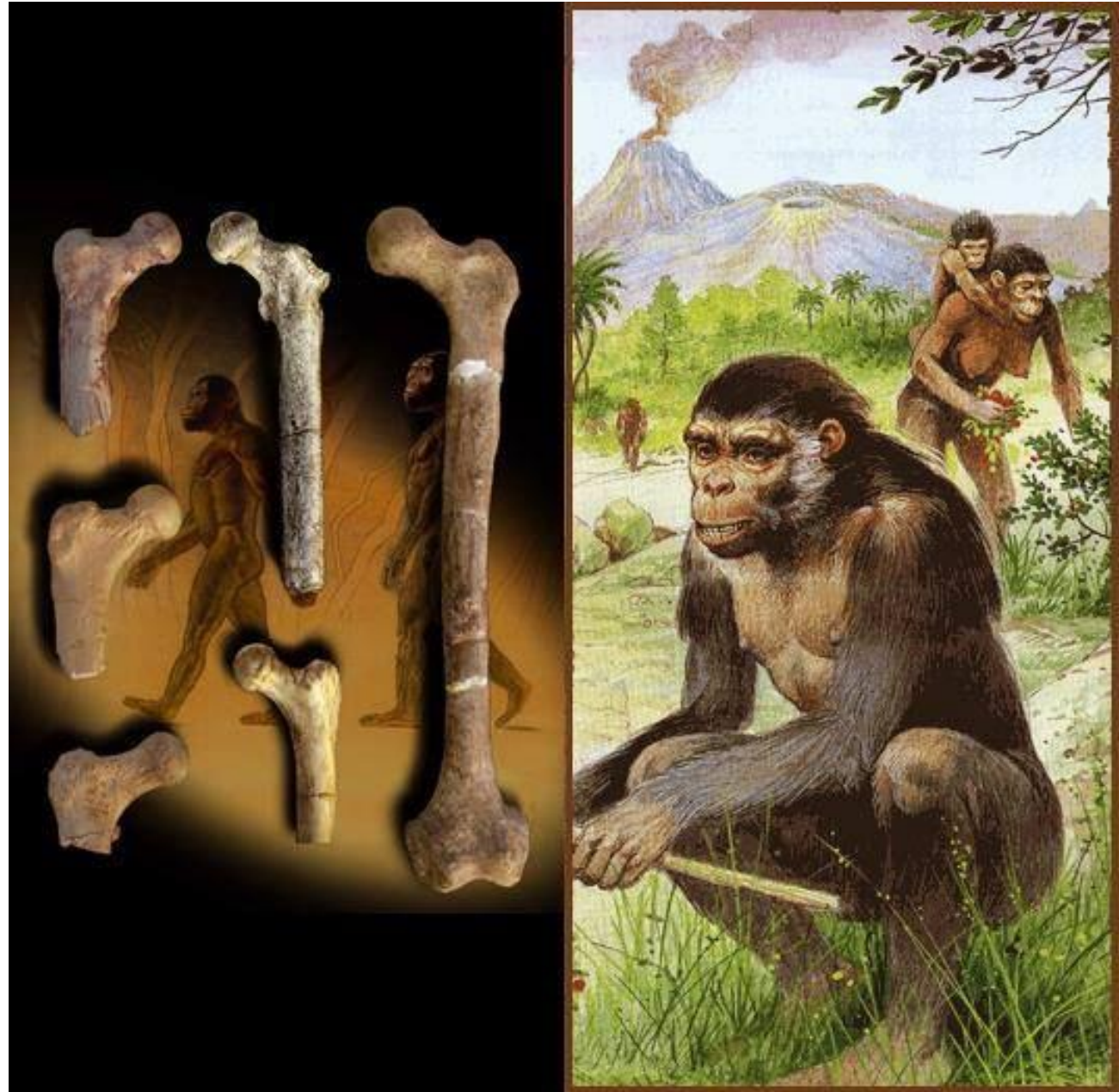
RIFT VALLEY



PRIMI OMININI...



ORRORIN




ARDIPITHECUS

ARDIPITHECUS RAMIDUS | WHAT SCIENTISTS LEARNED

The discovery of a set of fossilized bones in 1994 set off 15 years of research into a new species some 4.4 million years old. The work on "Ardi" culminated on Oct. 2 with a series of papers published in the journal *Science*. What the research team has uncovered:



 Skeletal fossils recovered by researchers.

HANDS

Ardi was a careful climber. Her wrists were flexible like ours, not stiff like those of chimpanzees and gorillas, which often support their heavy upper bodies on their knuckles. Ardi could easily cling to trees with her hands, but lacked the powerful upper torso and stiff wrists needed to swing from branch to branch as easily as modern apes.

FEET

Ardi had a relatively stiff outer foot, more like ours than an ape's. She also had a large toe that's useful for gripping branches. This suggests a transition between tree climbing and upright walking.

Sources: *Science*, skeletal structure redrawn from sketch by J.H. Mattenies



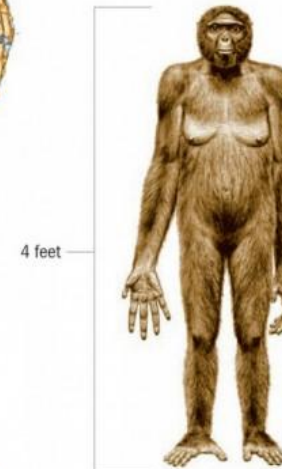
SKULL

Ardi's teeth are more like ours than like a modern ape's. Like us, she had small canine teeth, as did males of her species. (The recovered skull was compacted.)



PELVIS

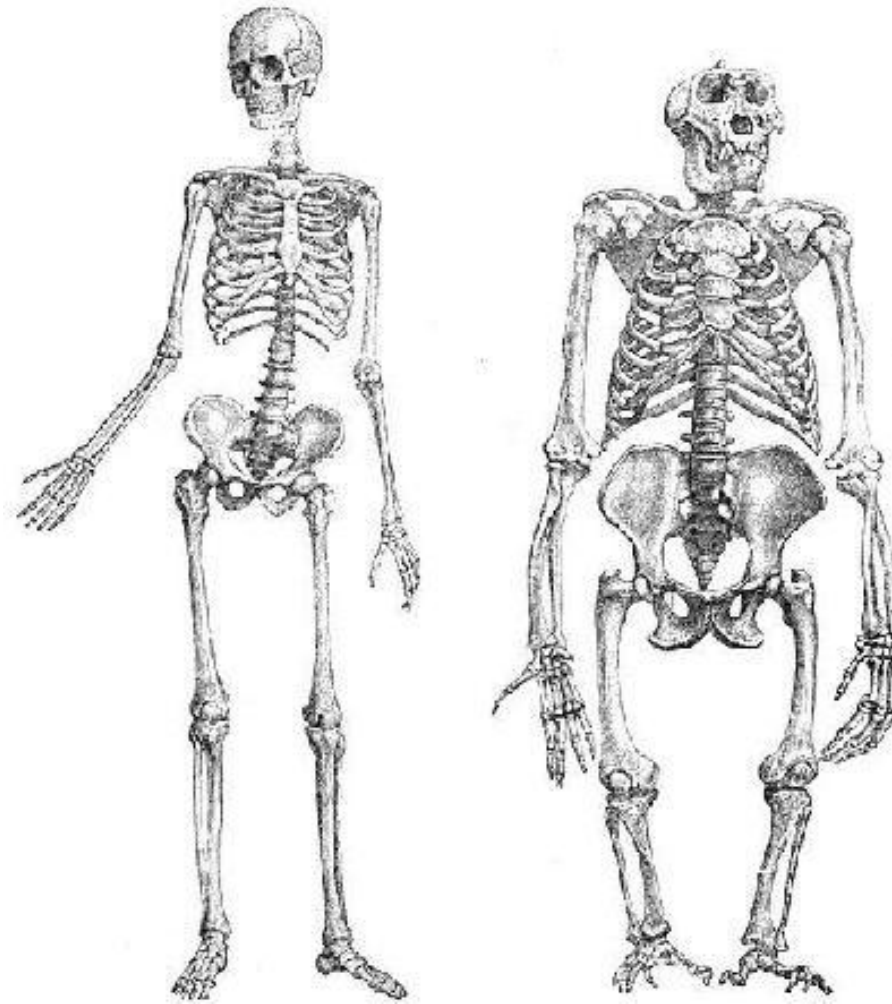
Ardi could walk upright and also climb trees. The hipbone includes structures unique to hominids like us, but not found in modern apes.



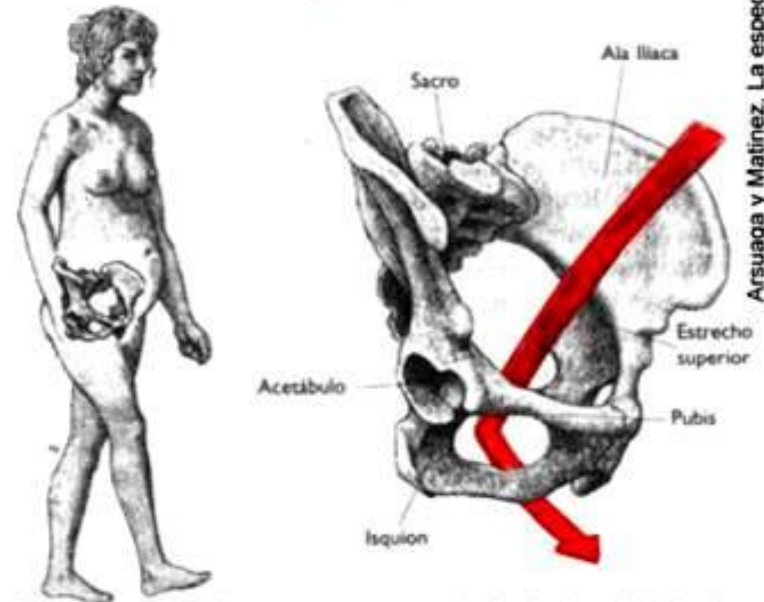
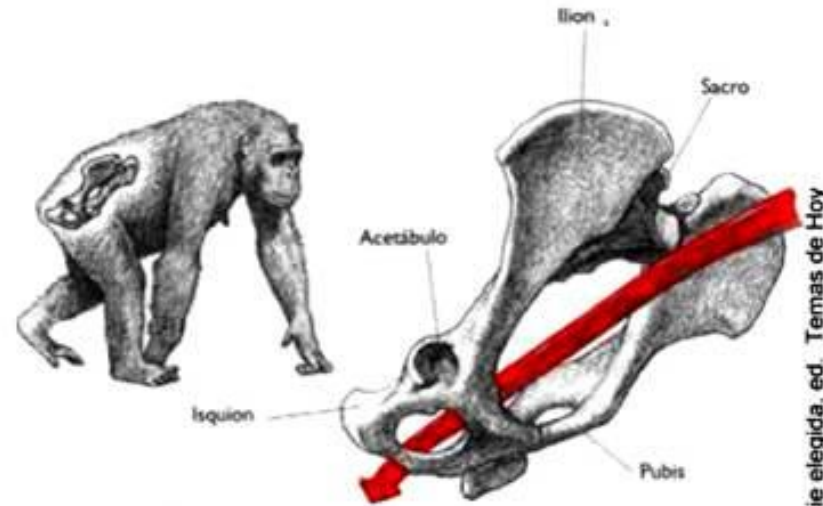
SAHELANTHROPUS



Bipedismo...



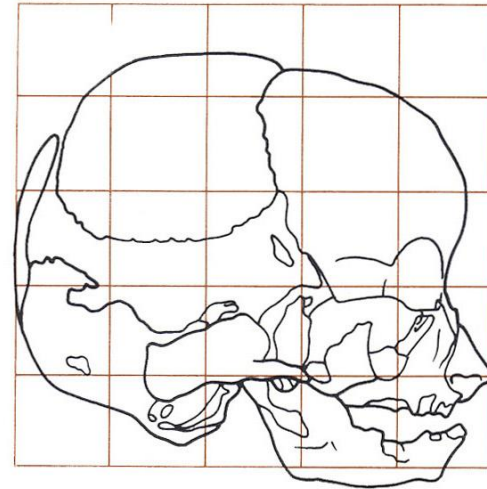
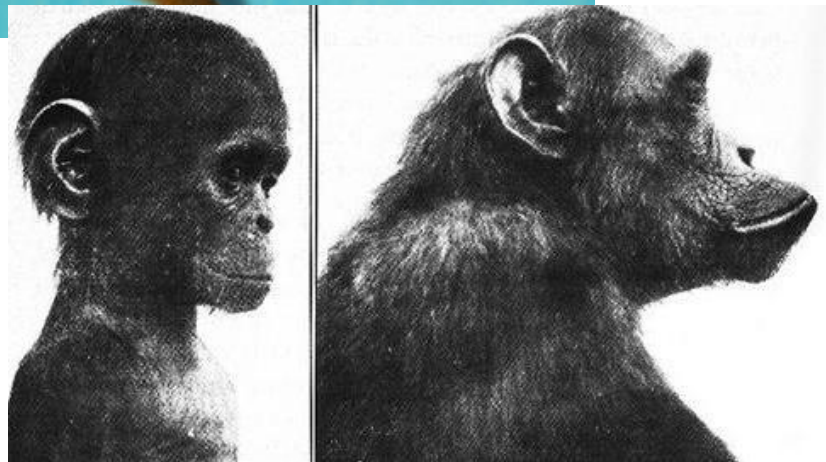
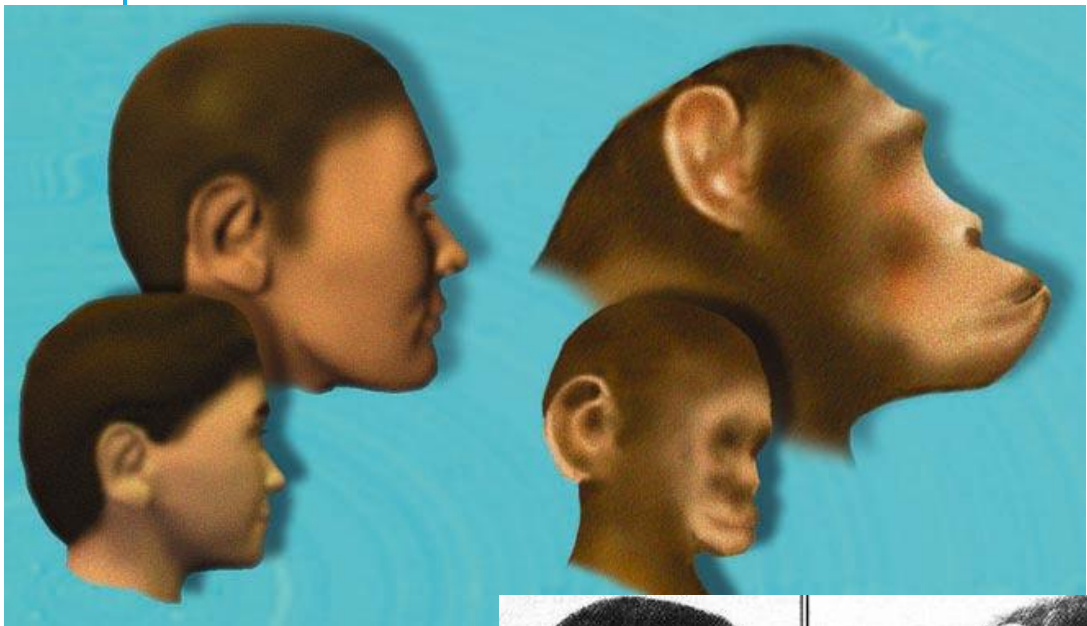
...E I SUOI PROBLEMI



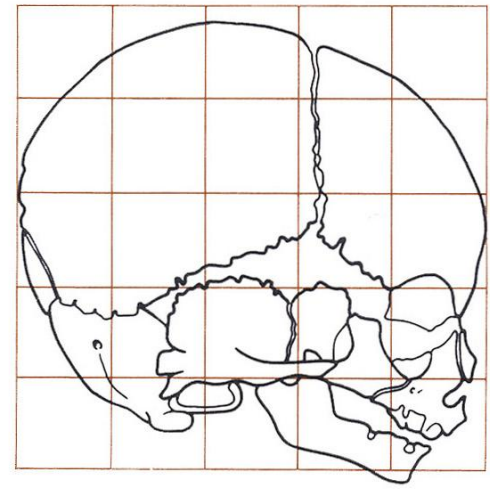
Morfología pélvica en una chimpance y en una mujer. La flecha roja indica la trayectoria del feto en el momento del parto. ¡ Que difícil es para nuestra especie!

Arsuaga y Matinez, La especie elegida, ed. Temas de Hoy

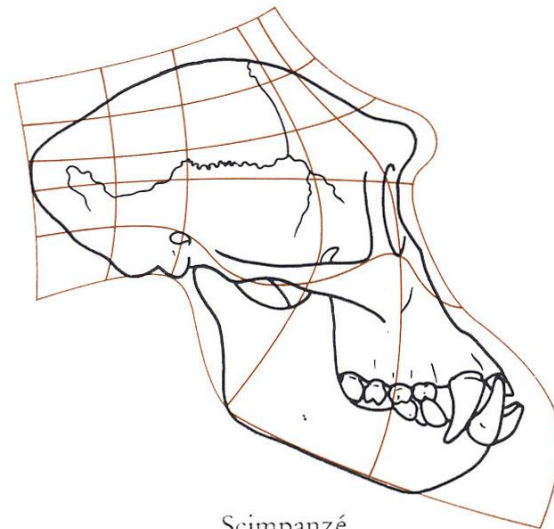
NEOTENIA UMANA...



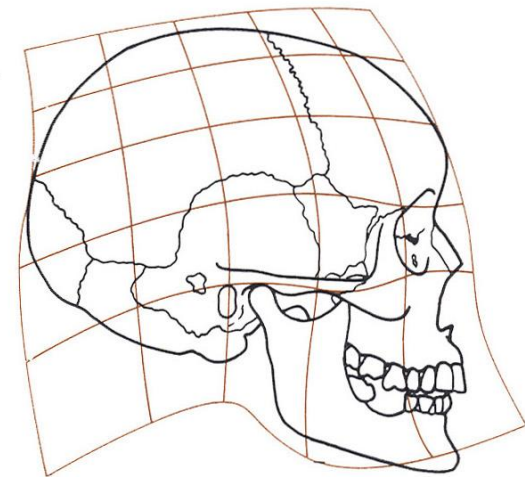
Feto di
scimpanzé



Feto umano



Scimpanzé
adulto



Uomo adulto

SVILUPPO CERVELLO...



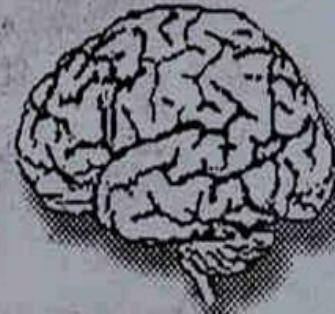
Alla nascita

Le fibre nervose non sono rivestite di mielina (una sostanza isolante), il neonato non è in grado di controllare i propri movimenti ma reagisce ai rumori, segue con gli occhi oggetti in movimento



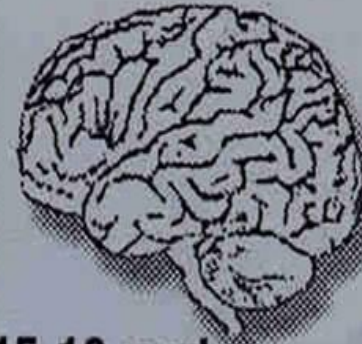
4 mesi-1 anno

Il cervello aumenta di volume, le fibre nervose vengono rivestite di mielina: maturano prima le fibre che servono per tenere eretta la testa, poi il tronco, infine le gambe inferiori. Il lattante si prepara a camminare



2-5 anni

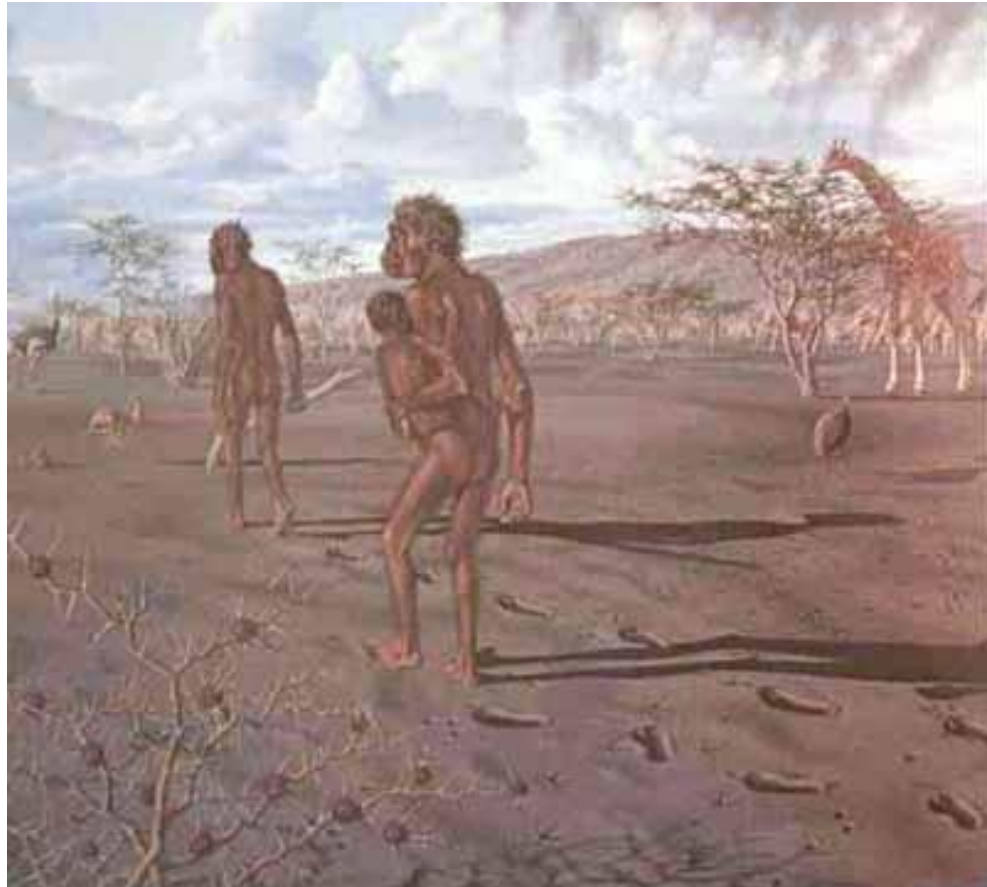
Maturano i centri del linguaggio: in seguito il bambino parla, è in grado di leggere, scrive. I due emisferi sono associati tra di loro da un crescente numero di fibre che passano attraverso il corpo calloso



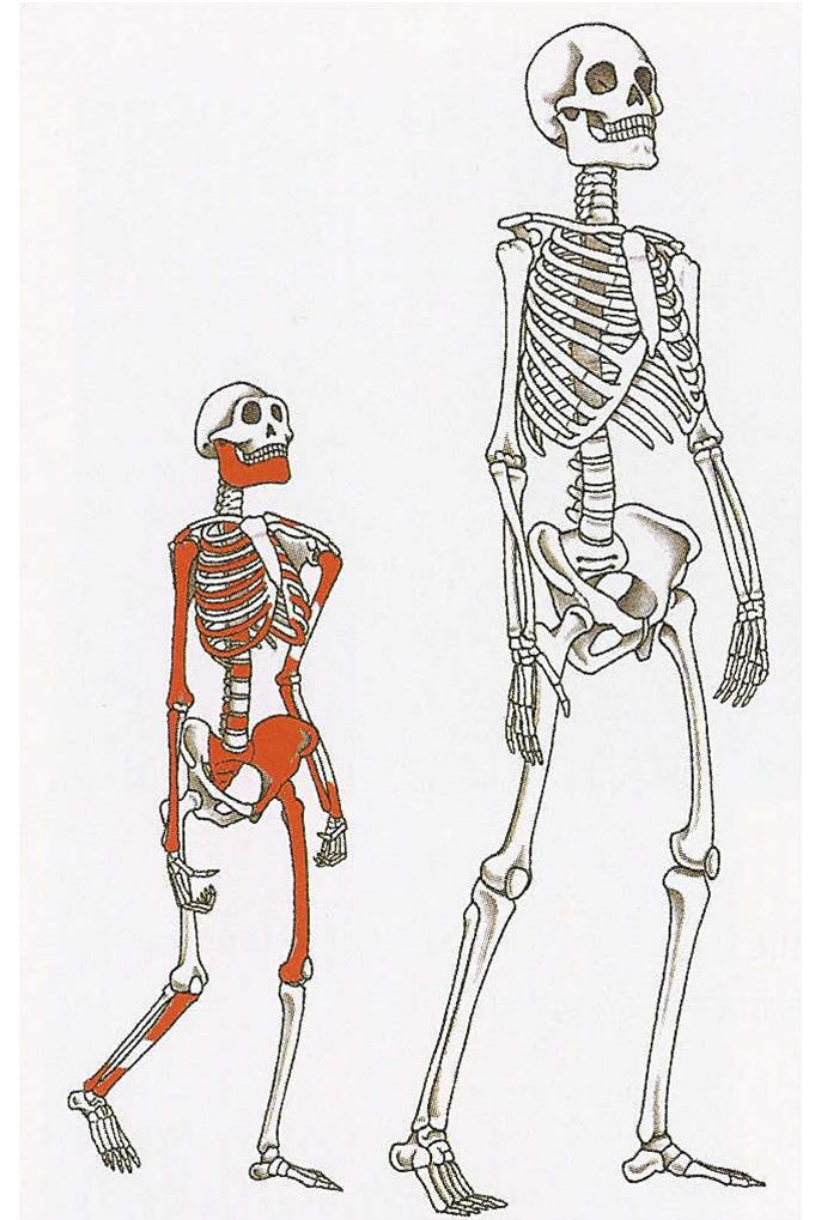
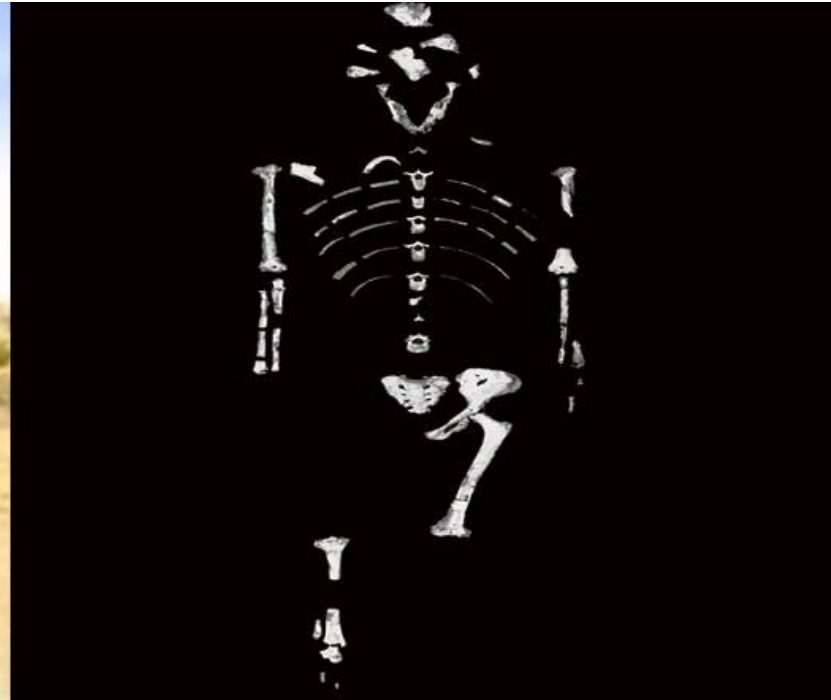
15-16 anni

Il cervello ha raggiunto un potenziale più o meno simile a quello di un adulto ma gruppi di cellule nervose che formano la cosiddetta «sostanza grigia» maturano fino a 20 anni ed oltre

ORME DI LAETOLI



AUSTRALOPITHECUS: LUCY



PARANTHROPUS E HOMO

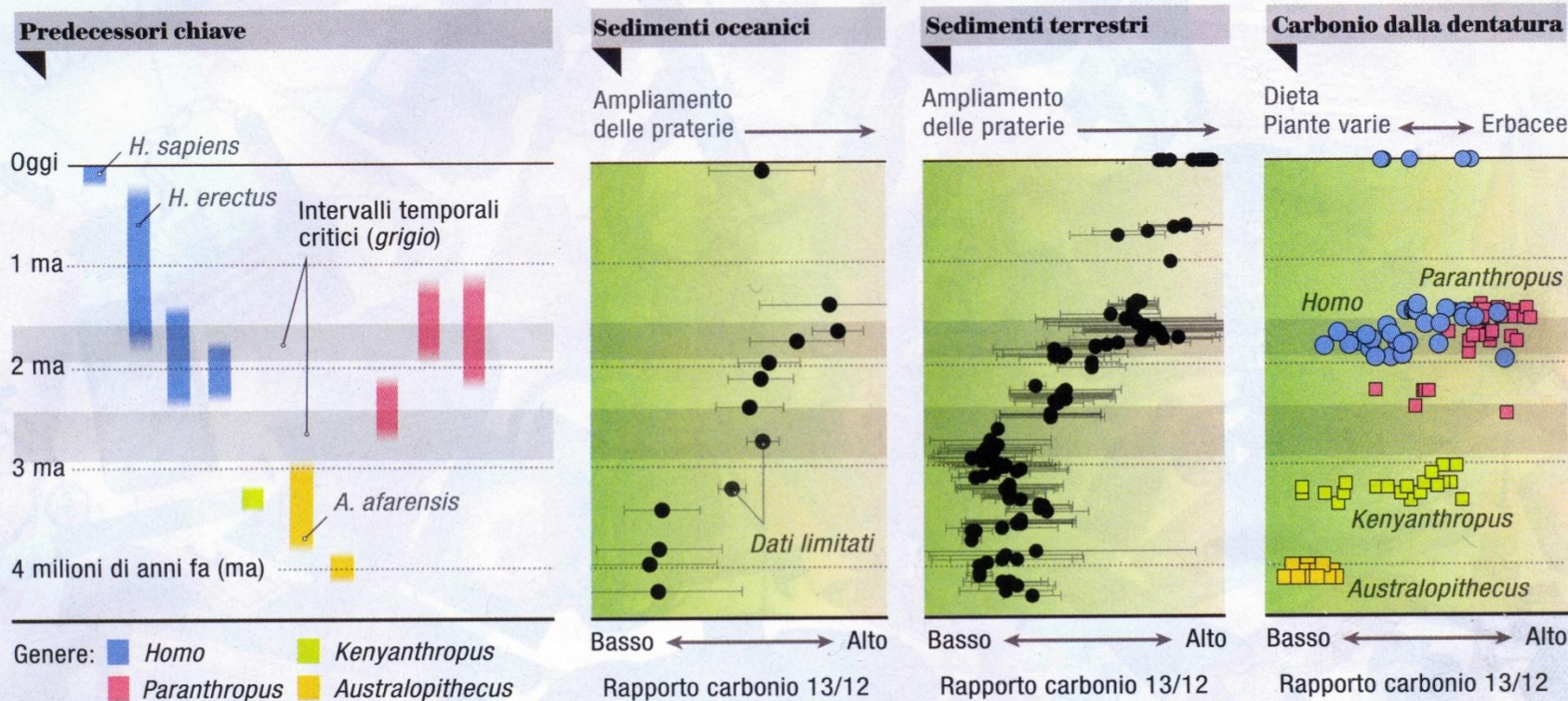


CONTINGENZE CLIMATICHE

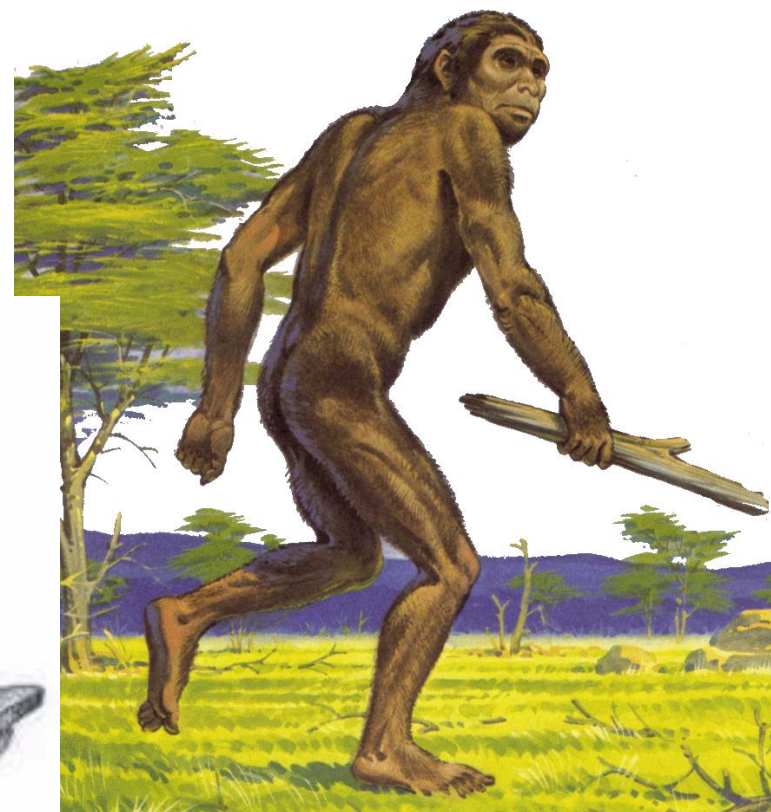
Svolte evolutive

Sono due i momenti nella nostra storia evolutiva che mostrano un'interessante relazione tra fluttuazioni climatiche e comparsa ed estinzione di alcuni importanti membri del nostro albero genealogico. A partire da 3 milioni di anni fa, la specie *Australopithecus afarensis* scomparve e apparvero i gruppi *Paranthropus* e *Homo* (il nostro genere). Durante quel periodo le modificazioni nei rapporti degli isotopi di carbonio presenti nei sedimenti terrestri e oceanici mostrano la rapida espansione delle praterie e la contrazione dei più umidi territori forestali.

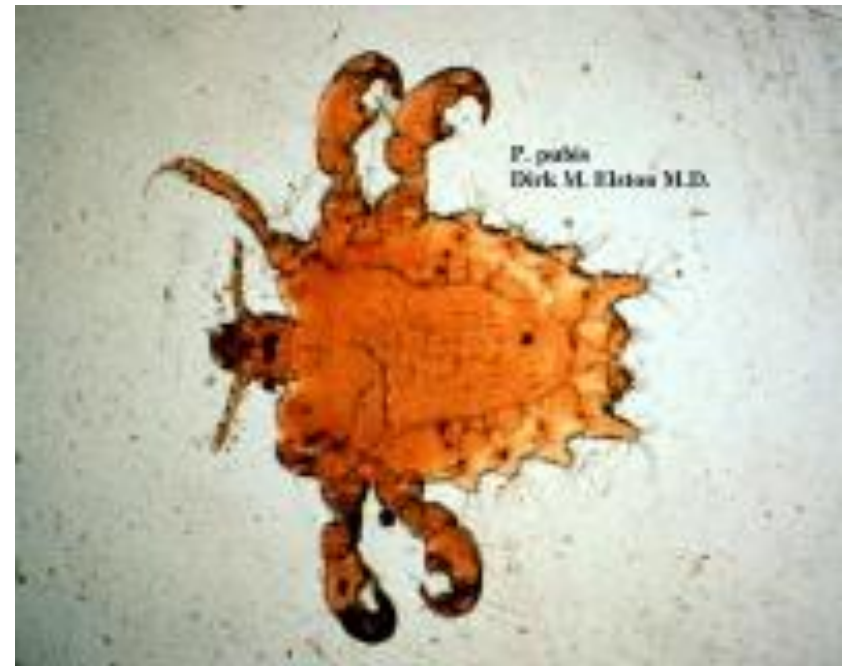
A partire da 2 milioni di anni fa comparve *Homo erectus*, uno dei nostri diretti antenati, che migrò fuori dai territori africani. Ancora una volta le prove del carbonio mostrano che le praterie stavano avendo una nuova esplosione. Tuttavia l'analisi del carbonio nei denti di *H. erectus* indica il consumo di una dieta variegata e la capacità di trovare cibo da diverse fonti anche quando le praterie si ingrandiscono. I denti di *Paranthropus*, invece, mostrano che questo gruppo (come un precedente antenato scomparso, *Kenyanthropus*) limitava la propria alimentazione ai territori erbosi circostanti.



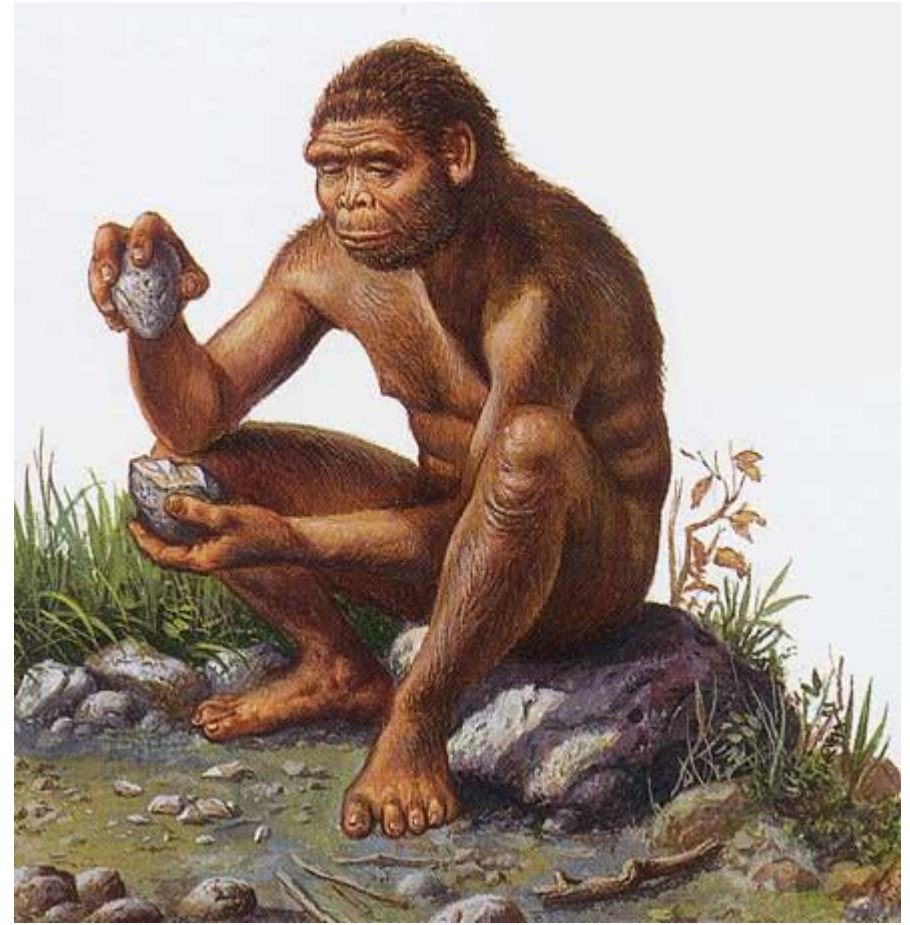
SCIMMIA NUDA...



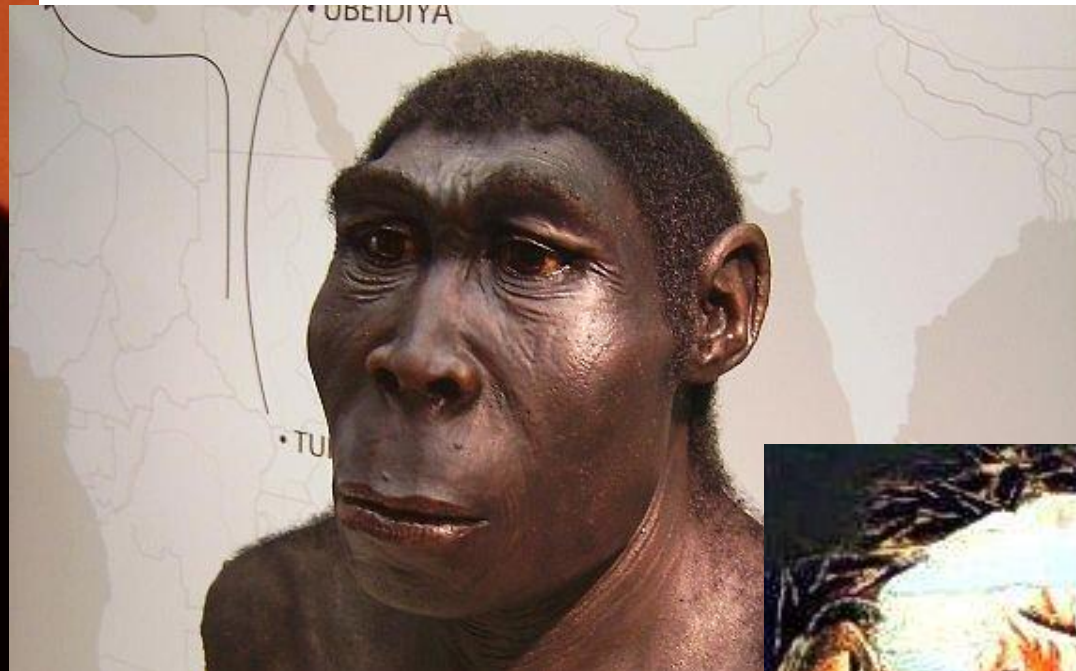
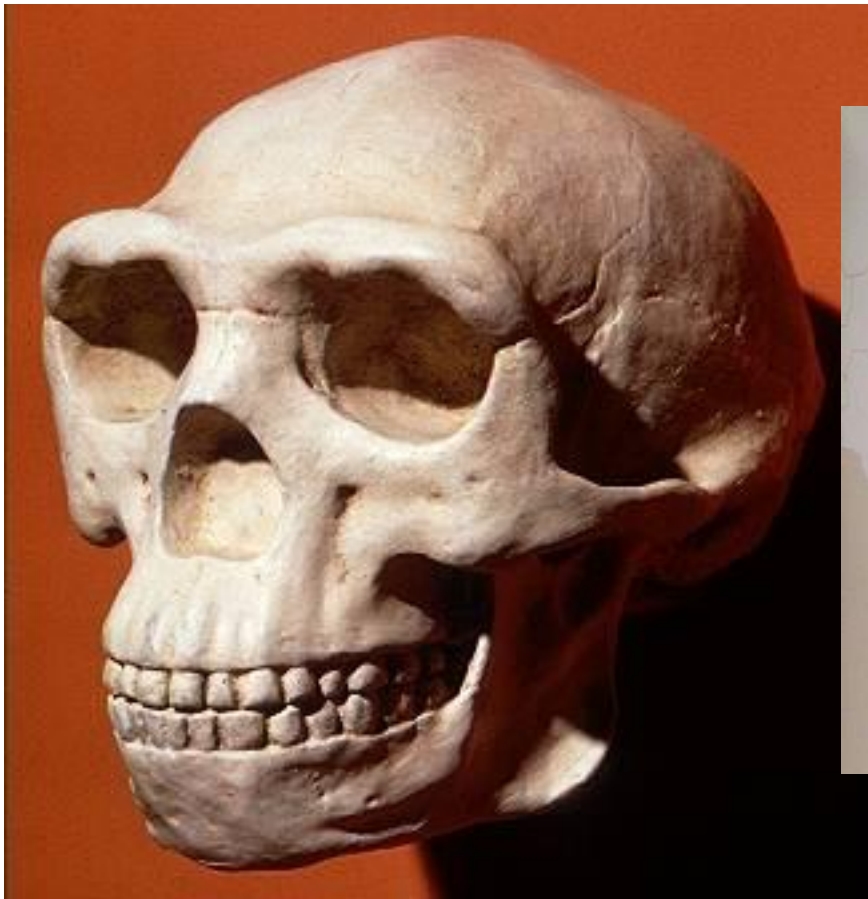
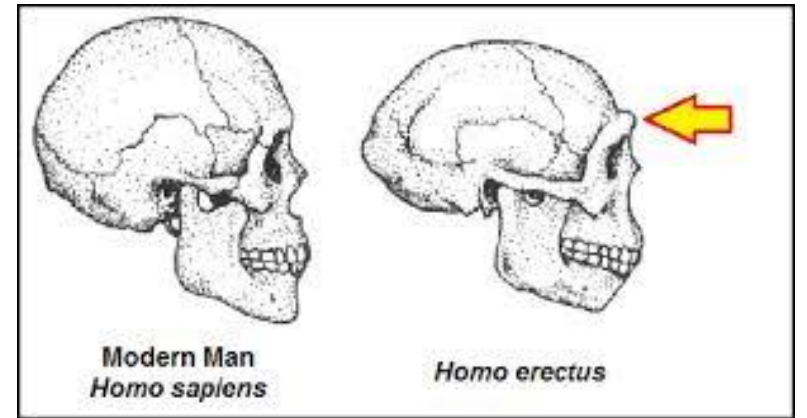
ANIMALI DA COMPAGNIA...



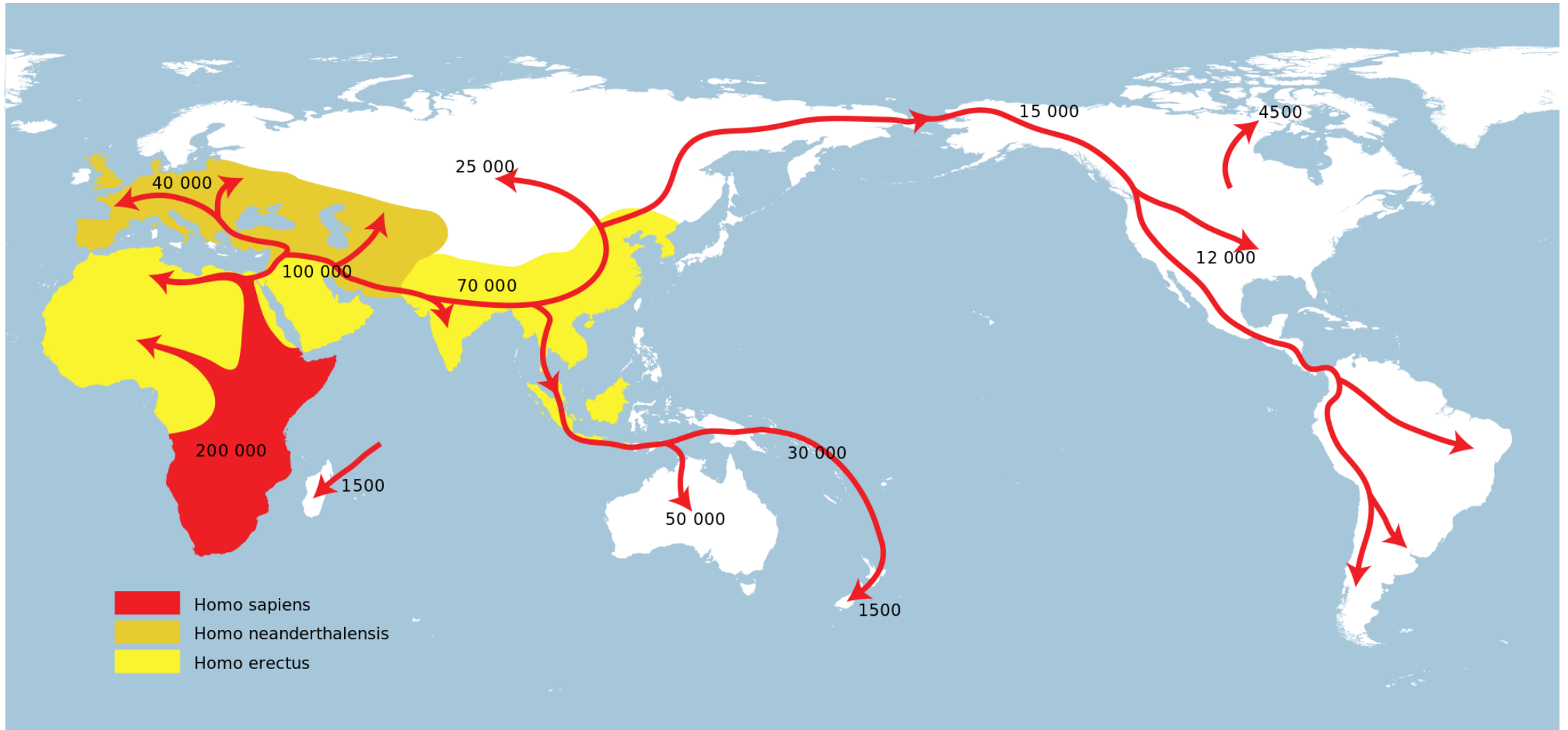
HOMO HABILIS



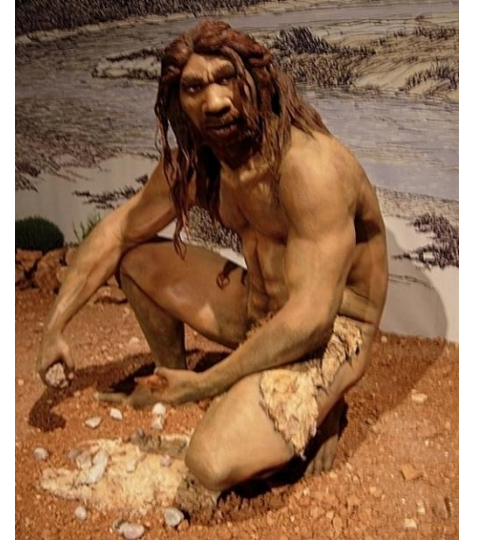
HOMO ERGASTER-HOMO ERECTUS



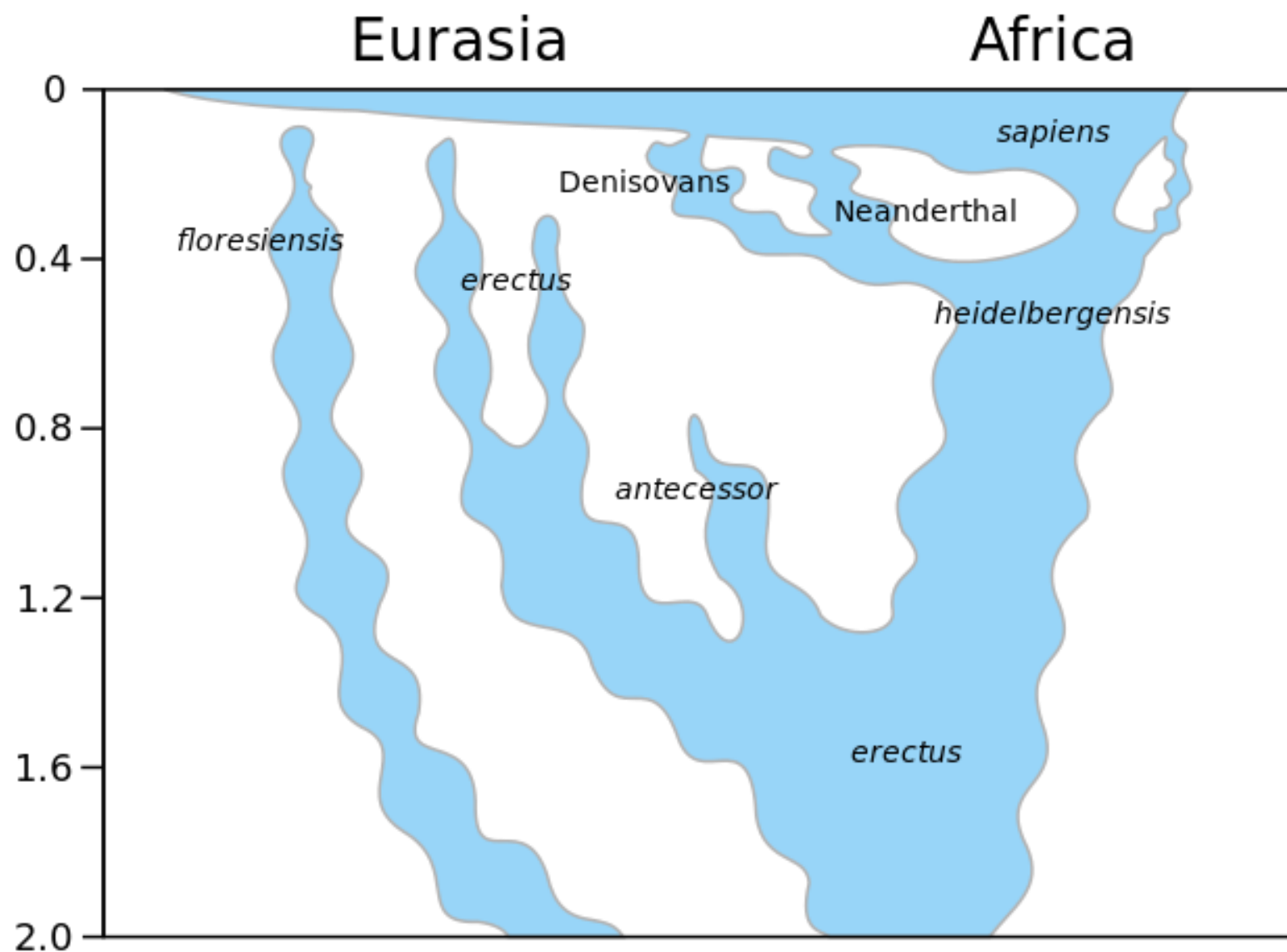
OUT OF AFRICA



HOMO HEIDELBERGENSIS



IL NOSTRO ALBERO GENEALOGICO...



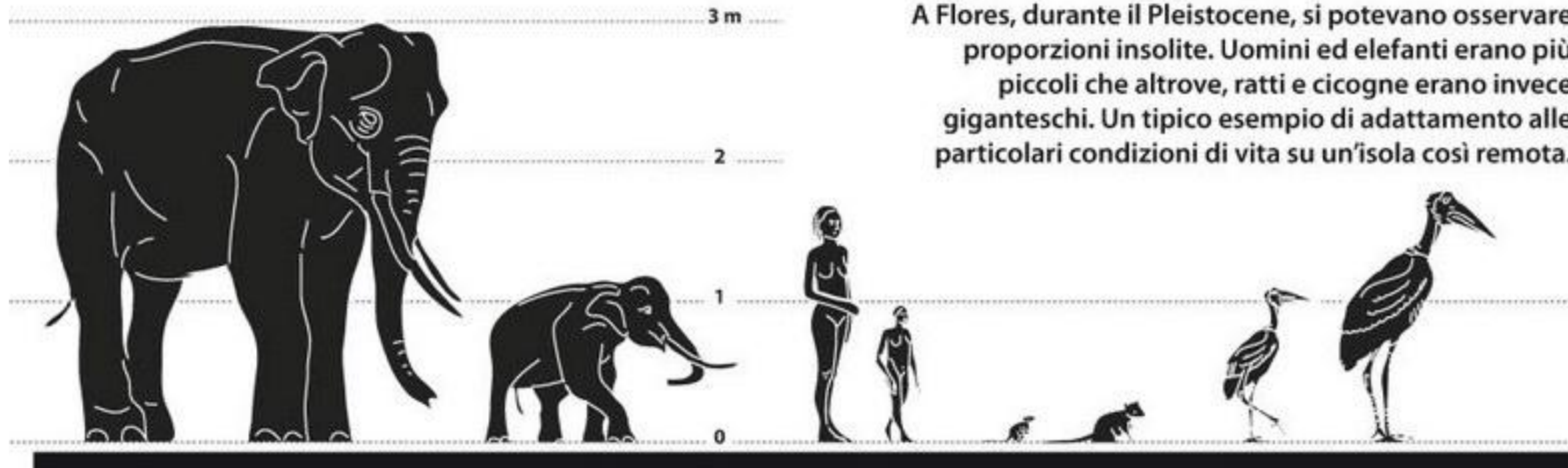
HOMO FLORENSIS



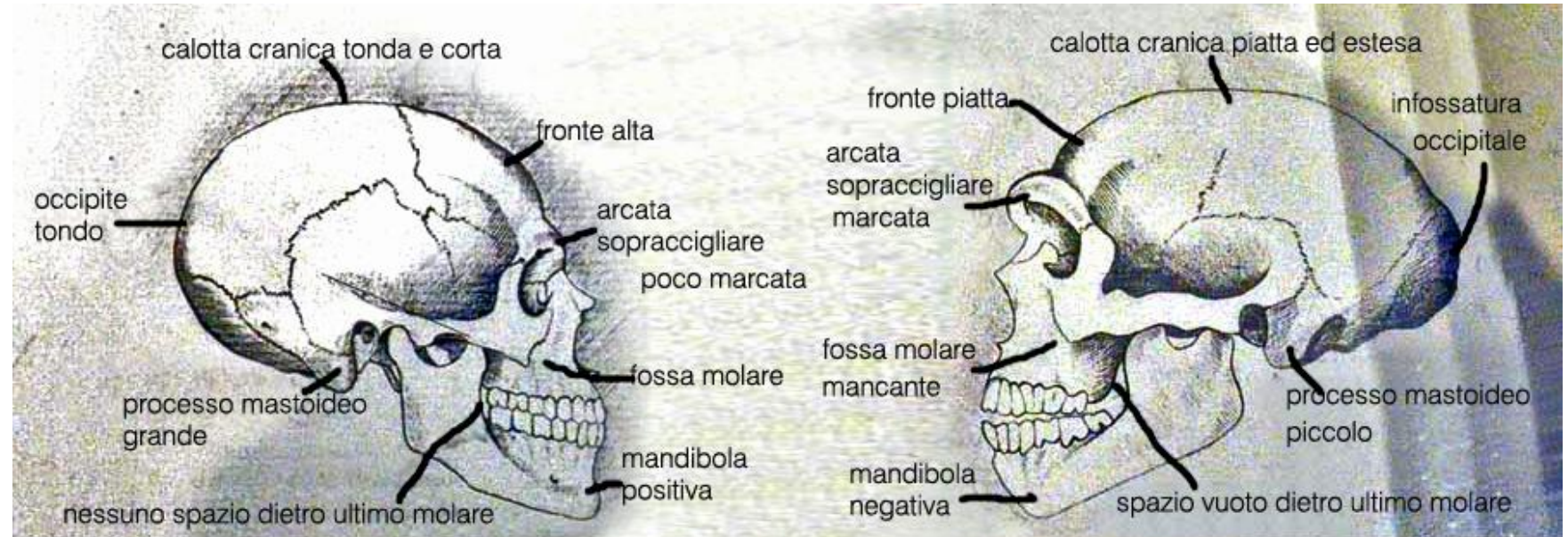
3 m

A Flores, durante il Pleistocene, si potevano osservare proporzioni insolite. Uomini ed elefanti erano più piccoli che altrove, ratti e cicogne erano invece

NANISMO INSULARE...



CONFRONTO CRANI



I disegni e le repliche dei crani sono stati fotografati al Museo Neanderthal di Mettmann.
Grafica e testi:
Sabina Marineo



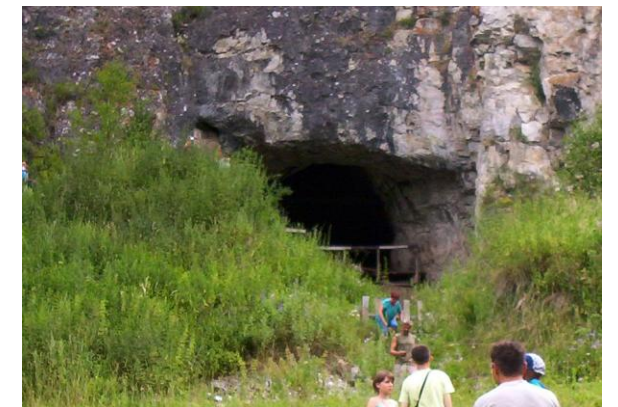
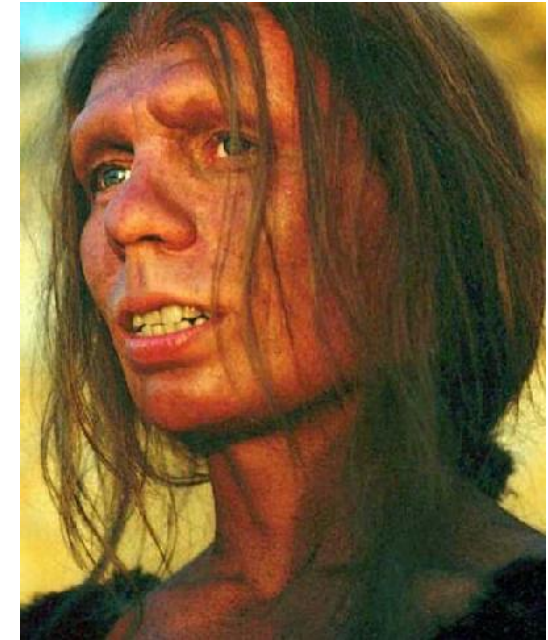
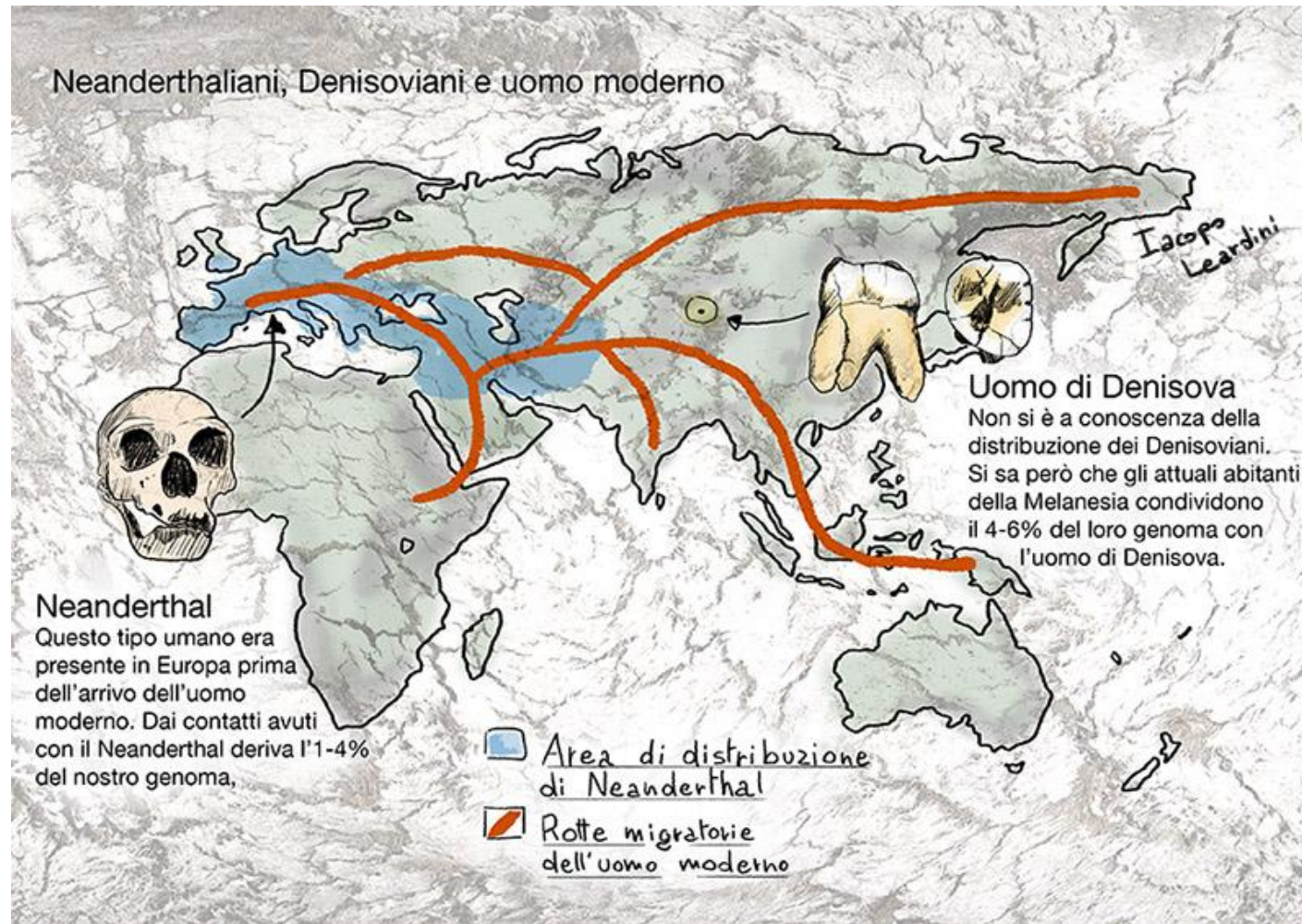
NEANDERTAL



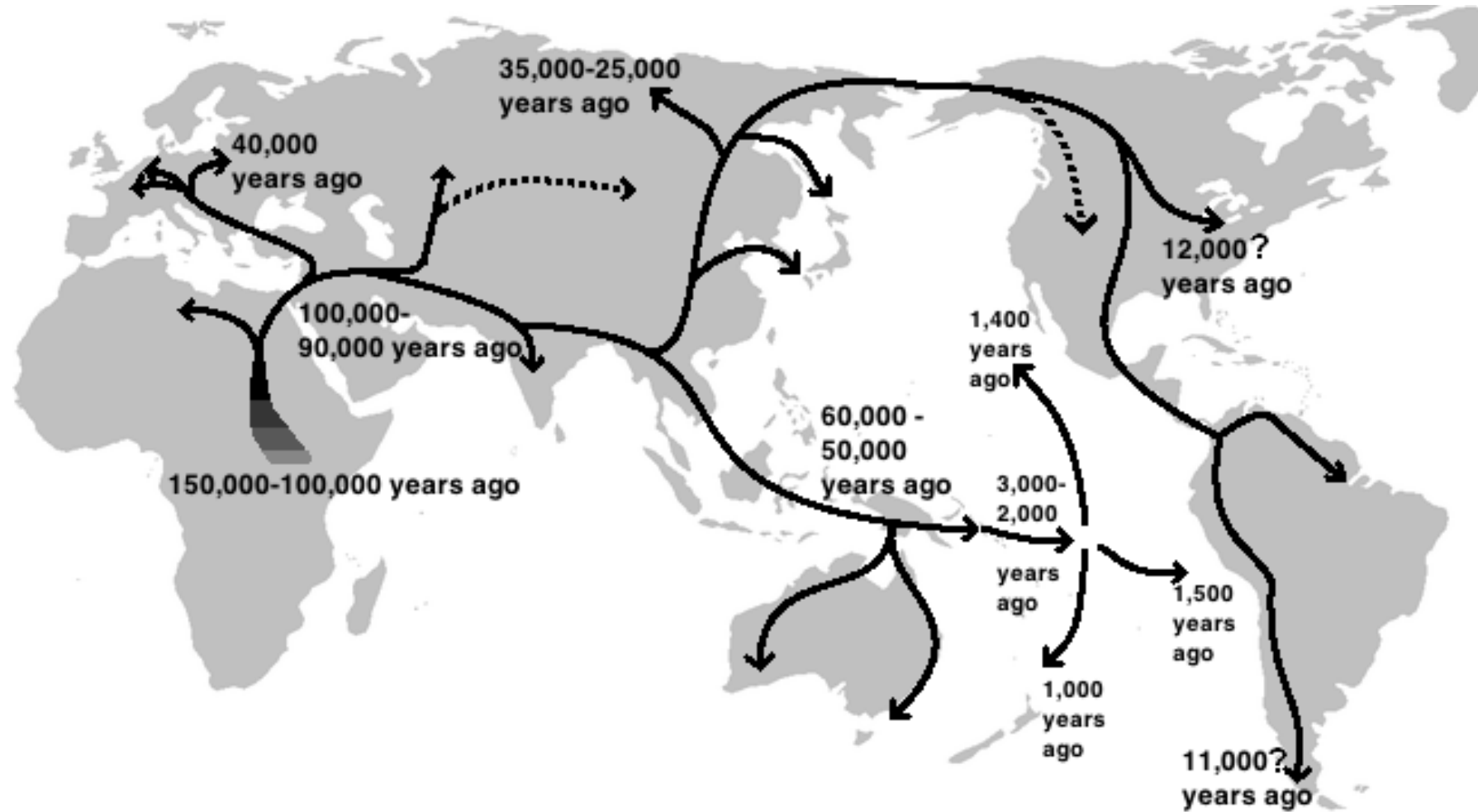
I NOSTRI CARI ESTINTI...



UOMO DI DENISOVA

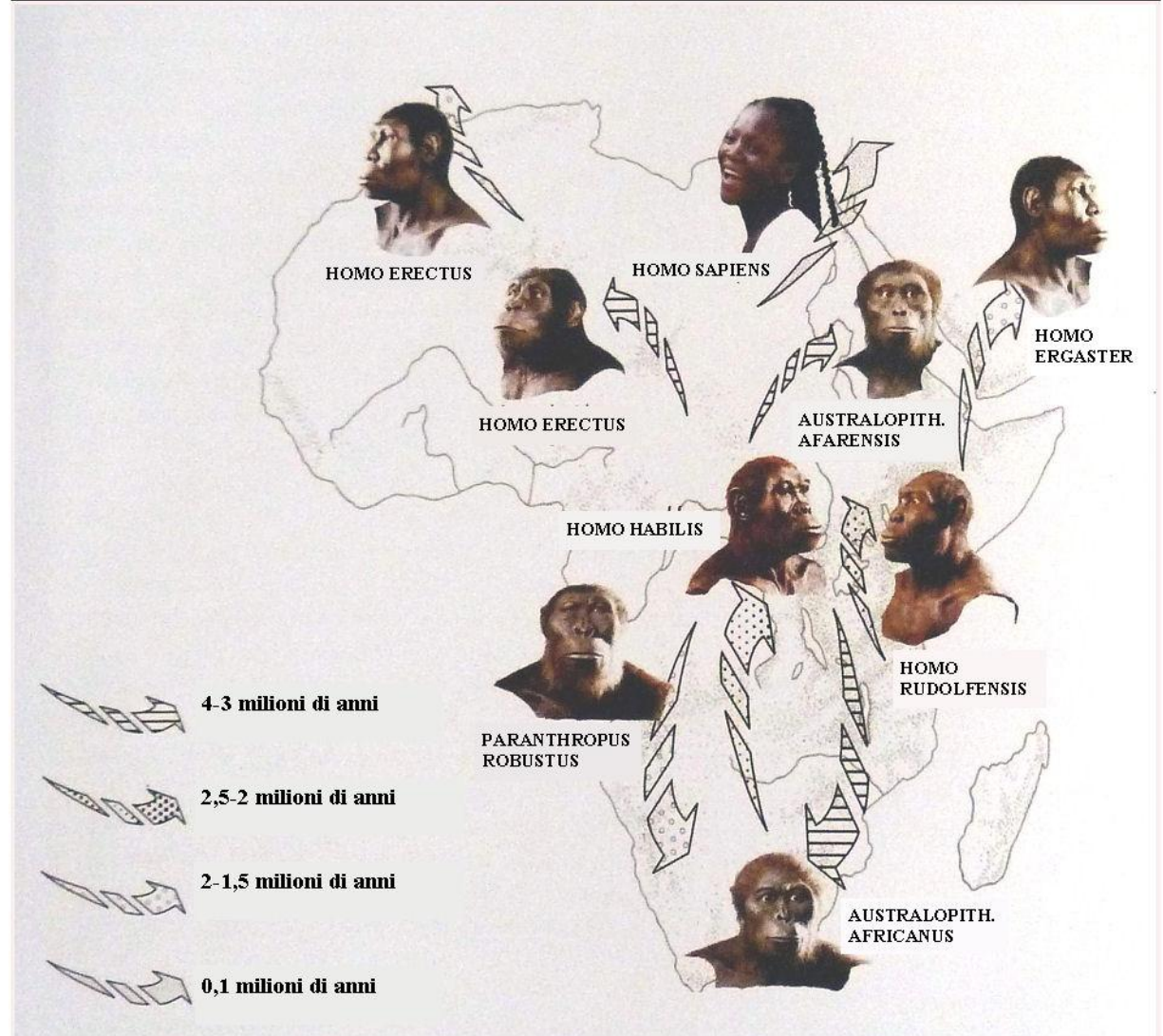


IL VIAGGIO DEI SAPIENS



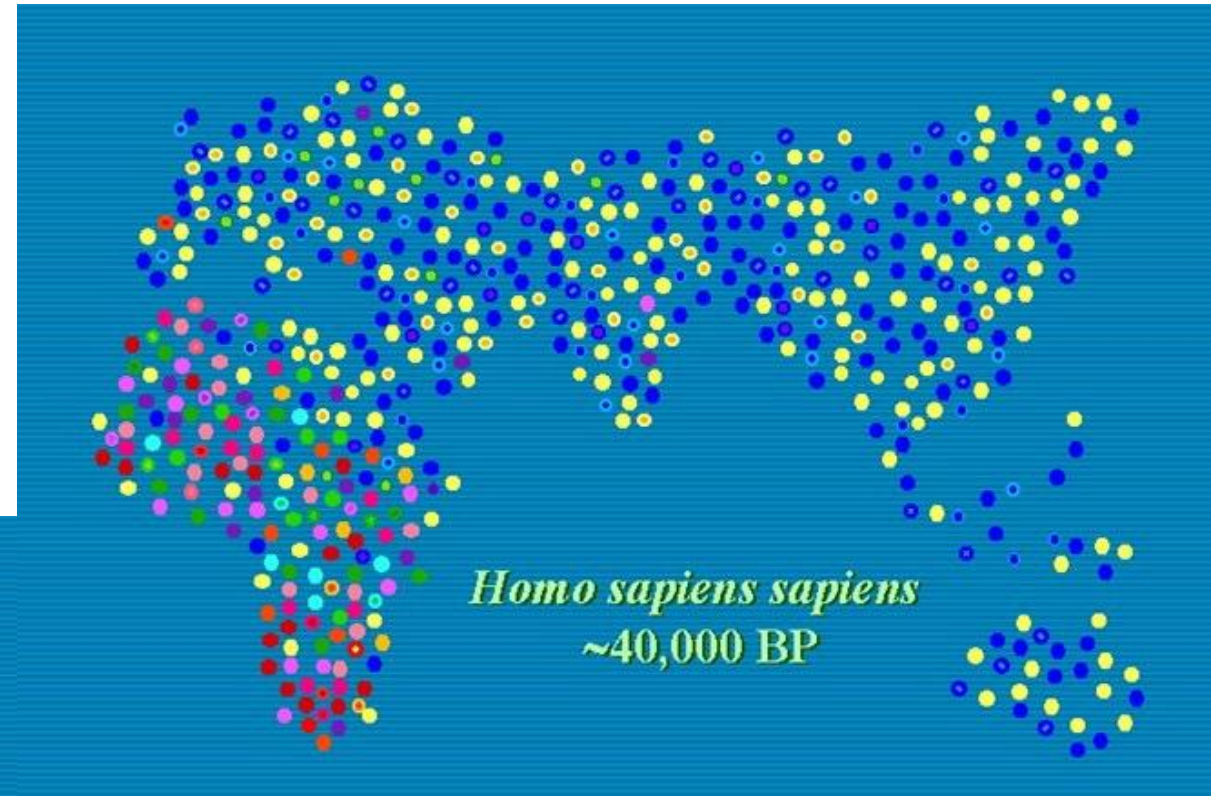
AFRICA CULLA UMANITA'...

Il continente africano, culla dell'umanità, fu teatro della genesi
ma anche dell'estinzione di molte specie di ominidi

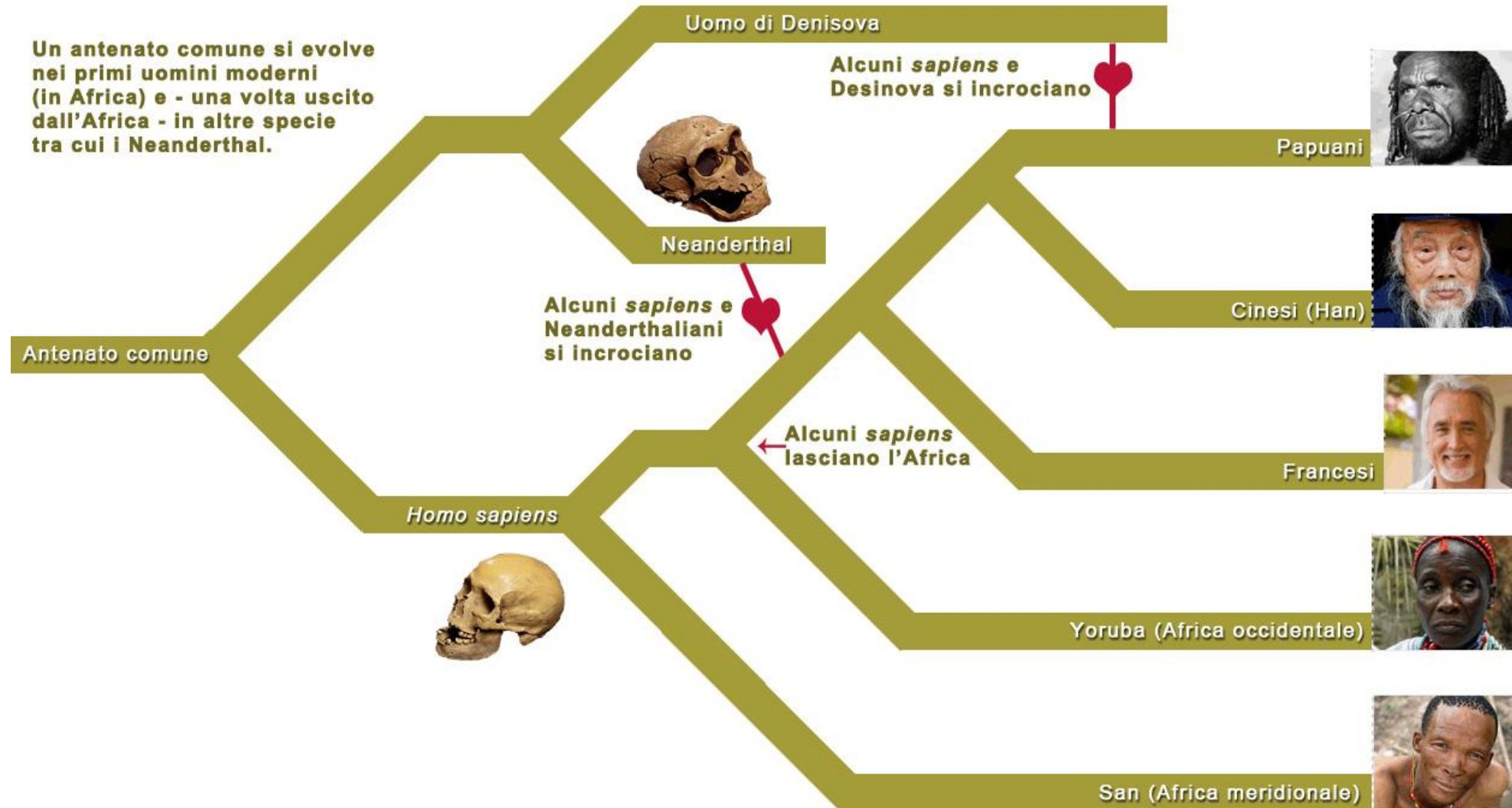


Tratto da: *Da Roots. Wurzeln der Menschheit. Reinisches Landes Museum Bonn 2006*

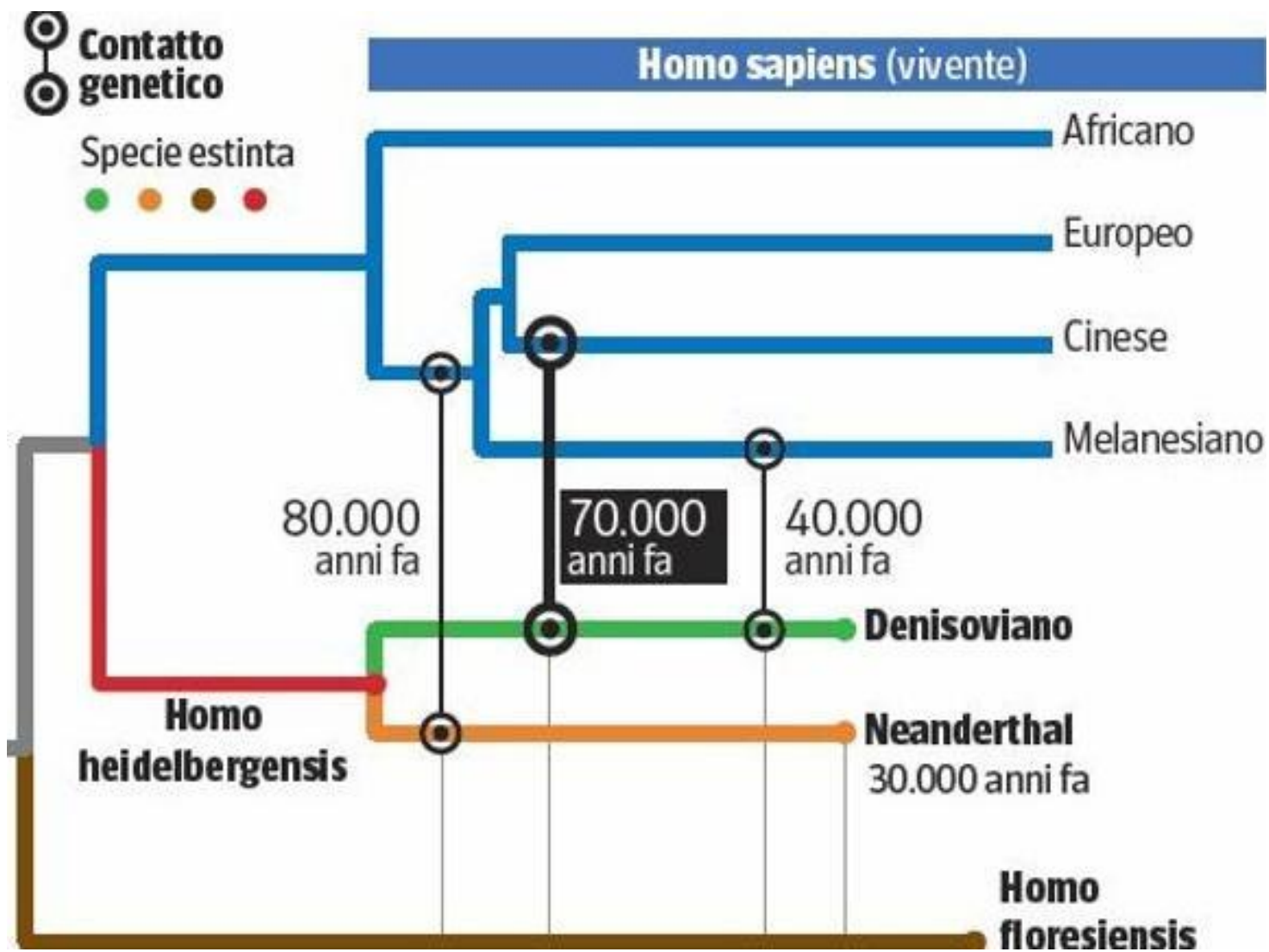
Variazione genetica uomo



SIAMO TUTTI NEANDERTALIANI...



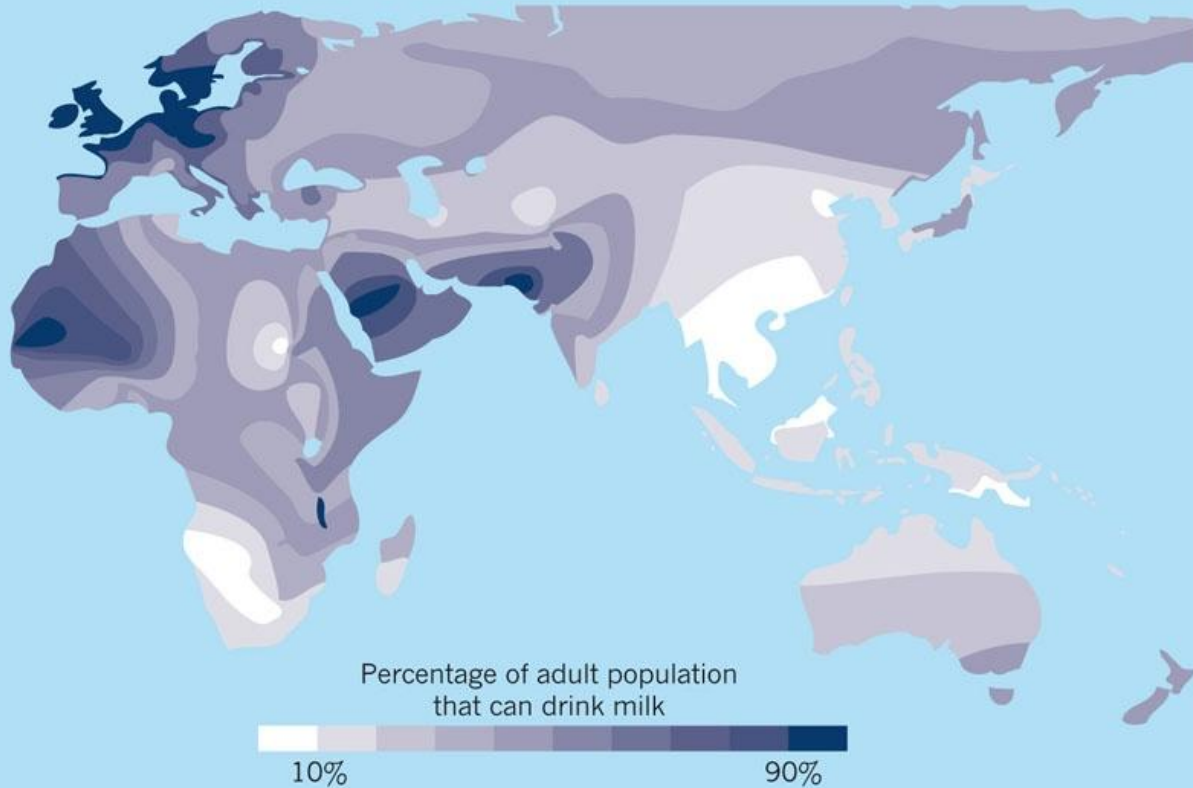
INCROCI «PERICOLOSI»...



HOMO SAPIENS E IL LATTE

LACTASE HOTSPOTS

Only one-third of people produce the lactase enzyme during adulthood, which enables them to drink milk.



DAIRY DIASPORA

Dairying practices spread from the Middle East to Europe as part of the Neolithic transition from hunting and gathering to agriculture.



6,500 YEARS AGO

Well-developed dairy economy established in central Europe.

7,500 YEARS AGO

Lactase persistence, the ability to drink milk in adulthood, emerges in central Europe.

8,000 YEARS AGO

Neolithic reaches the Balkans.

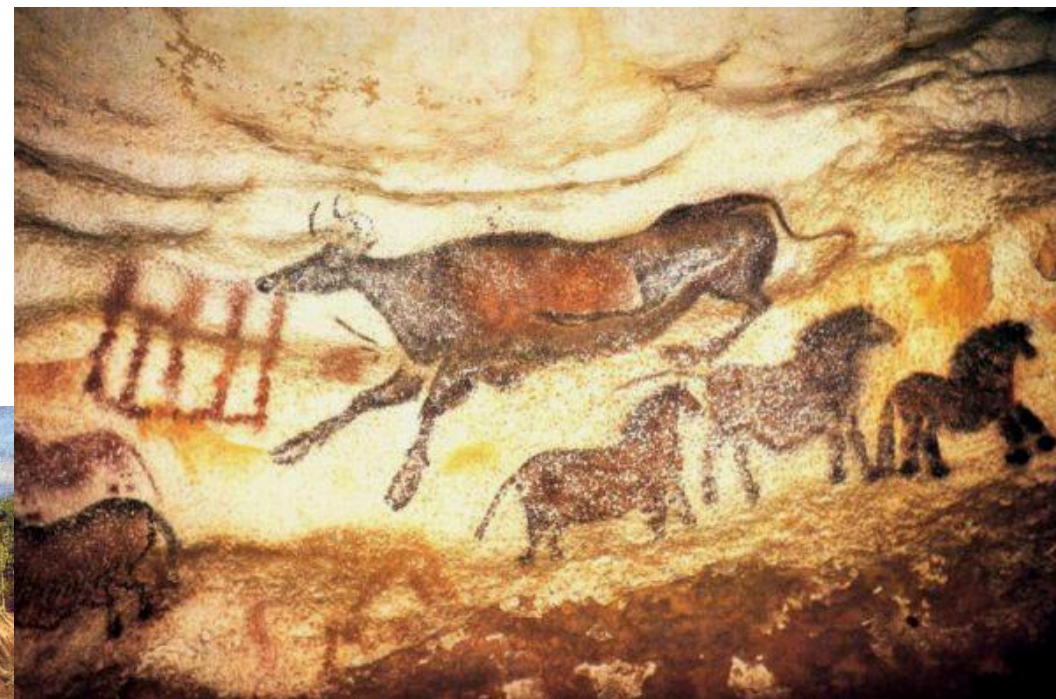
8,400 YEARS AGO

Neolithic spreads to Greece.

11,000-10,000 YEARS AGO

Neolithic culture develops in the Middle East. This is the start of agriculture and possibly the domestication of dairy animals.

INIZIO DELL'AGRICOLTURA...



PENSIERO SIMBOLICO...

