



Education and Culture

Erasmus Mundus

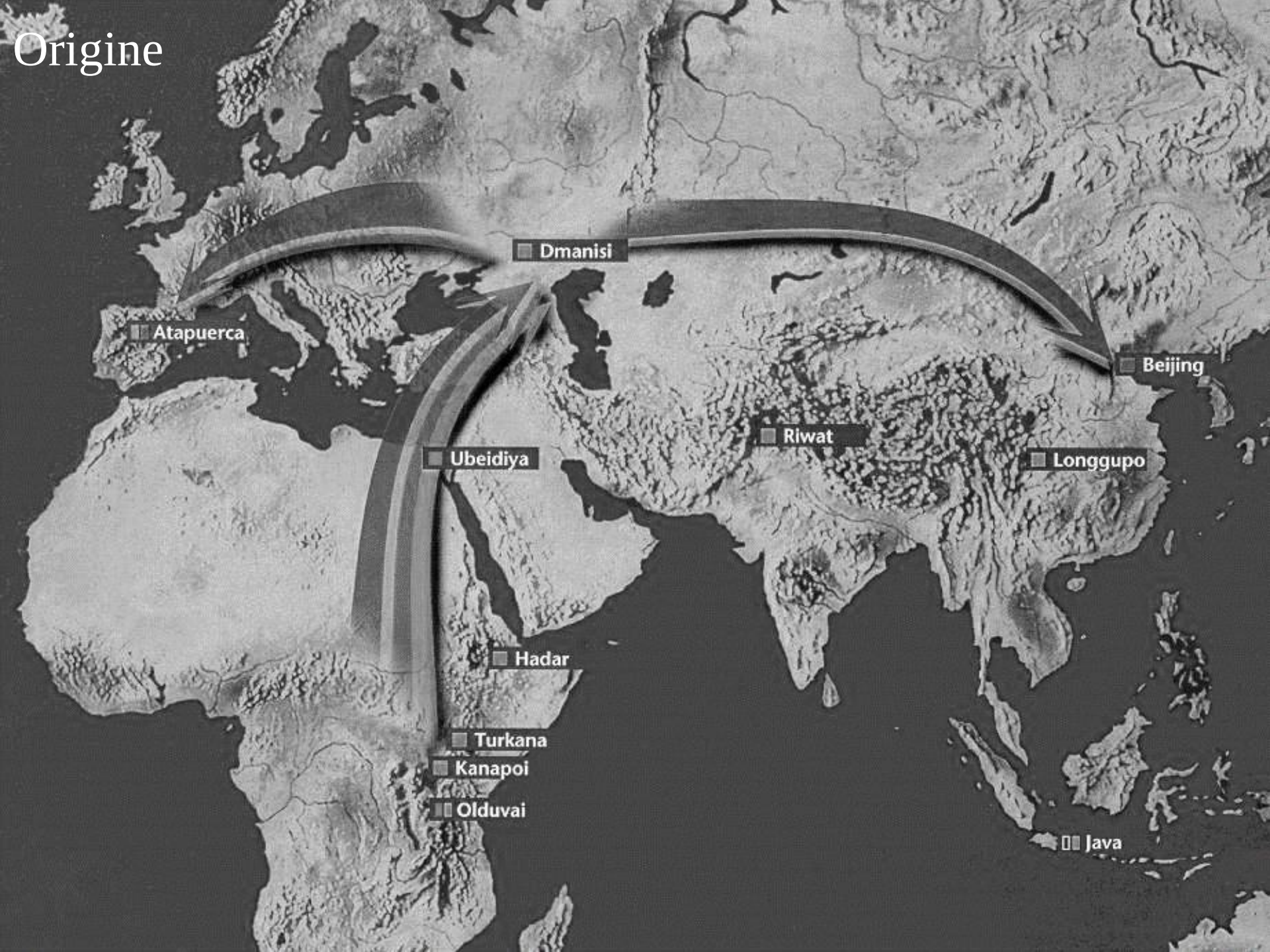
Laurea Magistrale in QUATERNARIO, PREISTORIA E ARCHEOLOGIA

Master in QUATERNARIO e PREISTORIA

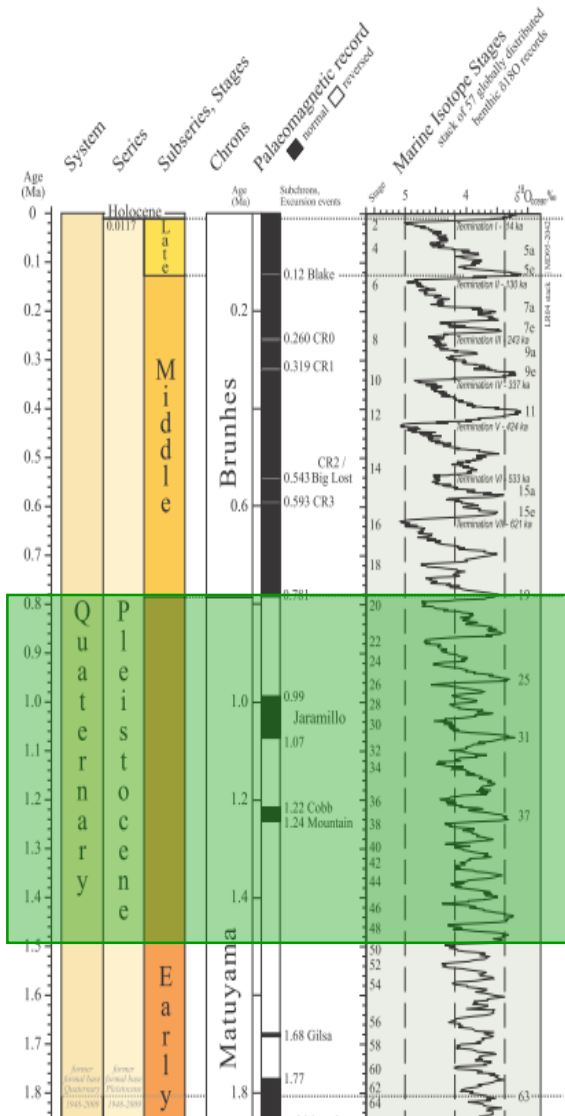
Il Popolamento dell'Europa

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Origine



Origine : Prime testimonianze del popolamento europeo



(Cohen & Cibbard, 2010)



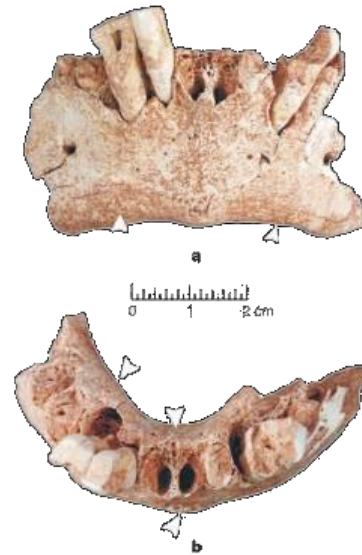
Origine : Il primo popolamento europeo

Anteneandertaliani : non hanno acquisito nessuna delle apomorfie dei neandertaliani

Ante-Neanderthals: they didn't acquired none of Neanderthals apomorphies

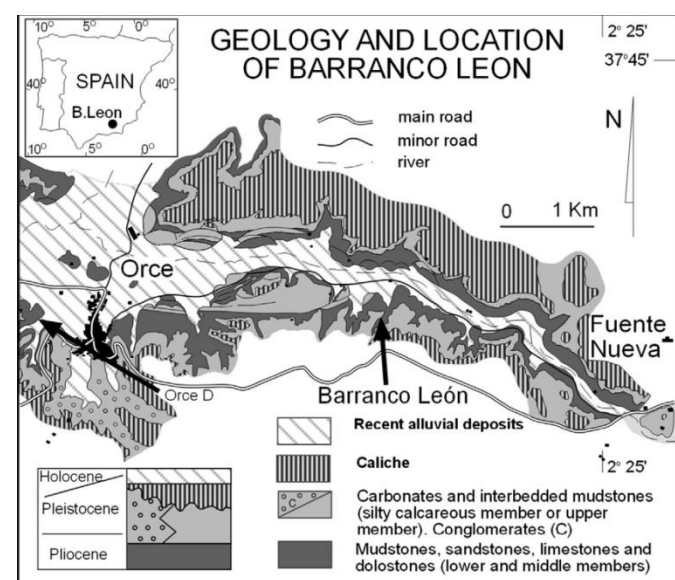
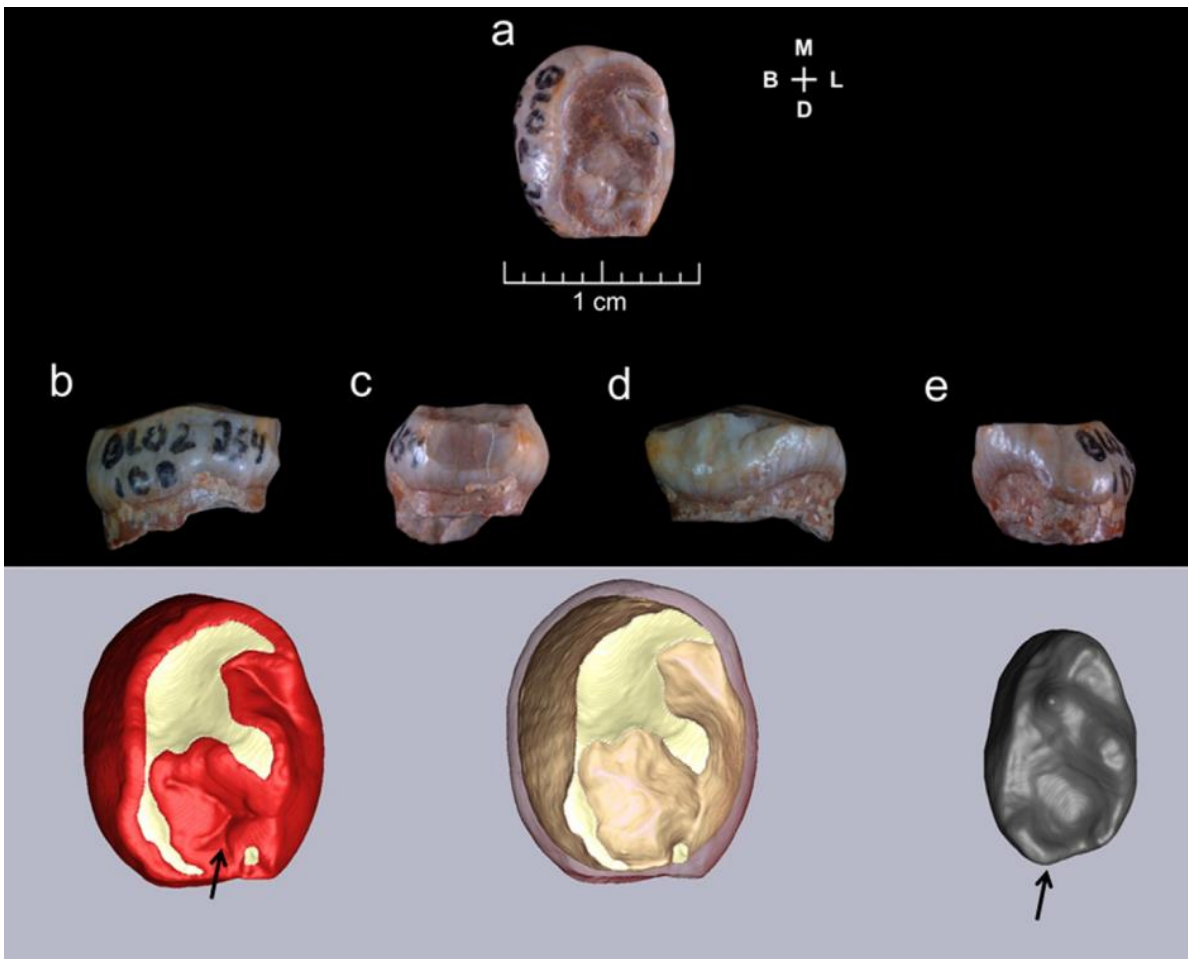


Gran Dolina
Homo antecessor 0,8
Myr (TD6)



Sima del Elefante
Homo sp.
1,3 Myr (Mandible ATE9-1)





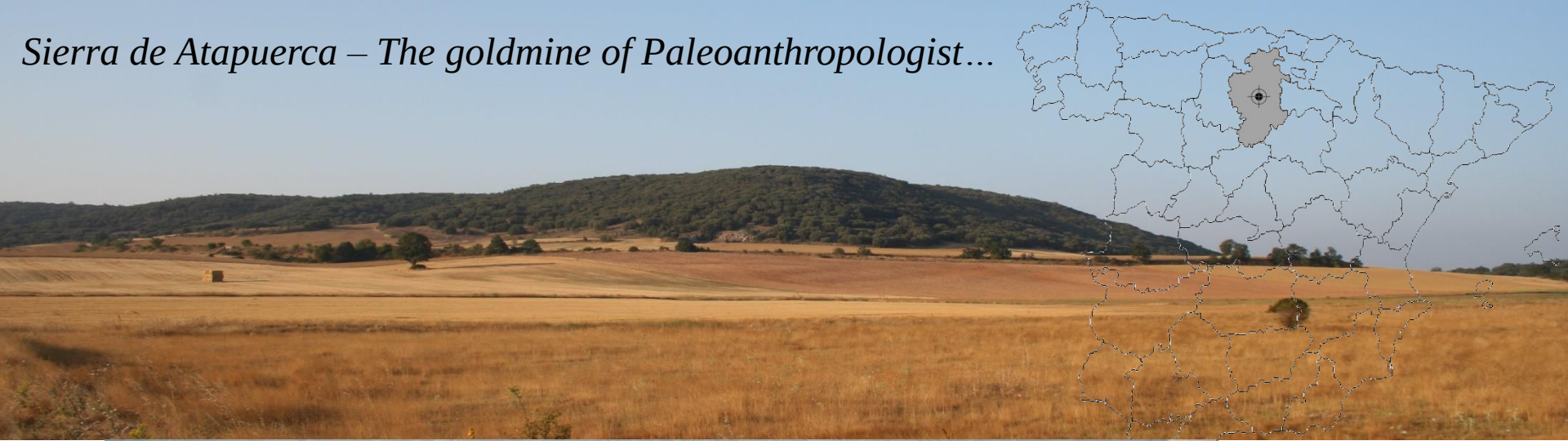
dm1 di Barranco León BL02-J54-100
 ESR: 1.02 e 1.73 Ma
 Paleomagnetismo: 1.07 – 1.77 Ma
 Biocronologia: 1.4 Ma

Questo ritrovamento associato ad un importante insieme litico conferma che l'Europa occidentale è stata colonizzata poco dopo la prima espansione out of Africa, documentata da Dmanisi

This finding combined with the important lithic tool assemblage confirms that Western Europe was colonized soon after the first expansion out of Africa, currently documented at the Dmanisi site.



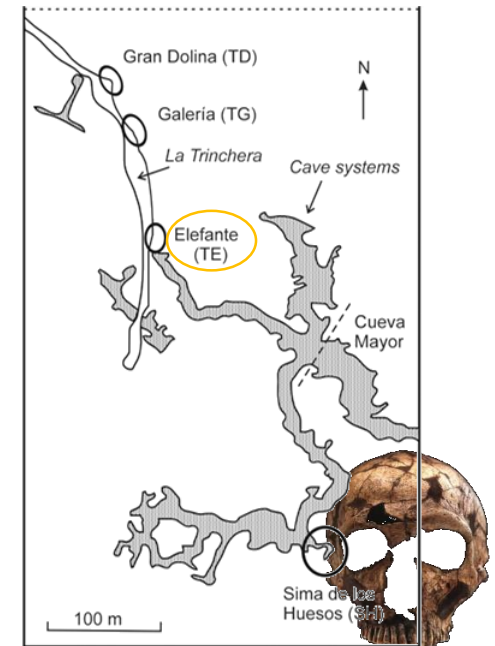
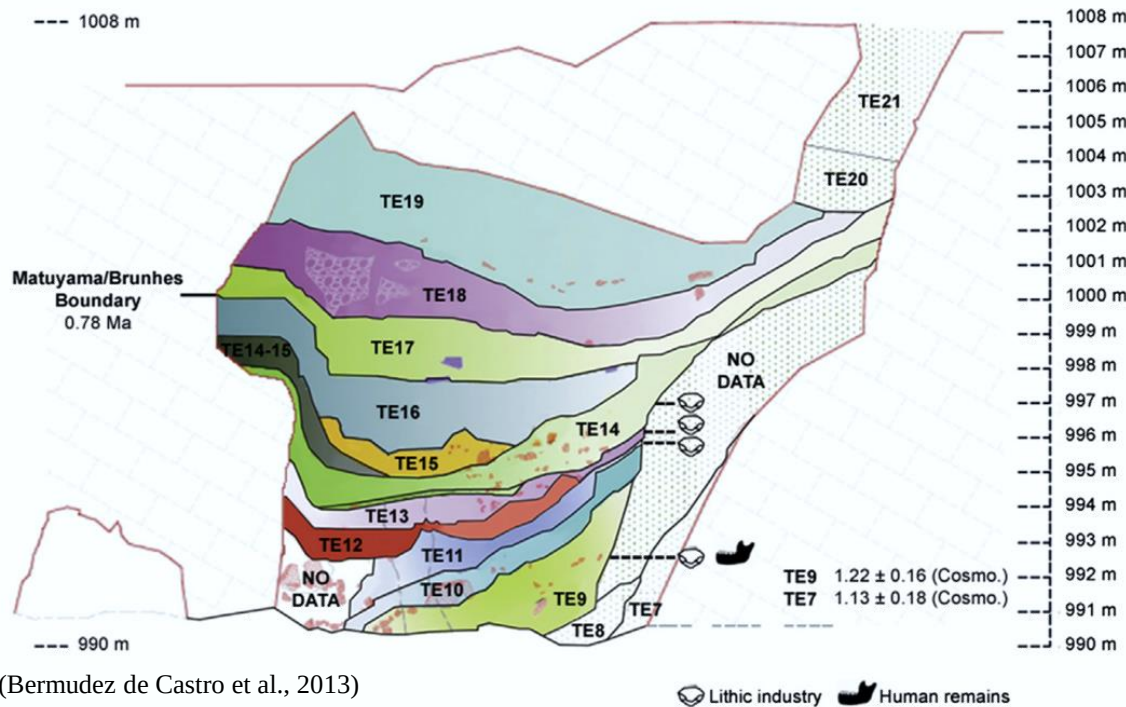
Sierra de Atapuerca – The goldmine of Paleoanthropologist...



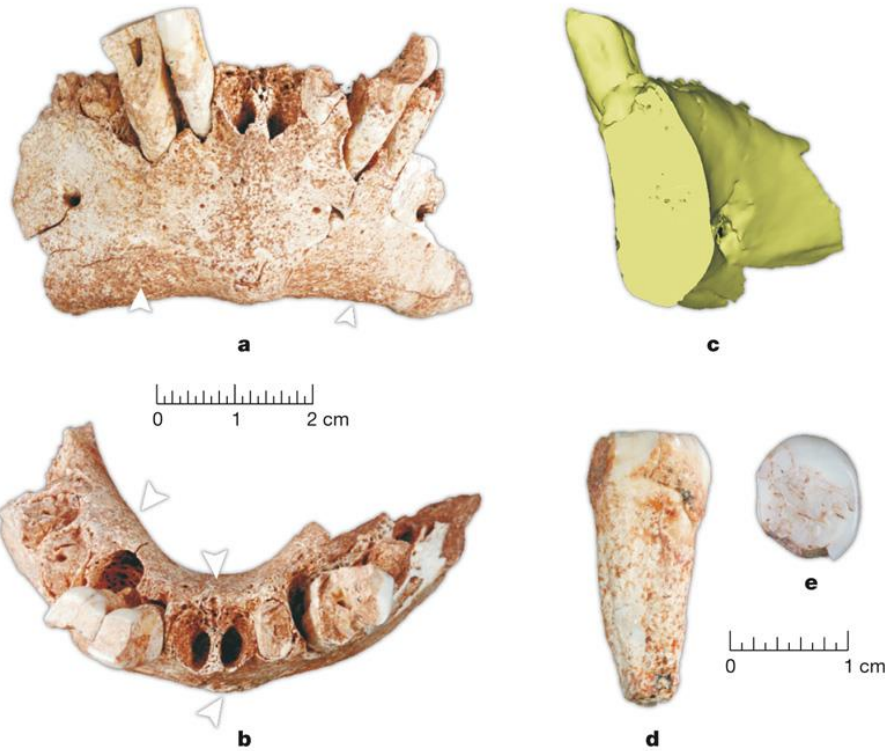
Javier Trueba / Madrid Scientific Films



Sima del Elefante



(Bermudez de Castro et al., 2013)



Primitive traits for the genus *Homo*:

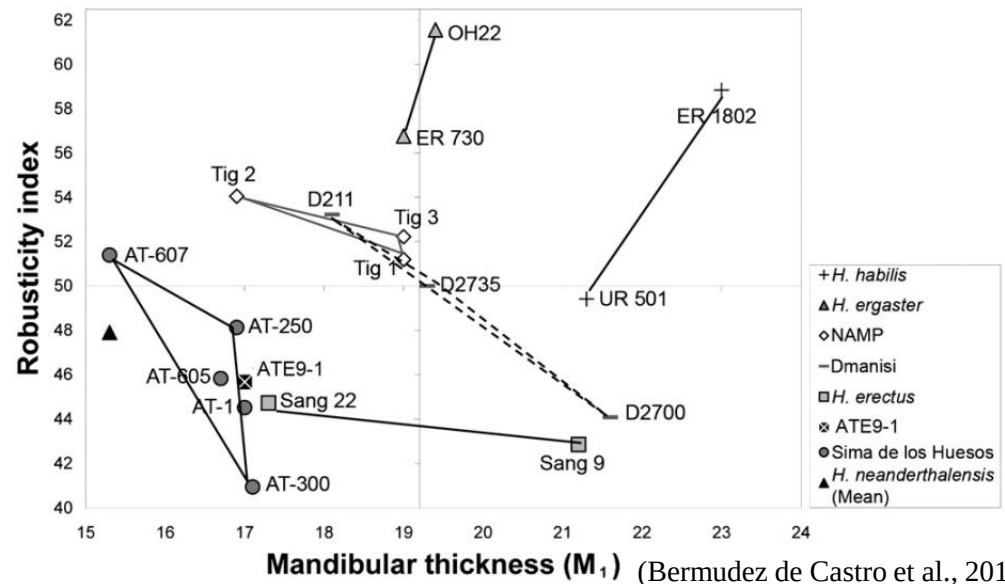
- Anterior marginal tubercle below C/P3
- Weakly express mentum osseum
- Distinct mental trigone
- Presence of incisura submentalis
- Morphology of the premolars

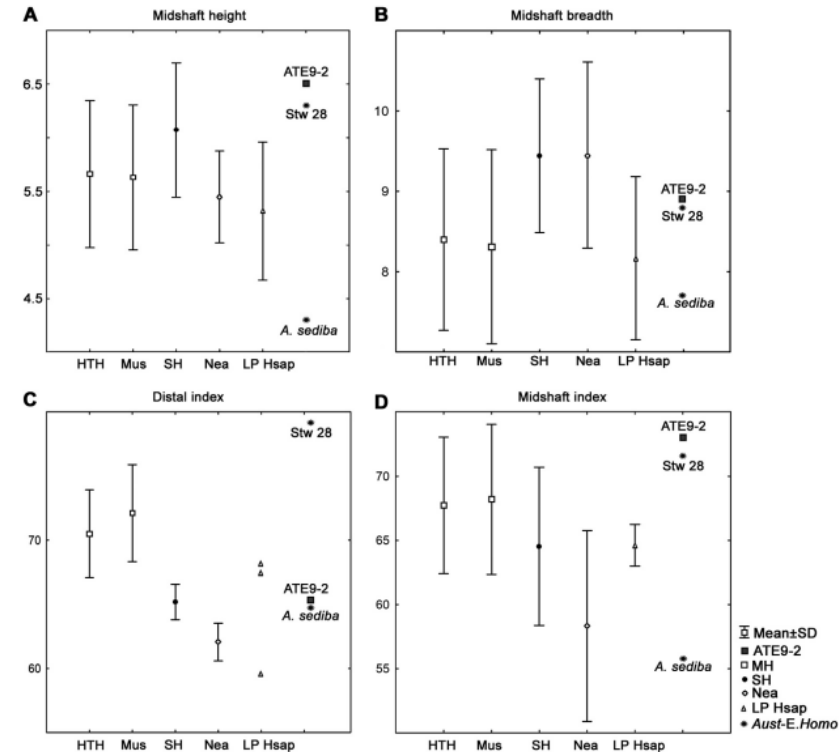
Derived traits relative to African early *Homo*:

- A minimal inclination of the planum alveolare
- Absence of the superior transverse torus
- Limited thickness of the mandibular body

(Carbonell et al., 2008)

ATE9-1 displays some morphological features that suggest a departure from the variability observed in the Dmanisi and African Pleistocene mandibles, suggesting the early appearance of a “European identity” in the hominin populations who settled this continent.

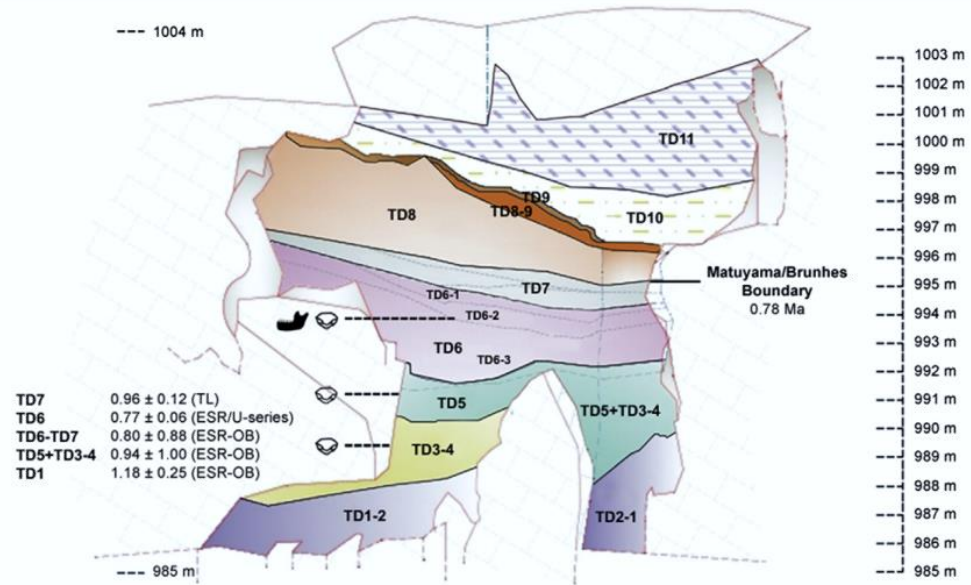




The hand phalanx ATE9-2, attributed to *Homo* sp. Show **no essential differences** between it and the reference collection (Neanderthals, Modern humans, Sima de los Huesos). This suggest that the morphology of the proximal hand phalanges and probably the entire hand could have remained stable over the last 1.2-1.3Ma. (Lorenzo et al., 2014)

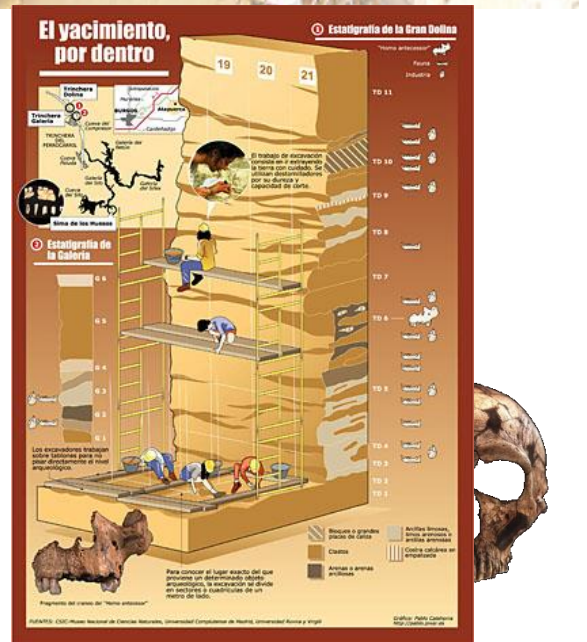


Gran Dolina and the *Homo antecessor* hypodigm



(Bermudez de Castro et al., 2013)

 Lithic industry  Human remains





Livello TD6 – c. 800 ka BP

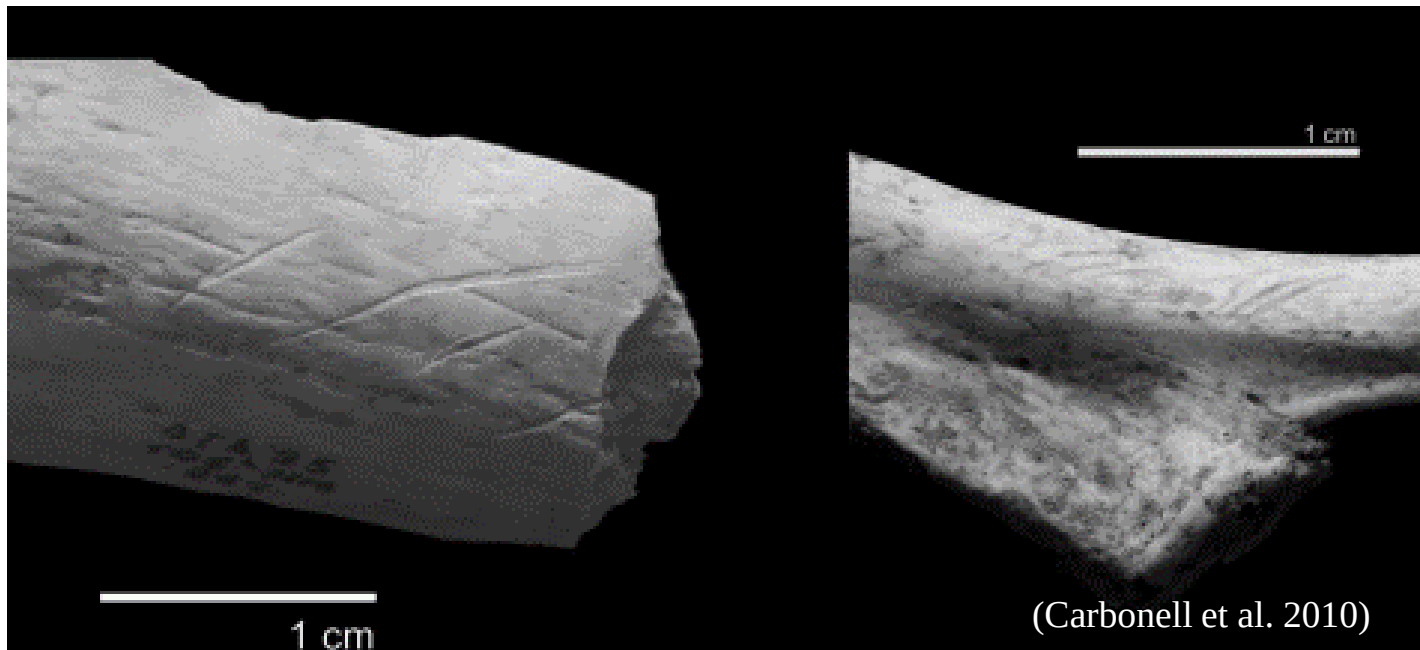
NMI: 2 adulti, 3 adolescenti, 6 bambini

Interpretazione

- cannibalismo gastronomico (Fernandez-Jalvo et al. 1999)
- Cannibalismo culturale (Carbonell et al., 2010)
- Violenza e cannibalismo intergruppo; excocannibalismo (Saladié et al., 2012)

Tracce di macellazione su la diafisi
di una tibia, interpretate come
tracce di scarnificazione

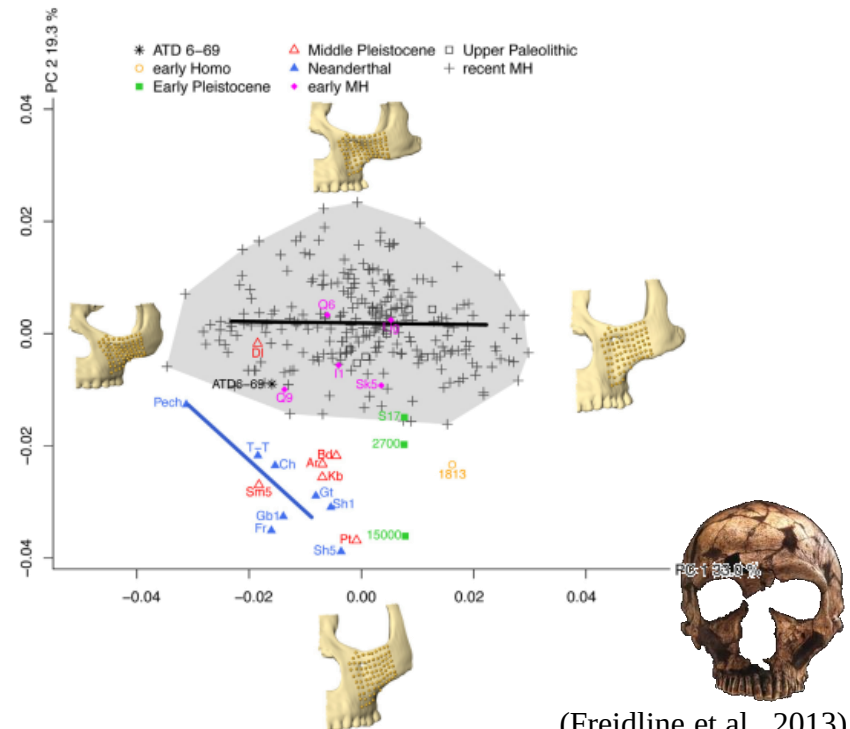
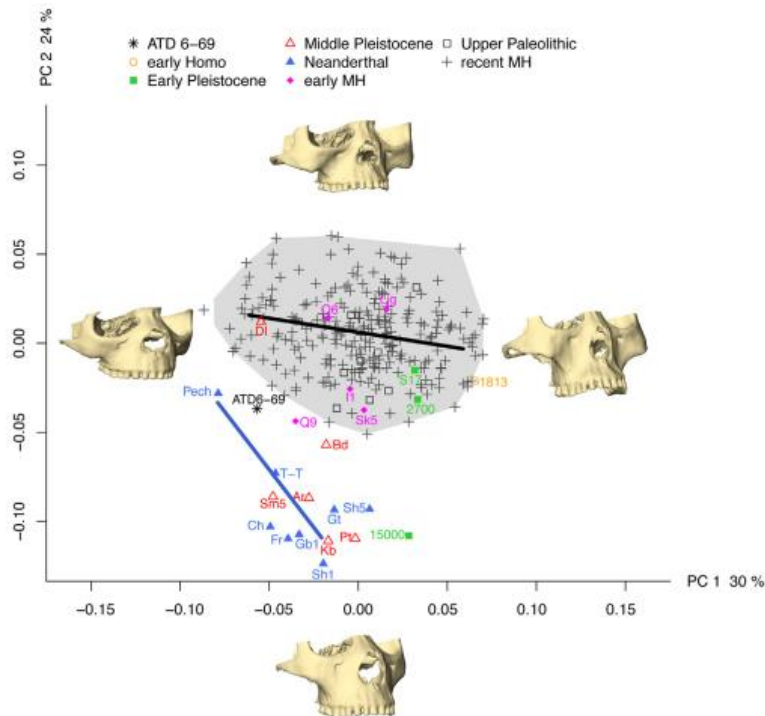
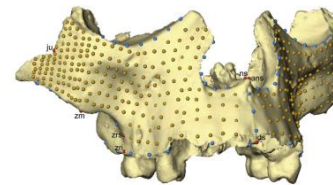
Costola umana con
incisione



(Carbonell et al. 2010)



The fossil ATD6-69 has been suggested to mark the earliest appearance of modern human facial features. However, this specimen is a subadult and the interpretation of its morphology remains controversial, because it is unclear how developmental shape changes would affect the features that link ATD6-69 to modern humans.



Twentieth anniversary of *Homo antecessor* (1997-2017): a review

José María Bermúdez de Castro^{1,2*} | María Martín-Torres^{2,3*} |
Juan Luis Arsuaga⁴ | Eudald Carbonell^{5,6}



TABLE 1 List of some of the features observed in *Homo antecessor*

• <i>Plesiomorphic (primitive) features for the Homo clade</i>
-Fusion of the styloid process to the basicranium
-Nasal floor showing a level and sloping configuration
-Position of the mental foramen at the level of mandibular P ₃ -P ₄
-Low position of the mylohyoid line in relation to the alveolar margin at the mandibular M ₃ level
-Parallel trajectory of the mylohyoid line in relation to the alveolar margin
-Shallow relief of the pterygoid fossa
-Lateral intersection between the mandibular notch and the condyle
-Absence of retromolar space
-M ₃ partially covered by the mandibular ramus
-Strong tuberculum molare on the deciduous dm ¹
-Presence of mesial and lingual styles on the deciduous upper canine
-Buccal faces of the mandibular premolars showing mesial and distal marginal ridges and grooves, which connect with the shelf-like cingulum
-Crown shape of the mandibular P ₃ is strongly asymmetrical, with a remarkable talonid and a large occlusal polygon
-Mandibular P ₄ showing an asymmetrical outline, with a mesially displaced metaconid extended talonid, and a broad occlusal polygon
-Mandibular P ₃ and P ₄ showing a complex root system (2R: MB+DL) ¹ formed by a mesiobuccal (MB) plate-like root with two pulp canals and a distolingual (DL) root with a single canal
-M1<M2 for both upper and lower molar series.
-Mandibular M ₁ and M ₂ exhibiting a Y-pattern of the buccal and lingual grooves separating the five principal cusps
-Enamel of the occlusal surface of the postcanine teeth is moderately or remarkably crenulated
-Absolutely and relatively long radial neck



- Apomorphic (derived features), shared with later hominins

- Doubled arched supraorbital torus

- Parietals showing parasagittal flattening of the upper surfaces

- Position of the lateral prominence at the level of the talonid of mandibular M₂

- Absence of alveolar prominence

- Oblique inclination of the trigonum postmolare

- Shallow relief of the masseteric fossa

- Moderately hollowed posterior subalveolar fossa

- Regular gonion profile

- Length/width index of the mandibular alveolar arcade clearly below 100 (following Rosas and Bermúdez de Castro⁴⁷)

- Permanent mandibular incisors buccolingually expanded with respect to *H. habilis* s.s. and other African and Eurasian Early Pleistocene hominins such as KNM ER 992 or Dmanisi

- P3>P4 size sequence for the crown area of the maxillary and mandibular premolars

- Postcanine teeth smaller than those of *H. habilis* s.s. and within the range of *H. ergaster* (or African *H. erectus*), *H. erectus* s.l., and European Middle Pleistocene hominins.

- Mandibular M₃ noticeably reduced with respect to M₁ and M₂

- Antero-medially facing radial tuberosities



- *Derived features, shared with Neandertals and modern humans*

- Convex superior border of the temporal squama²

- Anterior position of the incisive canal, which is nearly vertical

- Absence (or weak) planum alveolare

- *Derived features shared with modern humans*

- Modern-like mid-facial topography: infraorbital surface coronally oriented and sloping downward and backward (true canine fossa) with a horizontal and high rooted inferior border

- Medial position of the deepest point of the mandibular notch

- Relatively narrow patellae with high patellar indices

- *Derived features shared with Neandertals and the SH hominins*

- Presence of a medial pterygoid tubercle

- Rhomboidal and compressed occlusal polygon and a skewed external outline of the permanent M¹ with a bulging protrusion of the hypocone

- Permanent upper incisors showing a shovel shape,³ particularly marked in I²

- Large olecranon fossa and very thin medial and lateral pillars

- Clavicle absolutely very long (maximum length), relatively slender (low robusticity index), with pronounced shaft curvature and relatively small ephiphyses⁴

- Relatively narrower trochlea of the talus⁴

- Presence of middle trigonid crest

All these features have been studied by some authors.^{1,5,23,27,34,35,40,45,46,48,49,54,57,59,63,65,67,123} In these studies, more detailed descriptions and discussions of the polarity of the TD6 features can be found.

1. According to the Wood et al.¹²⁴ classification.¹²⁴

2 This feature as also present in African and later Asian Middle Pleistocene fossils.²⁷

3. This feature is also common in other Middle Pleistocene Eurasian hominins.

4. These features are found in Neandertals, but not in the SH hominins.⁶⁷



Origine : Il primo popolamento europeo

I Preneandertaliani : Si cominciano ad individuare alcune apomorfie.

Le prime caratteristiche morfologiche di tale popolazione si osservano attorno a 350-400.000 anni fa, sui fossili dell'Arago (Francia) e di Sima de los Huesos (Spagna).

Some apomorphies start to be individualized. The first morphological features of this kind of population are observed around 350-400 000 years.



Arago 21



Atapuerca 5

L'Homo heidelbergensis presenta un mosaico di caratteri.

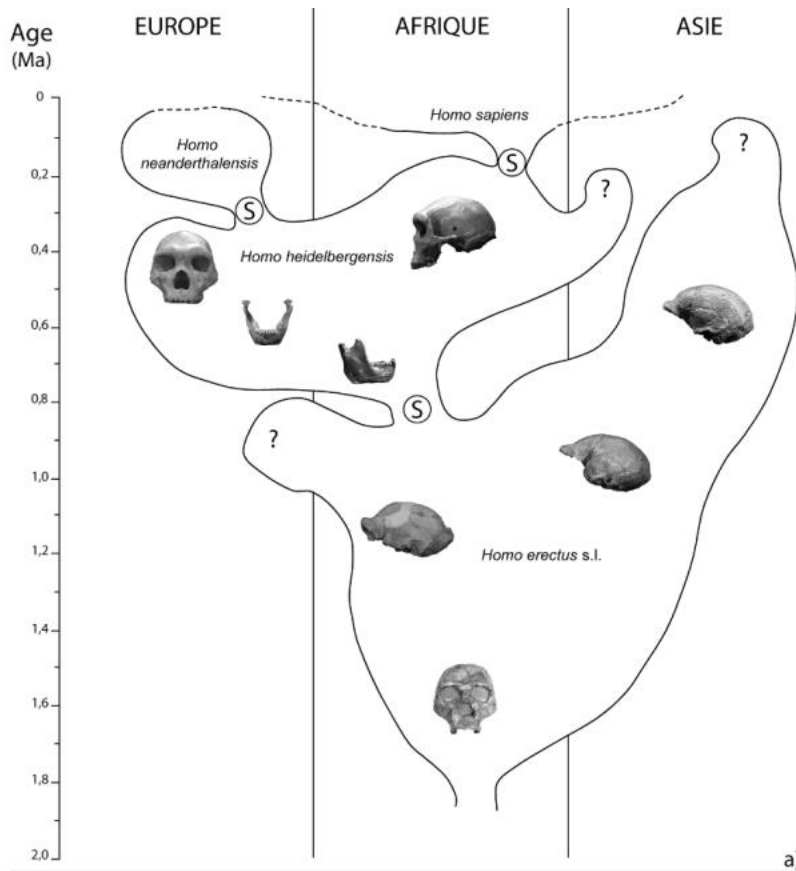
I caratteri derivati compaiono in un modo discontinuo, ma sono sistematicamente rappresentati negli ultimi Neanderthal.

The Homo heidelbergensis presents a mosaic of features.

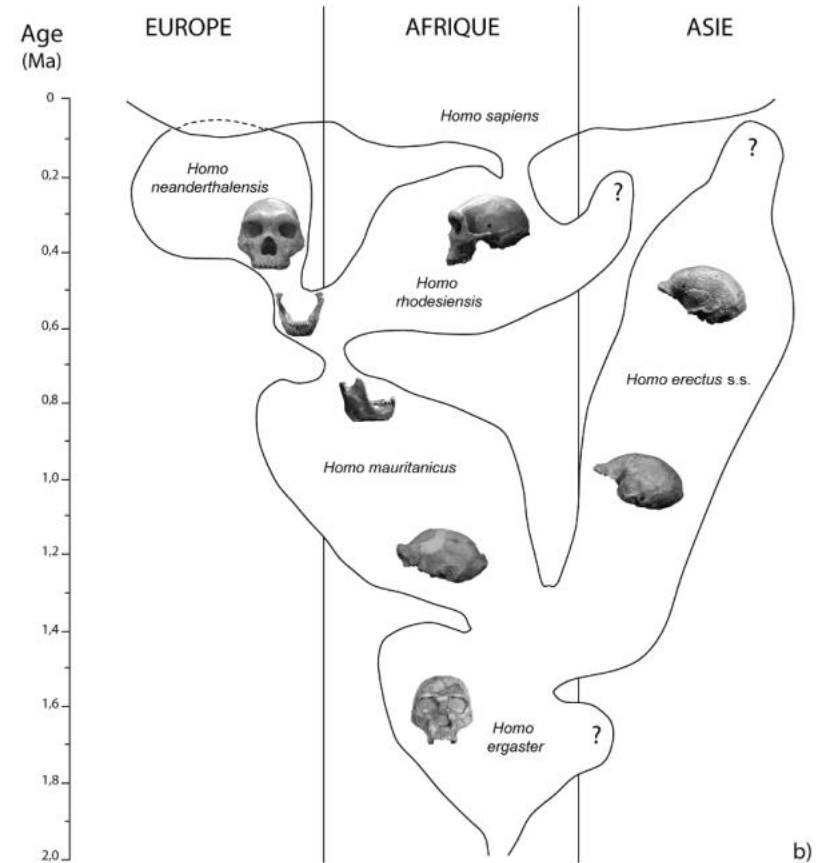
The derived features appeared in an discontinued mode, but they are systematically represented in the last neandertal.



Ipotesi Evolutive: Origine Afro-europea



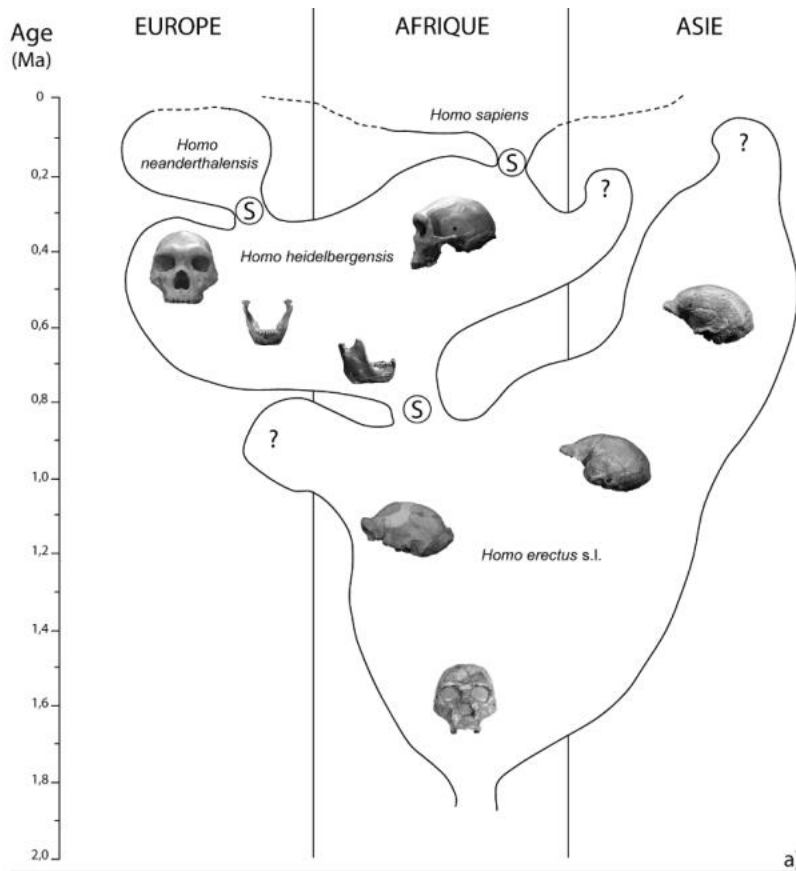
Esistenza nel P. medio di un taxa Afro-europeo ancestrali ai uomini moderni e ai Neandertaliani = basato sulle assomiglianza morfologiche tra Petralona Kabwe e Mauer. (Rightmire, 1998)



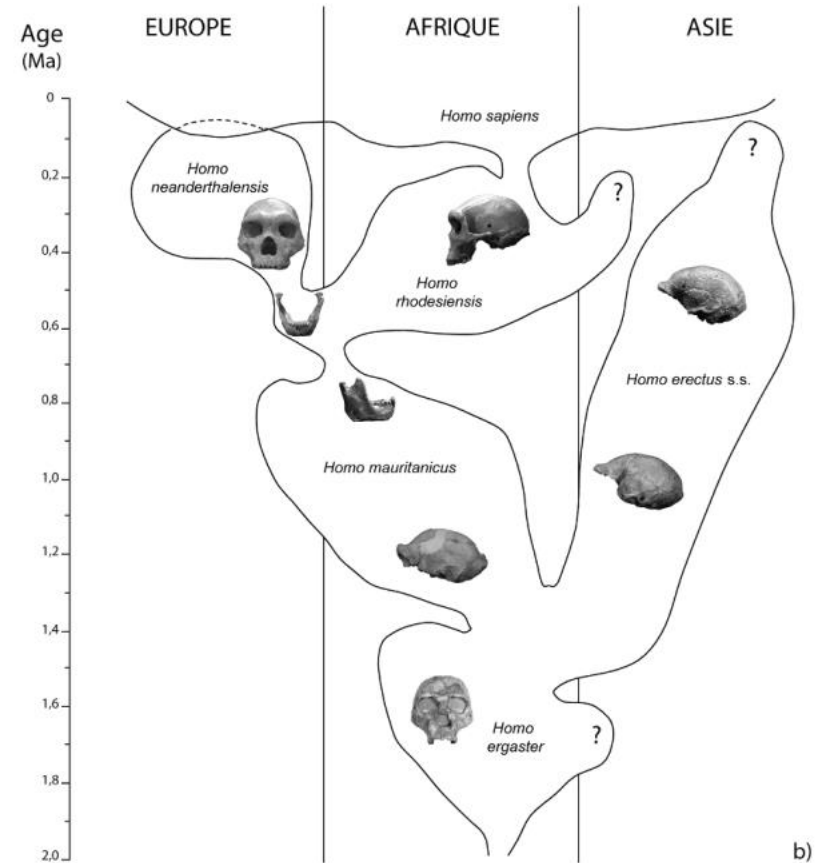
La presenza di caratteri Neandertaliani nella mandibola di Mauer giustifica la sua inclusione nella linea neandertaliana e quindi l'abbandono del nome *H. heidelbergensis* e l'introduzione del *H. mauritanicus* rappresentato dai resti di Tighenif e designato come l'ultimo antenato comune ai neandertaliani e i uomini moderni (Hublin, 2001)



Ipotesi Evolutive: Origine Afro-europea



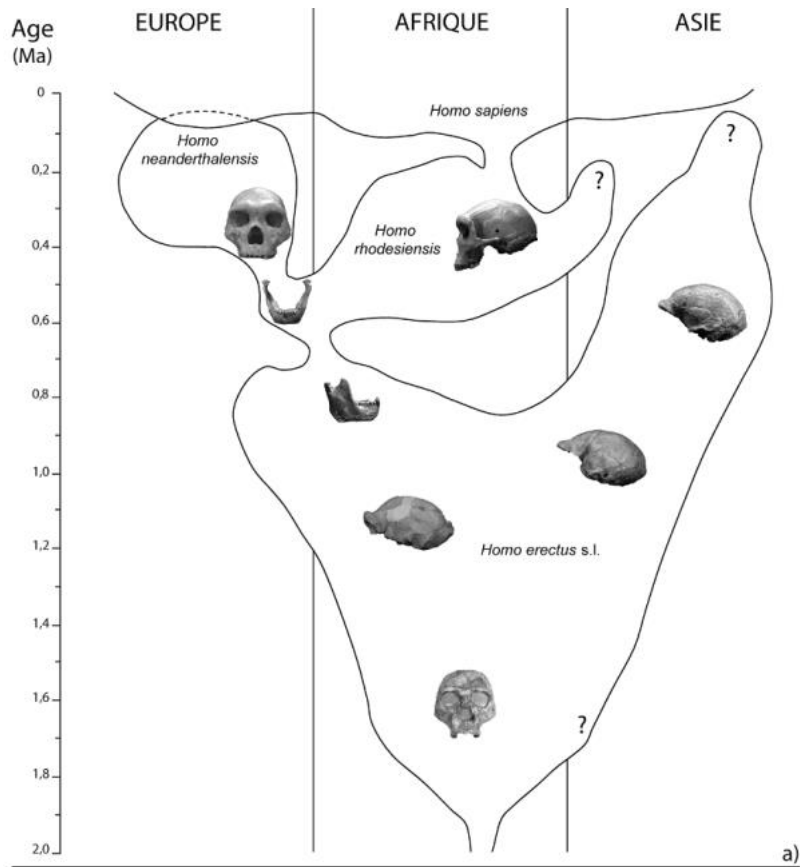
Existence in the Middle Pal. of a Afro-european taxon ancestral to modern human and Neanderthals = based on the morphological similarities between Petralona, Kabwe and Mauer (Rightmire, 1998)



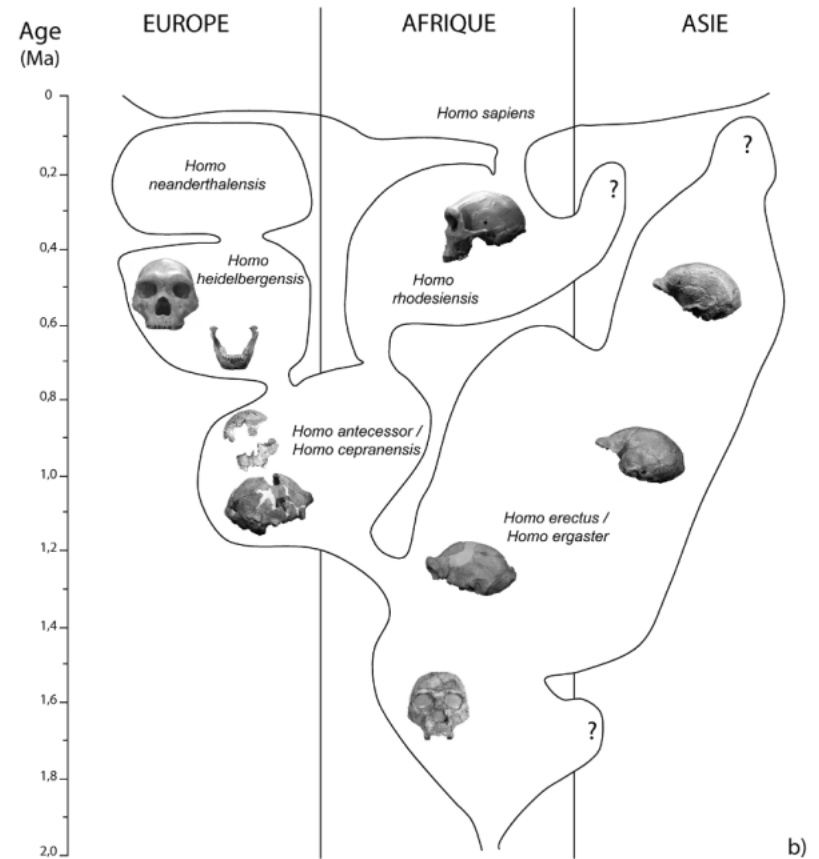
The presence of Neanderthals features on Mauer mandible justified his inclusion in Neanderthals lineage and then the abandon of the name H.heidelbergensis and the introduction of H. mauritanicus represented by the remains of Tighenif and designed as the last common ancestors between Neanderthals and modern humans (Hublin, 2001)



Ipotesi Evolutive: Origine esclusivamente Europea



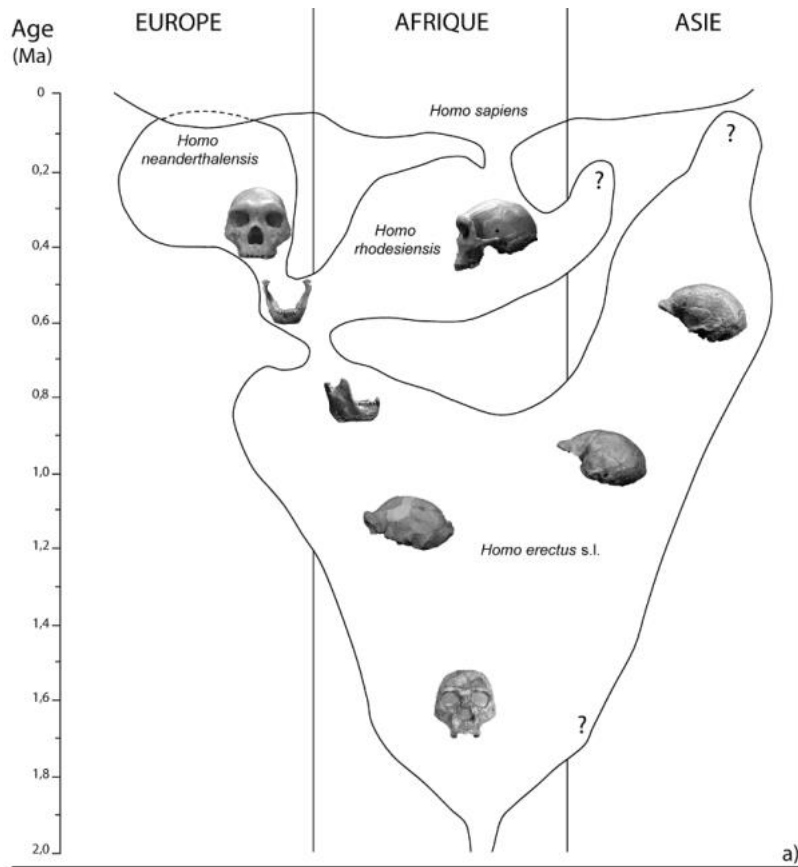
Teoria dell'accrescimento (acquisizione graduale dei caratteri derivati neandertaliani)



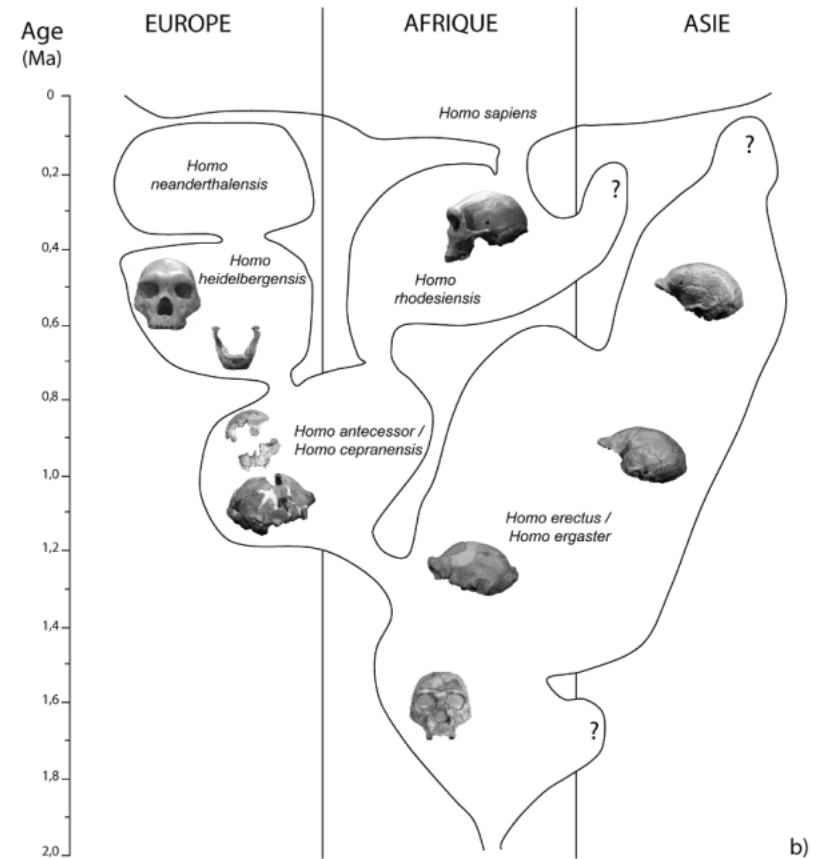
H. antecessor sarebbe l'ultimo antenato comune tra i neandertaliani e i uomini moderni (Bermudez de Castro et al., 1997; Mallegni et al., 2003)



Ipotesi Evolutive: Origine esclusivamente Europea

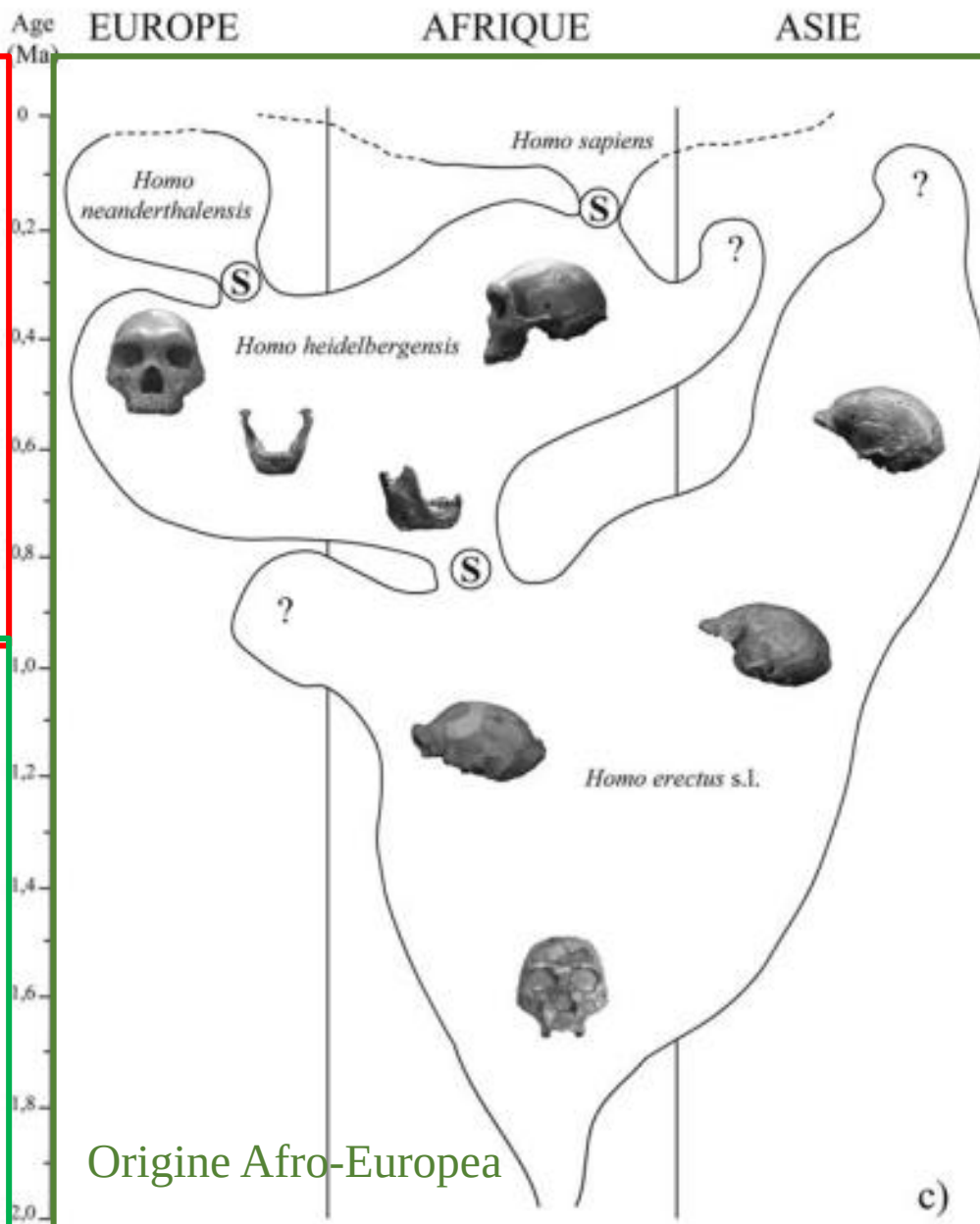
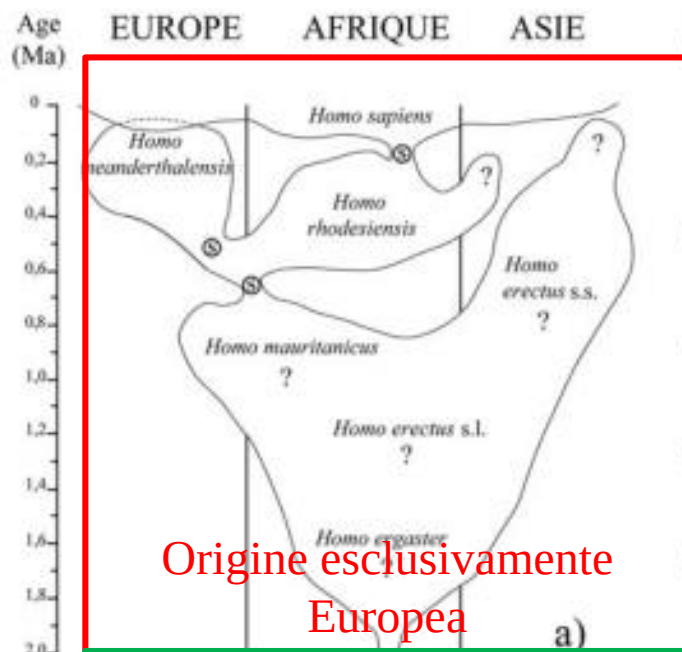


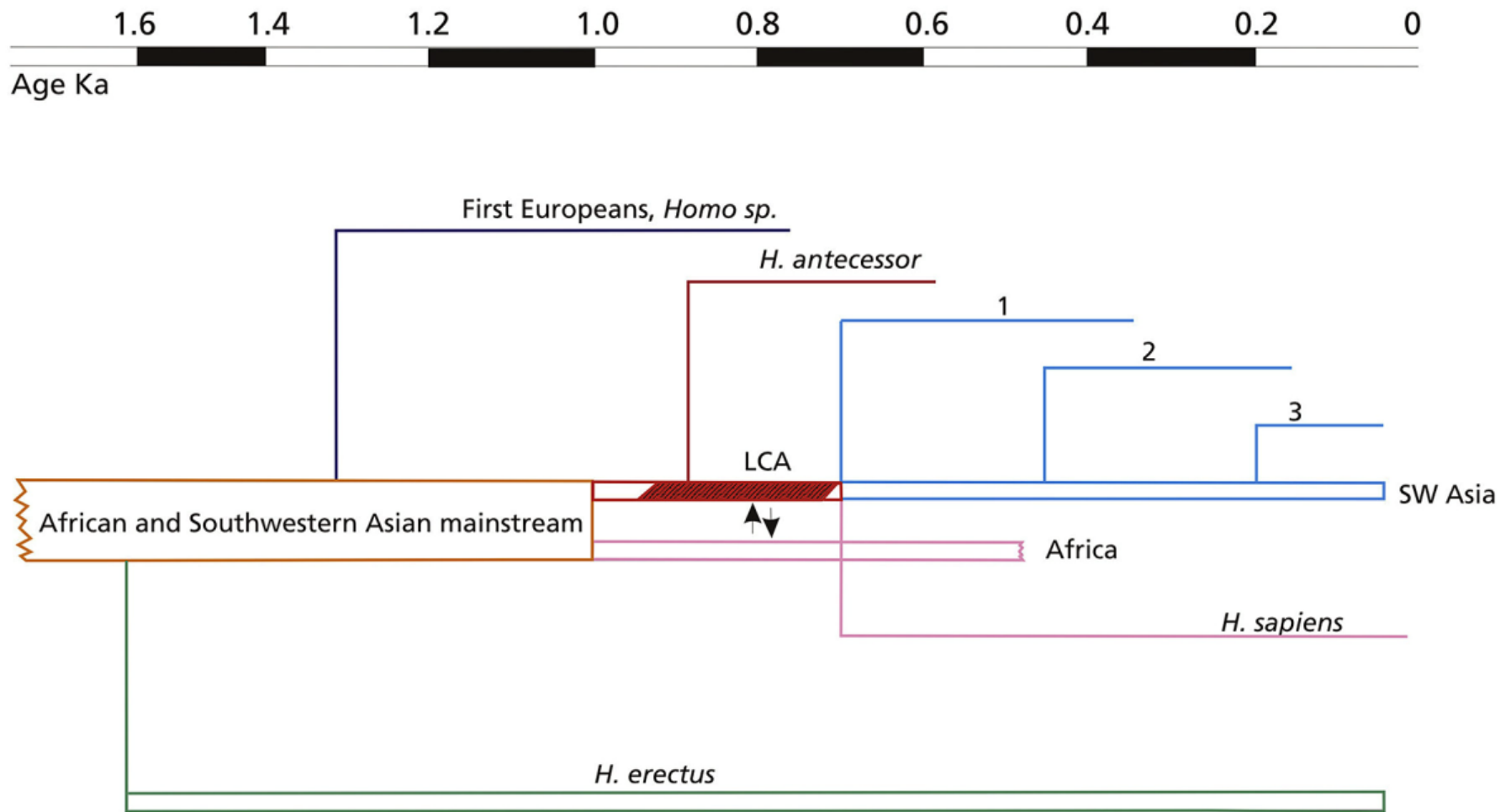
Accretion theory (gradual acquisition of Neanderthals derivative features)



H. antecessor is the last common ancestor between Neanderthals and modern humans (Bermudez de Castro et al., 1997; Mallegni et al., 2003)







H. antecessor = European branch closely related to the LCA Neandertal and MH
H. heidelbergensis removed of the hominin phylogeny
 European Middle Pleistocene specimens could be included in two or more branches of the Neanderthal clade



Definizione dei Neandertaliani s.s.

L'uomo di Neanderthal si caratterizza per la presenza di:

The Neandertals are characterized by the presence of:

- **Caratteri arcaici / Plesiomorfie** : dei caratteri ancestrali che non si ritrovano in nessun fossile moderno.

Archaic features / Plesiomorphies: These are ancestral features which are not found in the modern fossil.

- **Caratteri condivisi** con *Homo sapiens*.

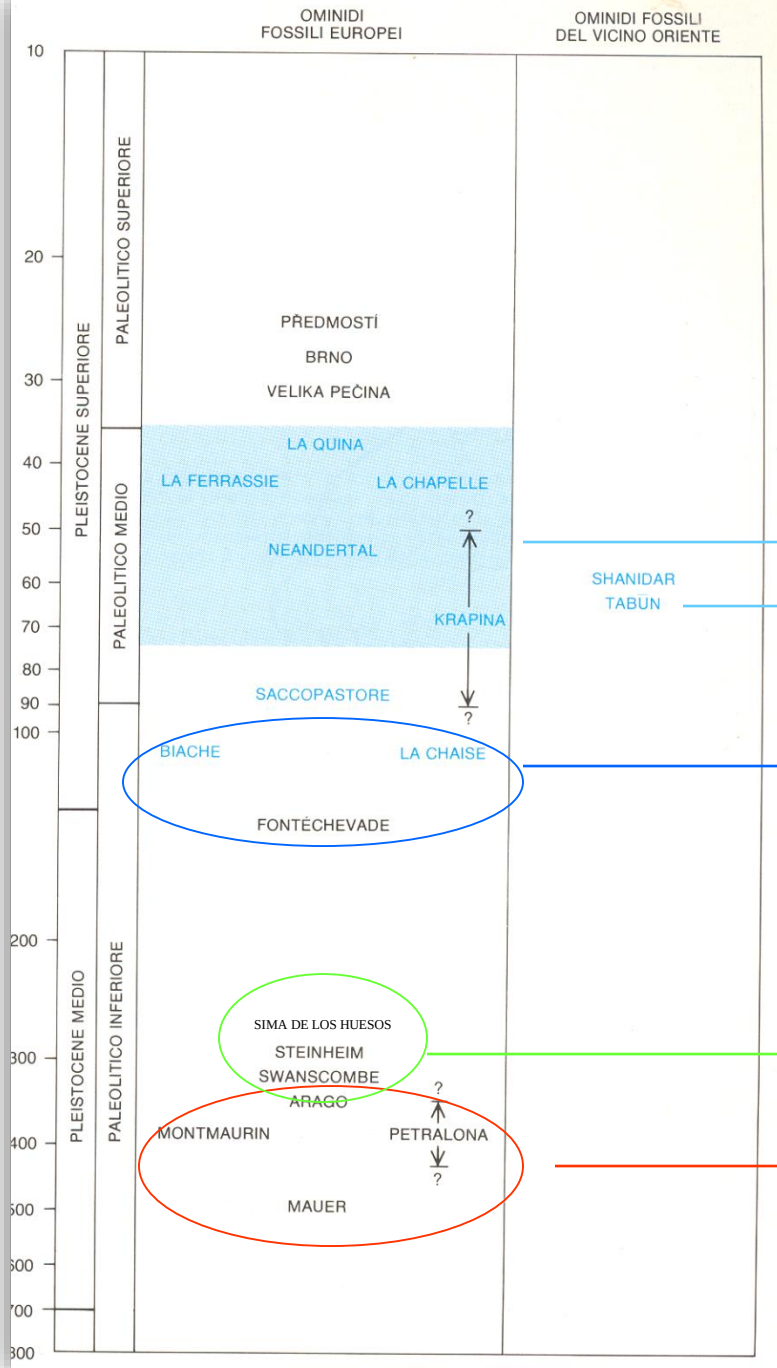
Feature shared with Homo sapiens

- **Caratteri derivati / Apomorfie** : presenti solo nei Neandertaliani, peculiari ed identificativi di questa specie.

Derivated features / Apomorphies: These are present only in the Neanderthals, and allow to identify this species.



I Neandertaliani



Neandertaliani classici
Neandertaliani orientali

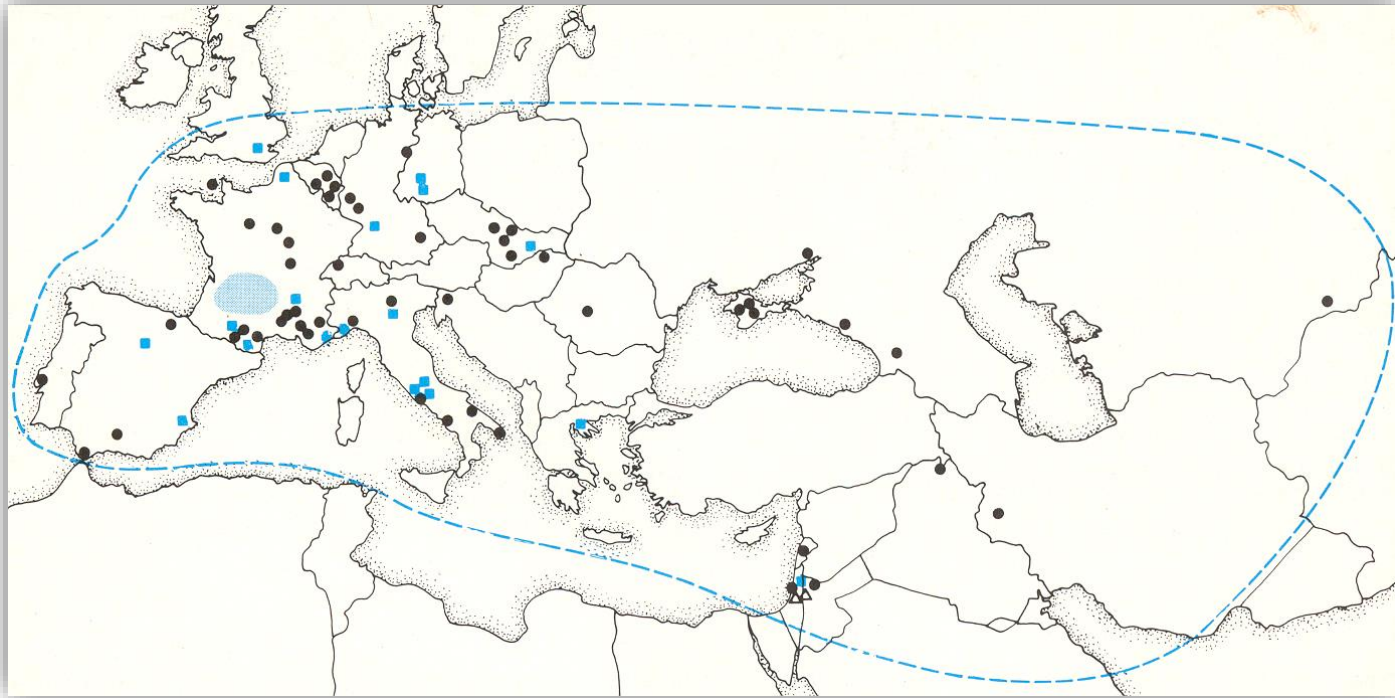
III fase (250.000-130.000):
stabilizzazione dei caratteri

II fase (400.000-250.000): regione
nucale e facciale

I fase (prima di 400.000): regione
infraorbitaria e mandibola



I Neandertaliani



Una speciazione di questi caratteri si osserva nel tempo e nello spazio, infatti i caratteri derivati si mostrano sempre più accentuati man mano che ci si sposta verso Ovest.

→ attorno a 50000 anni in Europa occidentale, gli individui di Neanderthal presentano dei caratteri derivati più pronunciati rispetto agli individui neandertaliani dell'Europa orientale.

A speciation of these features can be observed in time and space. In fact the derived features are more accentuated going toward Western Europe.

→ around 50 000 years in Western Europe, the neanderthal present derived features more marked compared to the Neanderthal from Eastern Europe.



Il Cranio



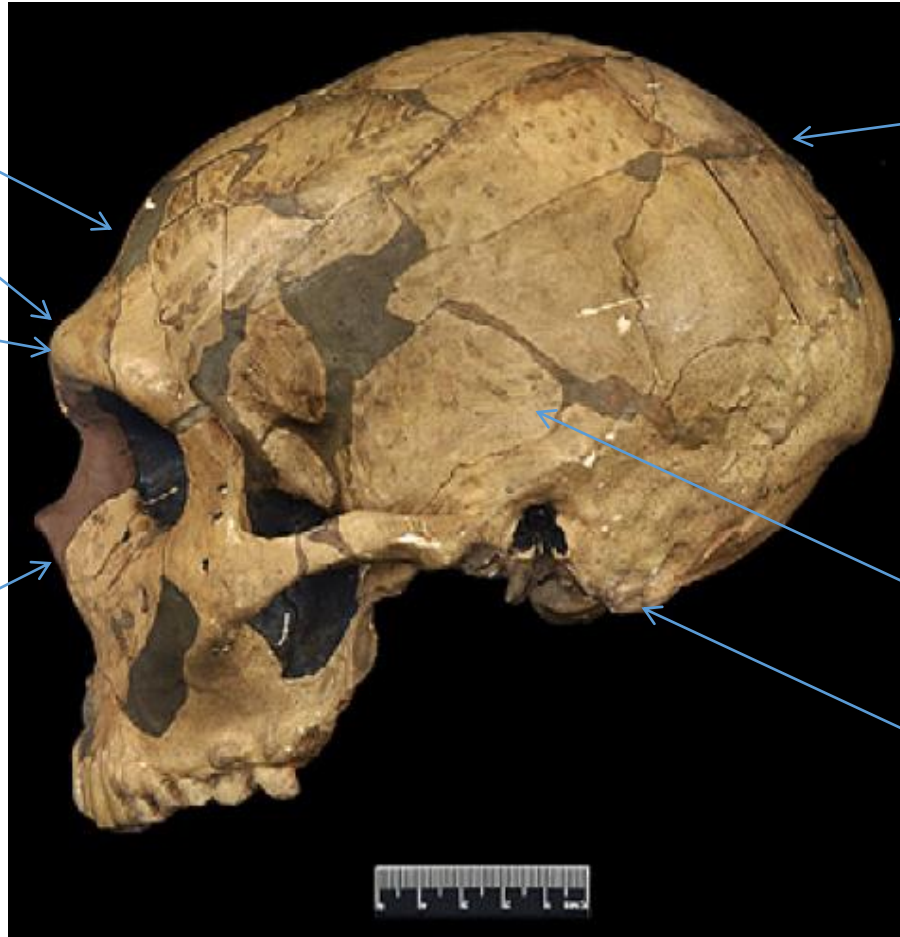
Grande capacità cranica 1500-1700 cm³

Frontale sfuggente

Toro sopraorbitario

Glabella sporgente

Naso alto, e proiettato
verso avanti =
Prognatismo meso-
facciale



Occipito-parietale
piatto

Occipitale pinzato

Piano nucale e Piano
occipitale formano un
angolo chiuso

Temporale basso

Apofisi mastoidee
piccole e poco sviluppate

Il cranio cerebrale è allungato per compensare la faccia
voluminosa

La Ferrassie 1



CC 1500-1700
cm³

Fleeing frontal

Sus-orbital torus

Protruding glabella

*High nose and projected
forward = mid-facial
prognatism*

*Flat Occipito-
parietal*

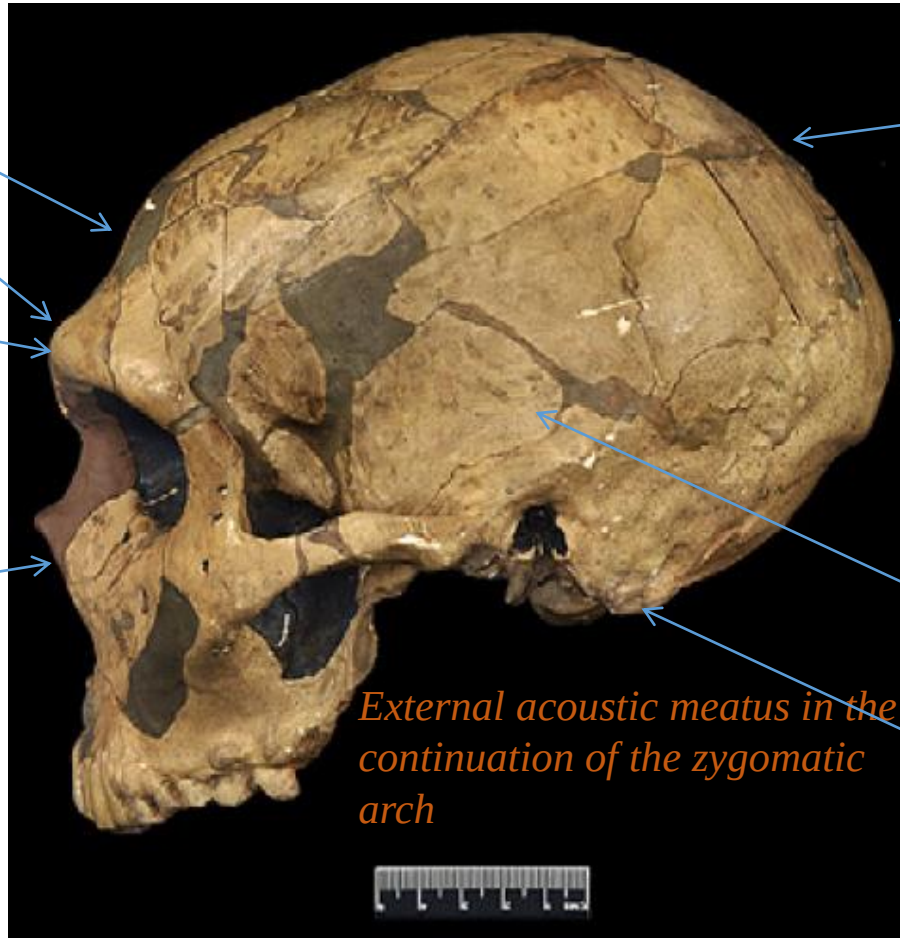
Pinned Occipitale

*Nuchal and occipital
plan are forming a
closed angle*

Low temporal

*Small Mastoid apophysis
and under developed*

*External acoustic meatus in the
continuation of the zygomatic
arch*



The cranium is elongated to balance the voluminous face

La Ferrassie 1

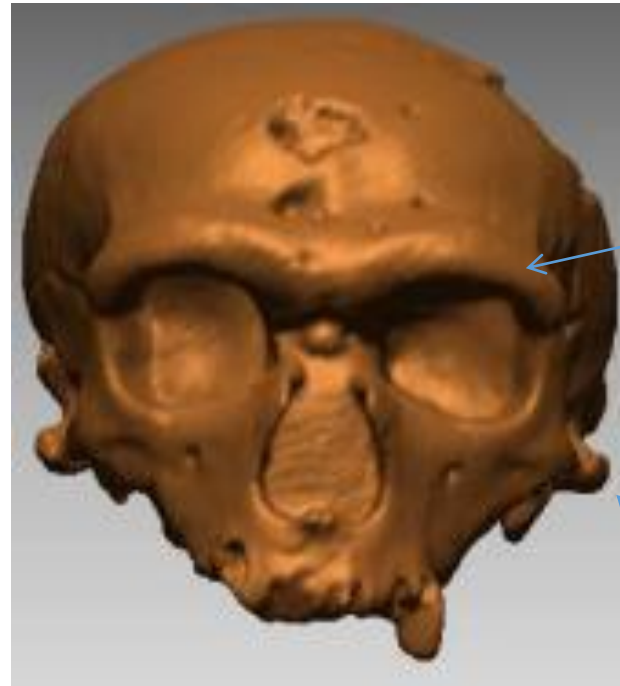


Orbite più large che alte, arrotondate e grandi

Cavità nasale alta e voluminosa



La Ferrassie 1



La Chapelle-aux-Saints 1

Toro sopraorbitario continuo

Arcata zigomatica sporgente



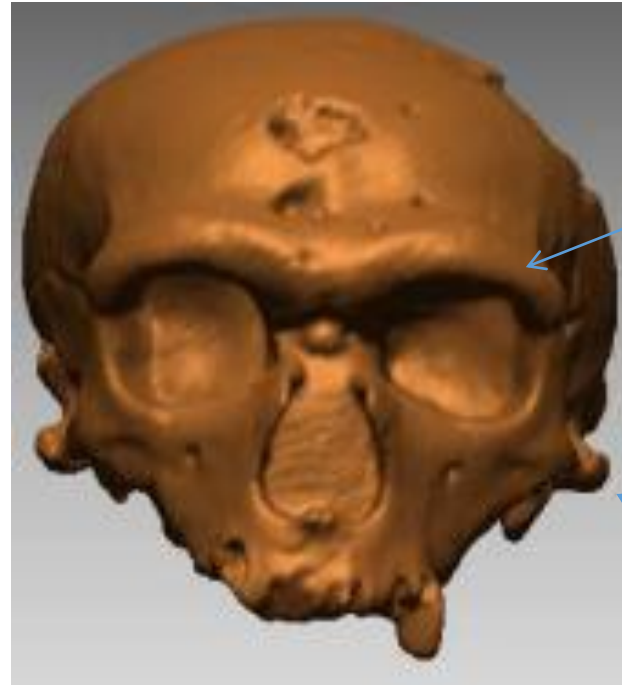
Assenza di fossa canina

Larger than higher orbit, rounded and wide

Nasal cavity high and voluminous



La Ferrassie 1



La Chapelle-aux-Saints 1

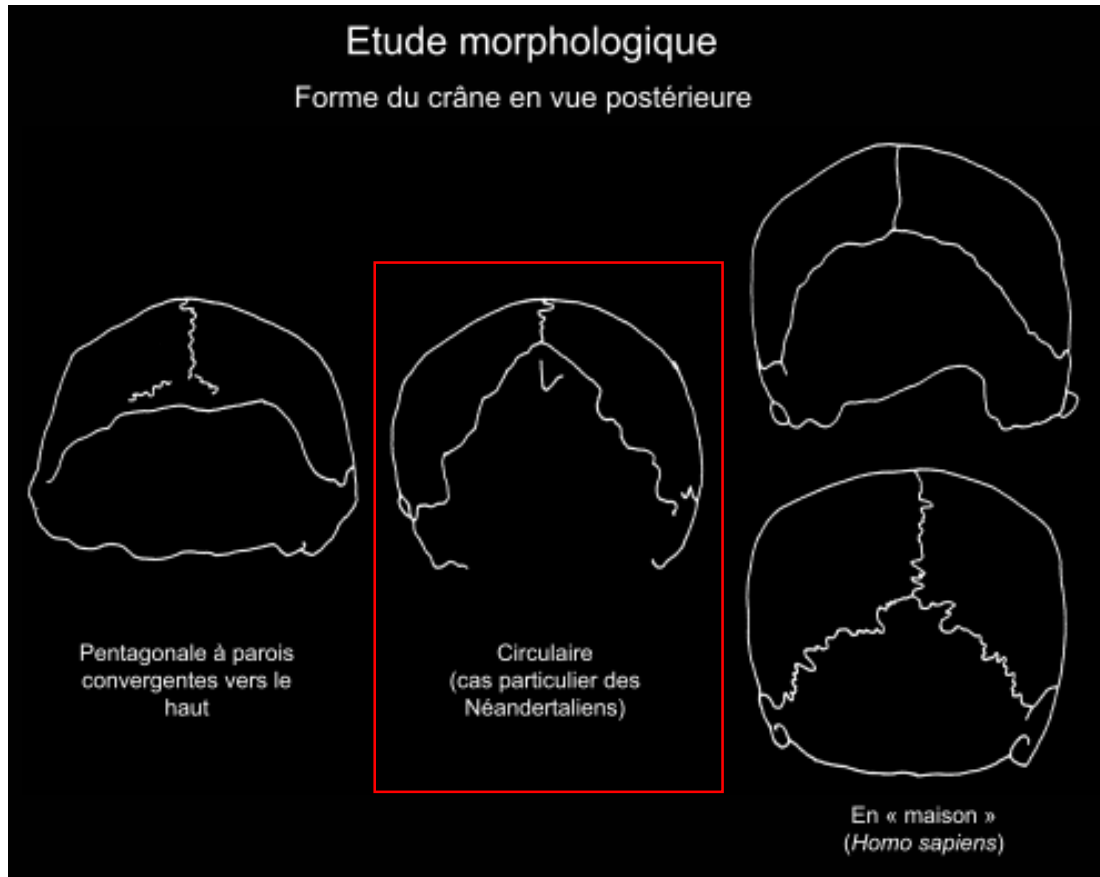
Sus-orbital torus continuous

Projected zygomatic arch

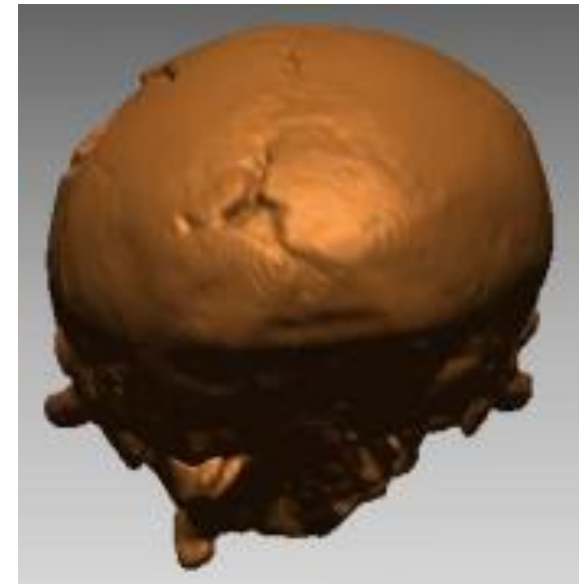


Absence of canine fossa

Forma circolare del cranio in vista posteriore
Circular shape of the cranium in posterior view



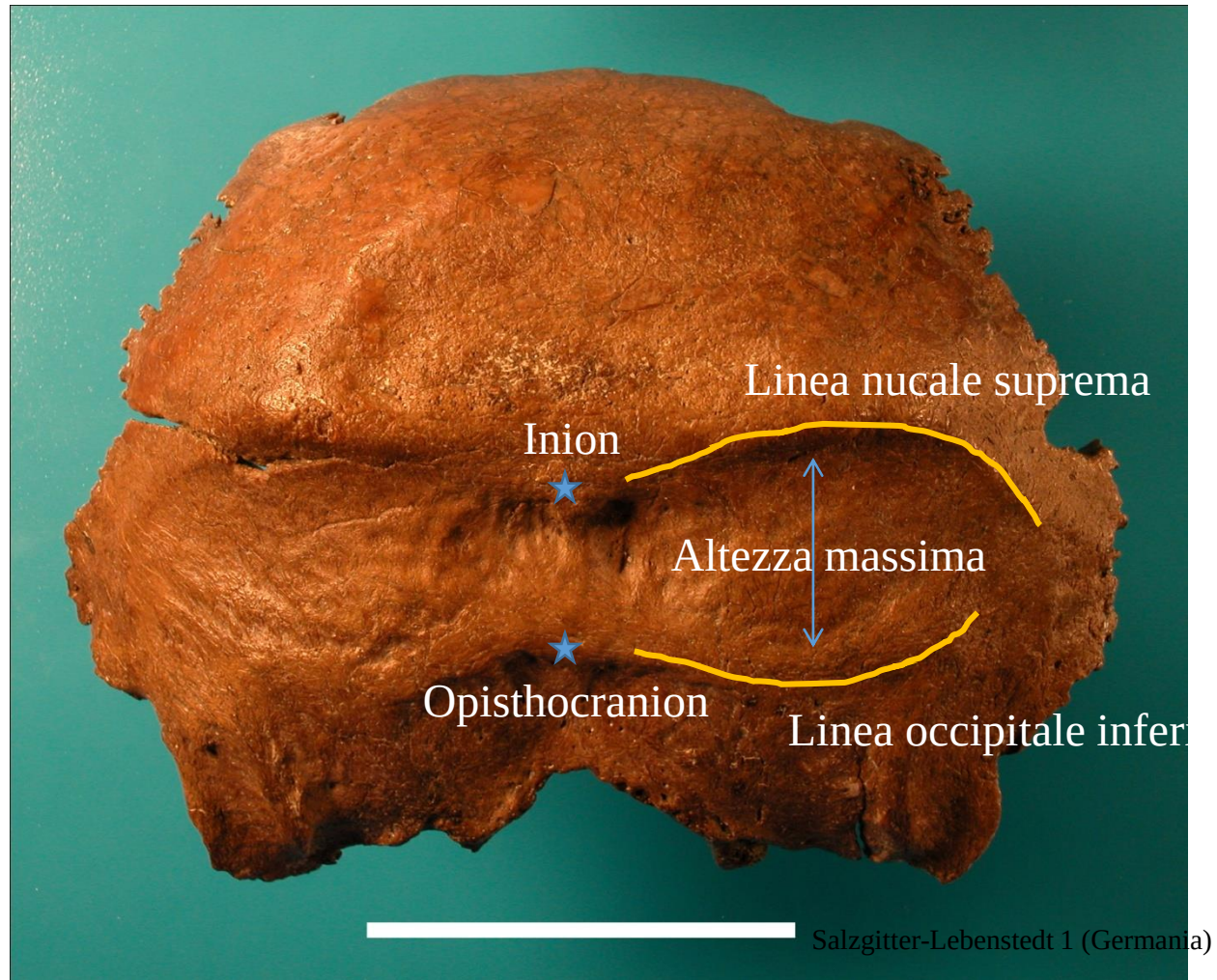
Chignon occipitale

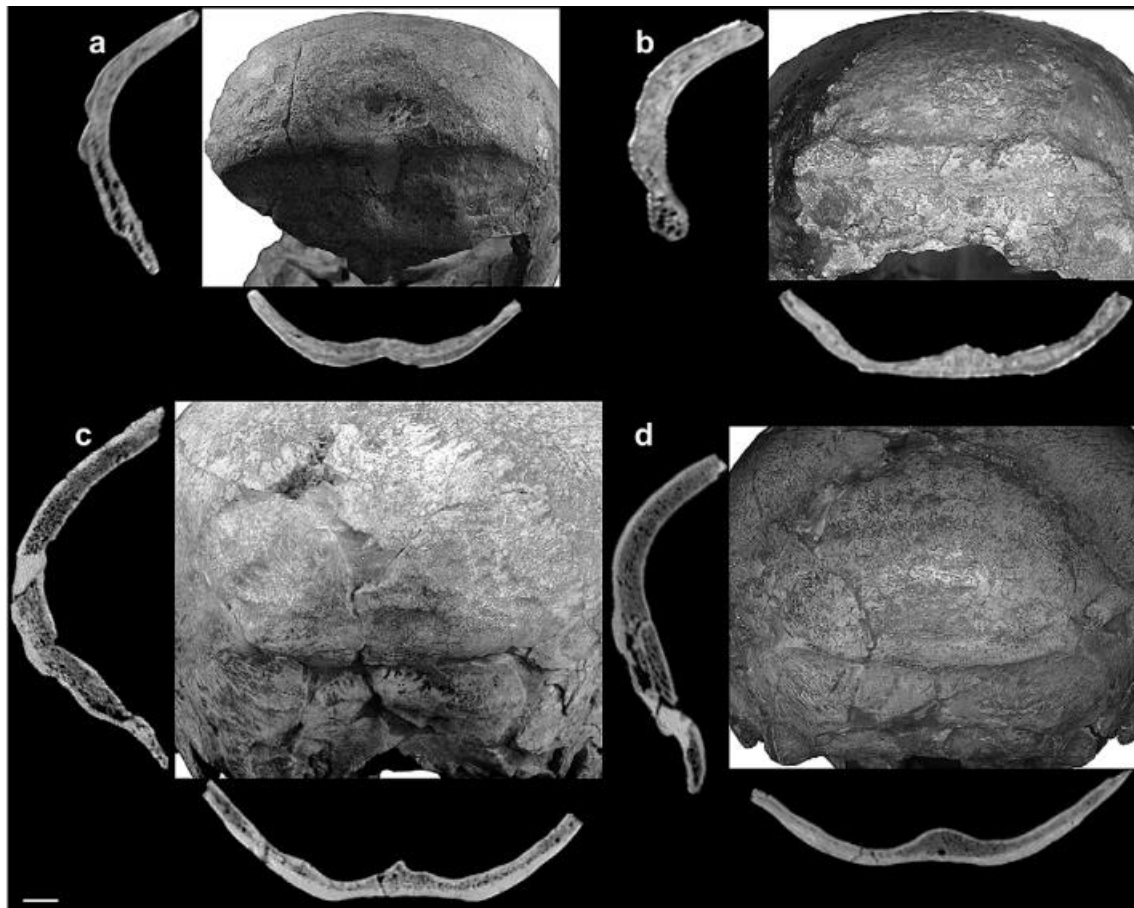


La Chapelle-aux-Saints (Francia)



Fossa soprainiaca / *suprainiac fossa*





- a: Gibraltar 1
- b: Guattari 1
- c: La Chapelle-aux Saints 1
- d: La Ferrassie 1

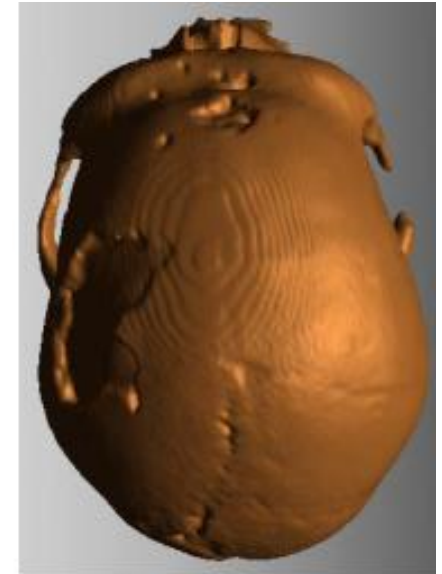
(Balzeau, 2010)

La fossa soprainiacca è un carattere derivato dei neandertaliani che si ritrova in tutti i campioni, si individua già durante i primi stadi di sviluppo ed è presente presto nella differenziazione della linea.

Corrisponde ad un assottigliamento della diploe.

The suprainiac fossa is a derived feature of the Neandertals which is found in all the samples, and is already observed in the first development stage and is present early in the differentiation of the line. This corresponds to a thinning of the diploe.





Homo neanderthalensis
(La Chapelle-aux-Saints
1)

Cranio allungato / *elongated cranium*

Zigomi sporgenti / *prominent zygomatic*

Larghezza massima in posizione bassa /
maximum width in a low position



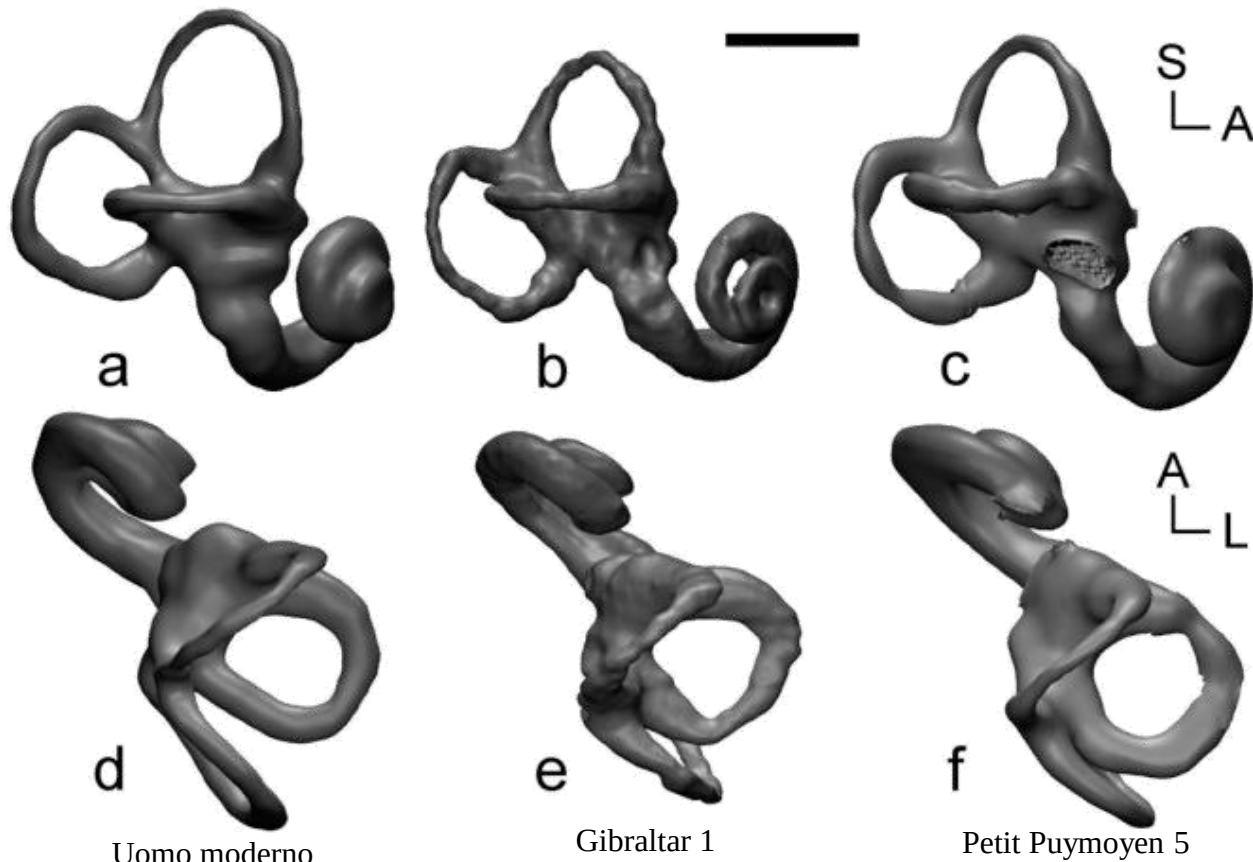


Fig. 2. Lateral (a)–(c) and superior (d)–(f) aspects of the right bony labyrinths of a Holocene human (a), (d), and the Neanderthal specimens Gibraltar 1 (b), (e) and Petit Puymoyen 5 (c), (f), reconstructed from sagittal CT scans. The lateral views are aligned according to the plane of the lateral semicircular canal. S, superior, A, anterior, and L, lateral. Scale bar is 5 mm.

Rispetto all'uomo moderno l'orecchio interno del Neanderthal è caratterizzato da un arco del canale semicircolare anteriore più piccolo nel valore assoluto e relativo, abbastanza appuntito e con più torsioni.

Compared with Holocene humans the bony labyrinth of Neanderthals can be characterized by an anterior semicircular canal arc which is smaller in absolute and relative size, is relatively narrow, and shows more torsion.

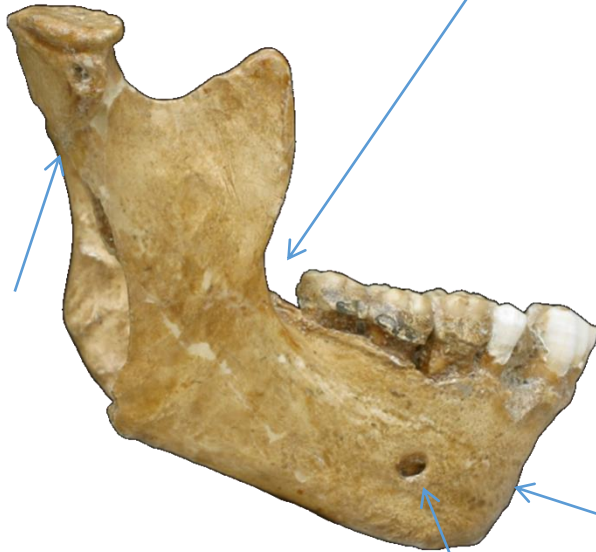


La mandibola



Spazio retro-molare

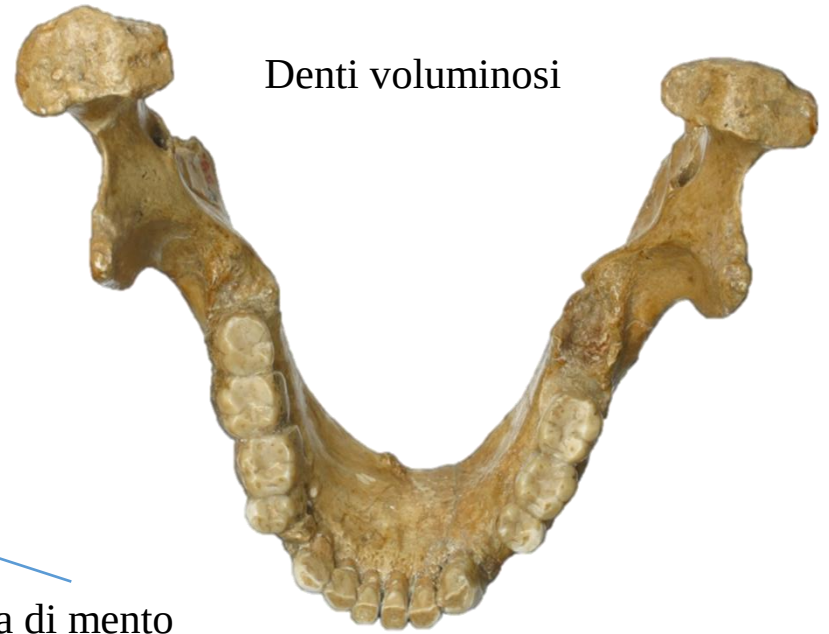
Ramo largo e
divergente



Foramen mentoniero spostato
indietro

Assenza di mento

Denti voluminosi

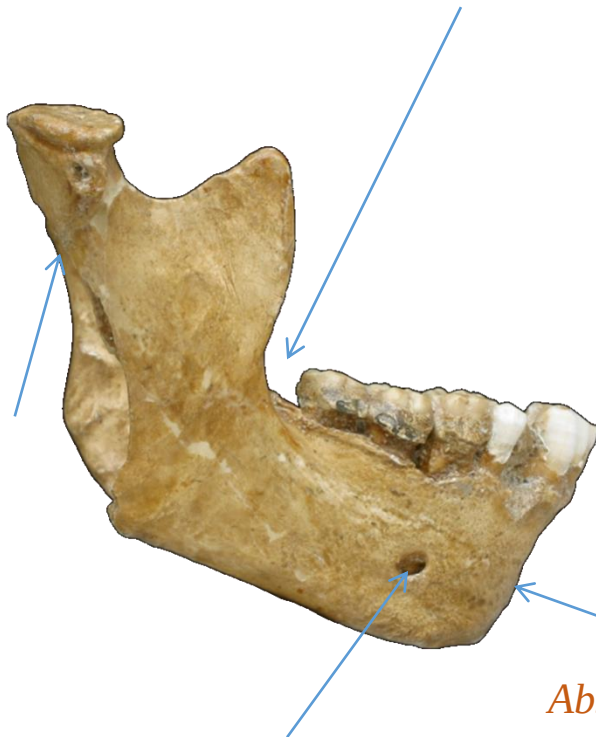


Krapina 59 (Croazia)



Retromolar space

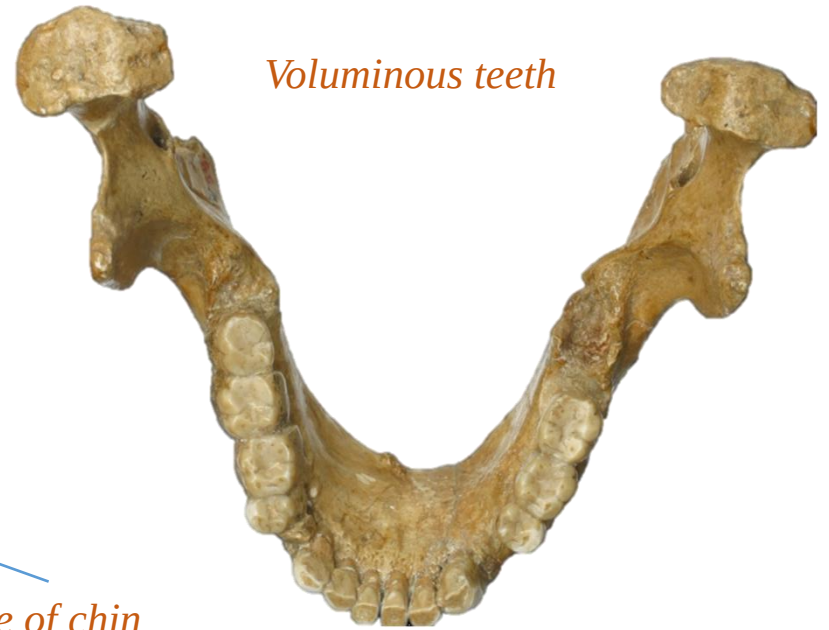
*Large and
divergent
ramus*



Mental foramen backward

Absence of chin

Voluminous teeth



Krapina 59 (Croazia)

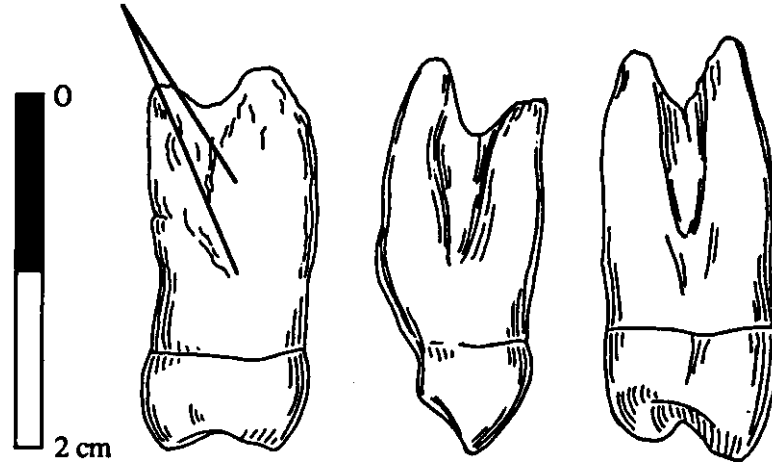


Dentizione





radici fuse
e cavità pulpare
ingrandita



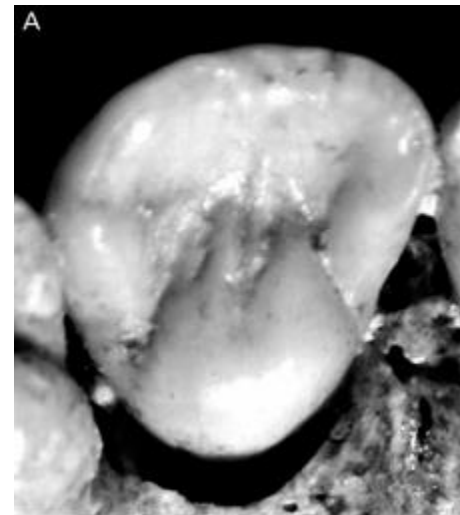
Denti premolari e molari taurodonti di Krapina

Taurodontismo: Grande cavità pulpare

Taurodontism: Big pulp cavity

Incisivo con una forma di spatola e con una convessità labiale e un tubercolo linguale

Incisive shovel-shaped, with a labial convexity and a lingual tubercle



Elementi post-craniali



1,65m – 1,55m

Scheletro robusto con inserzioni muscolari robuste.

Robust skeleton with powerful muscular insertion

Vertebre cervicali che denotano un collo corto e tozzo

Cervical vertebra induce a short and squat neck

Muscolatura dorsale molto sviluppata

Dorsal musculature well developed

Torace largo, sviluppato lateralmente e verso l'avanti

Large thorax, laterally and frontward developed

Il radio presenta una curvatura che denota una grande capacità di movimento.

The radius is curved which indicate an importante mouvement capacity.

Clavicola grande e gracile

Large and gracile clavicle

Mani grandi ma con dita corte: presa potente ed efficace

Large hand with short finger: powerful and effective handle



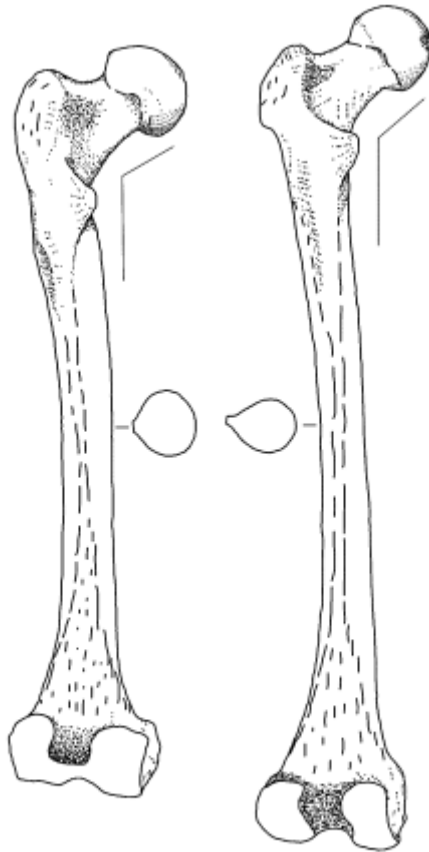
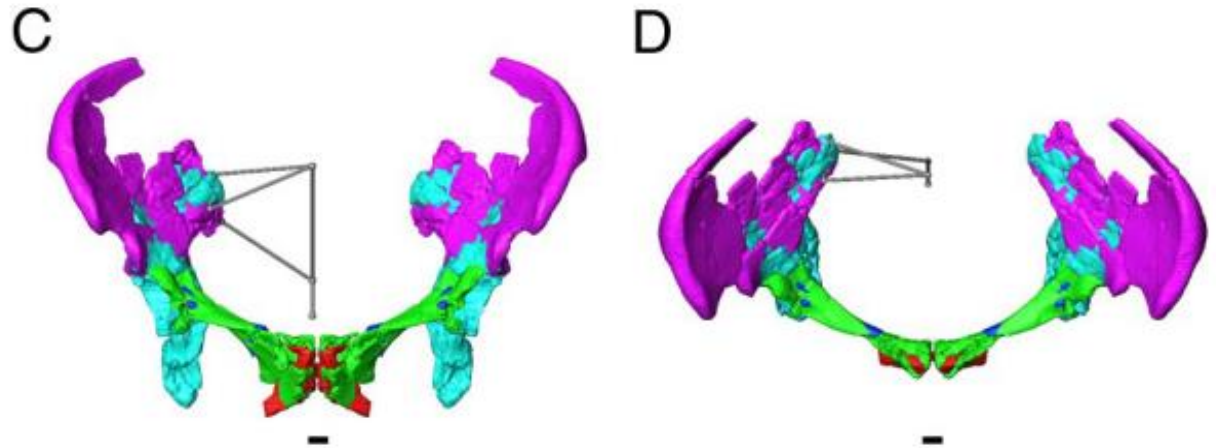


Fig. 1. Distinctive features of the Neanderthal femur. (Left) The Neanderthal 1 (Feldhofer Cave Neanderthal) femur. (Right) The Skhul IV near-modern human femur. Relative to near-modern humans, the Neanderthal femur has larger articulations (head and distal end), a thicker and rounder shaft, and a lower neck-shaft angle. Adapted from McCown and Keith (9).

(Weaver, 2003)

Allungamento mesio-laterale della branca orizzontale dell'osso pubico. Il pube risulta molto alto e gracile.

Extension meso-lateral of the horyzontal crest of the pubic bone. This bone is high and gracile.



Ricostruzione virtuale delle pelvi del neandertal di Tabun (Weaver & Hublin)

Femore corto e curvo. L'epifisi è voluminosa e la diafisi presenta una sezione cilindrica.

L'angolo tra la testa e la diafisi è piccolo.

The femur short and curved. The epiphysis is voluminous and the diaphysis present a cylindrical section.

The angle between the femoral head and the diaphysis is small.



Significato della morfologia



Evoluzione della linea neandertaliana

Il modello di evoluzione dei Neanderthal è detto ad accrezione: questo gruppo di ominidi si è sviluppato in un parziale o completo isolamento dal resto dell'umanità.

Questo sviluppo è il risultato di un'accumulazione graduale di tratti morfologici distintivi delle popolazioni Europee.

Alcuni studiosi hanno ipotizzato che i tratti neandertaliani si siano sviluppati seguendo un adattamento a delle condizioni climatiche fredde :

Larga cavità nasale

Robustezza

Morfologia tarchiata



Evolution of Neanderthal lineage

The evolution model of Neanderthal is ad accretion: this hominid group evolved in a partial or complete isolation from the rest of the humanity

This development is the result of a gradual accumulation of morphological features, distinct from European population

Some researchers hypothesized that Neanderthals features have been developed following an adaptation to cold climatic conditions:

Large nasal cavity

Robustness

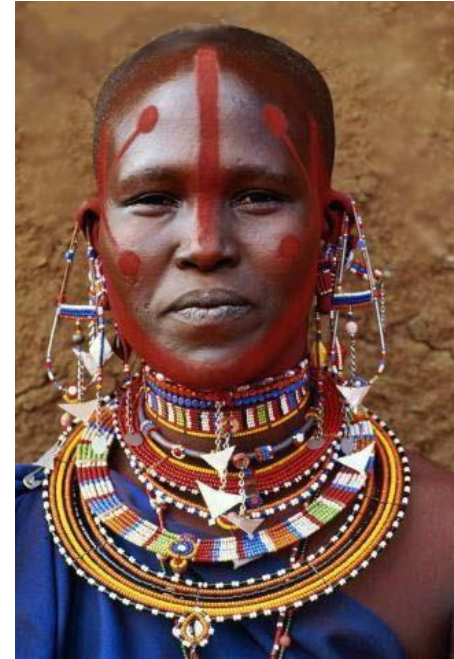
Stocky morphology



Adattamento al freddo

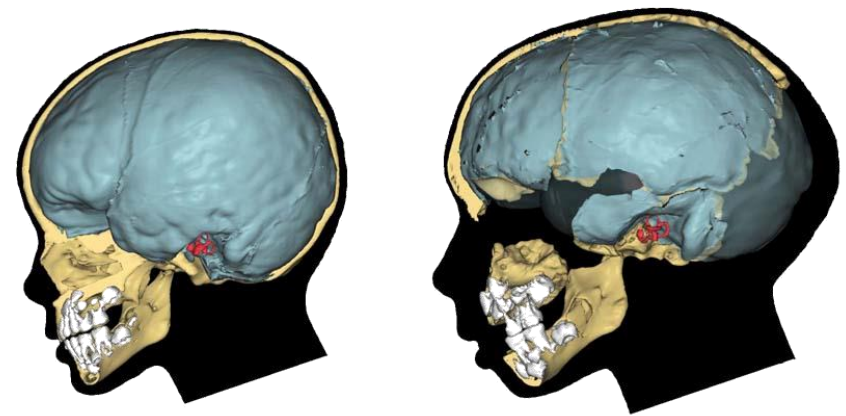
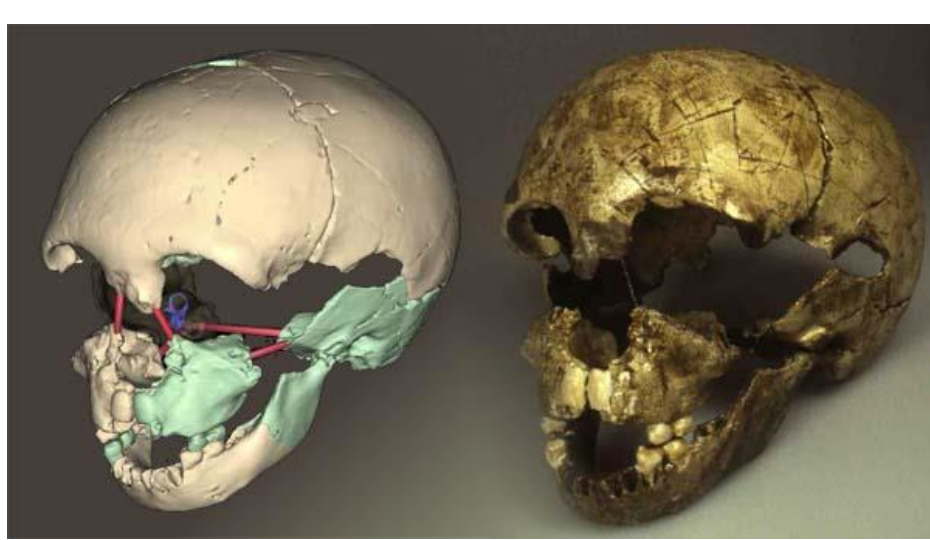
Regola di Allen : In un clima freddo, gli individui tendono ad essere più larghi e ad avere degli arti più corti rispetto a quelli che vivono in un clima temperato, poiché in questo modo la ritenzione del calore è più efficace (rapporto massa corporea/superficie esposta)

In cold climat, individuals tends to have shorter limbs than the one from warmer climates, in this way the heat rentention is more effective (ratio corporeal mass/exposed surface)



Ontogenesi

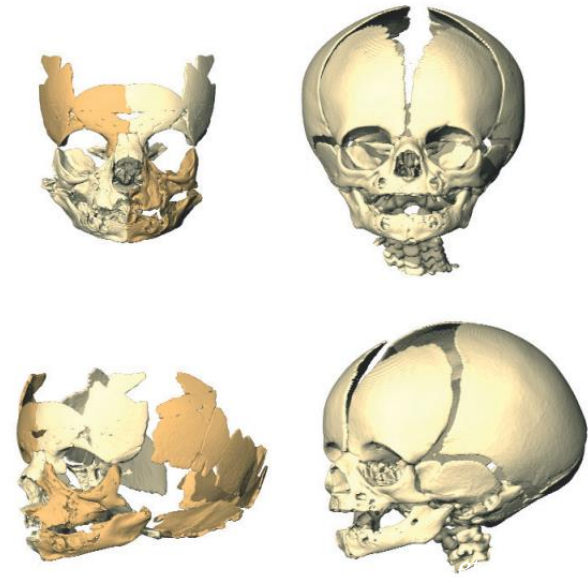




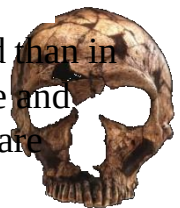
Gibraltar 2, Devil's Tower

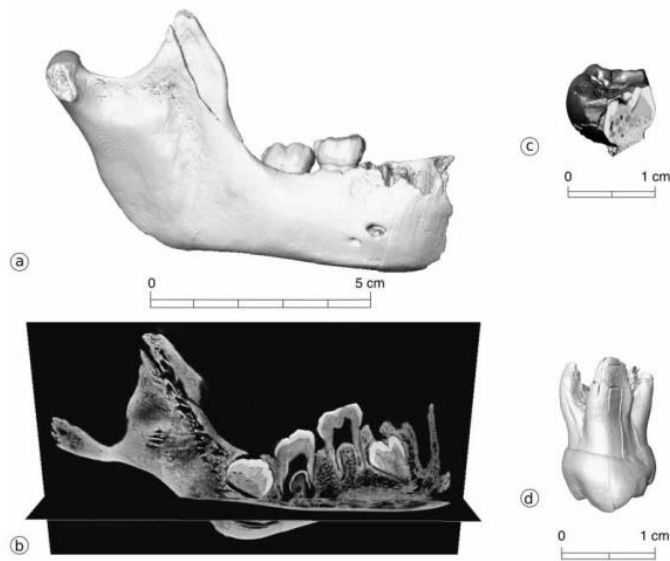


Dederiyeh, Syria



Le Moustier 2 is larger and more projected than in the modern human. Orbital, nasal shape and infraorbital surface of Le Moustier 2 are characteristic for Neanderthals





(a and b) Right hemi-mandible from Scladina (Scla 4A-1).
 (c) Probable Neandertal deciduous molar from Couvin. (d)
 deciduous second upper molar from Engis 2

Sequenze d'eruzione dei denti permanenti: differenze
 tra *sapiens* e *Neanderthal*

Homo sapiens: M1 – I1- I2 – P1 – C-P2-M2-M3

Homo neanderthalensis: M1-I1-I2-C-M2-P1-P2-M3

Eruzione dei denti in *Homo sapiens*

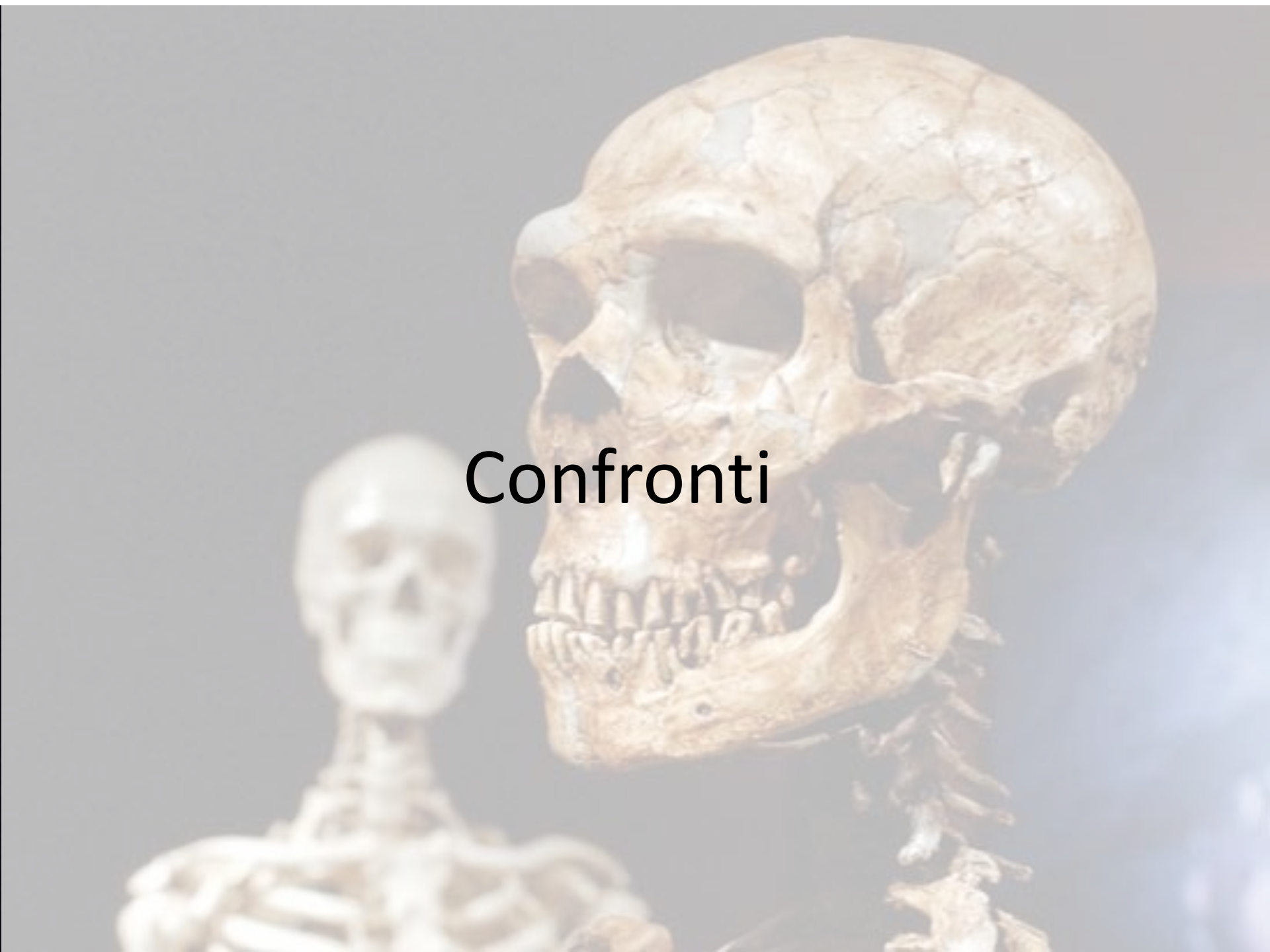
PRIMARY DENTITION

Upper Teeth		Erupt	Exfoliate
Central incisor		8-12 months	6-7 years
Lateral incisor		9-13 months	7-8 years
Canine (cuspid)		16-22 months	10-12 years
First molar		13-19 months	9-11 years
Second molar		25-33 months	10-12 years
Lower Teeth		Erupt	Exfoliate
Second molar		23-31 months	10-12 years
First molar		14-18 months	9-11 years
Canine (cuspid)		17-23 months	9-12 years
Lateral incisor		10-16 months	7-8 years
Central incisor		6-10 months	6-7 years

PERMANENT DENTITION

Upper Teeth		Erupt
Central incisor		7-8 years
Lateral incisor		8-9 years
Canine (cuspid)		11-12 years
First premolar (first bicuspid)		10-11 years
Second premolar (second bicuspid)		10-12 years
First molar		6-7 years
Second molar		12-13 years
Third molar (wisdom tooth)		17-21 years
Lower Teeth		Erupt
Third molar (wisdom tooth)		17-21 years
Second molar		12-13 years
First molar		6-7 years
Second premolar (second bicuspid)		10-12 years
First premolar (first bicuspid)		10-11 years
Canine (cuspid)		11-12 years
Lateral incisor		8-9 years
Central incisor		7-8 years

Source: Adapted with permission from the Arizona Department of Health Services, Office of Oral Health, courtesy of Don Altman, D.D.S., M.P.H. The assistance of the American Dental Hygienists' Association is gratefully acknowledged.

The image features two human skulls against a dark, textured background. The skull on the right is in sharp focus, showing a large, rounded braincase, a prominent brow ridge, and a wide, toothy jaw. The skull on the left is out of focus, appearing smaller and more delicate. The word 'Confronti' is centered between the two skulls.

Confronti

Definizione dei Neandertaliani s.s.

L'uomo di Neanderthal si caratterizza per la presenza di:

The Neandertals are characterized by the presence of:

- **Caratteri arcaici / Plesiomorfie** : dei caratteri ancestrali che non si ritrovano in nessun fossile moderno.

Arcaic features / Plesiomorphies: These are ancestral features which are not found in the modern fossil.

- **Caratteri condivisi** con *Homo sapiens*.

Feature shared with Homo sapiens

- **Caratteri derivati / Apomorfie** : presenti solo nei Neandertaliani, peculiari ed identificativi di questa specie.

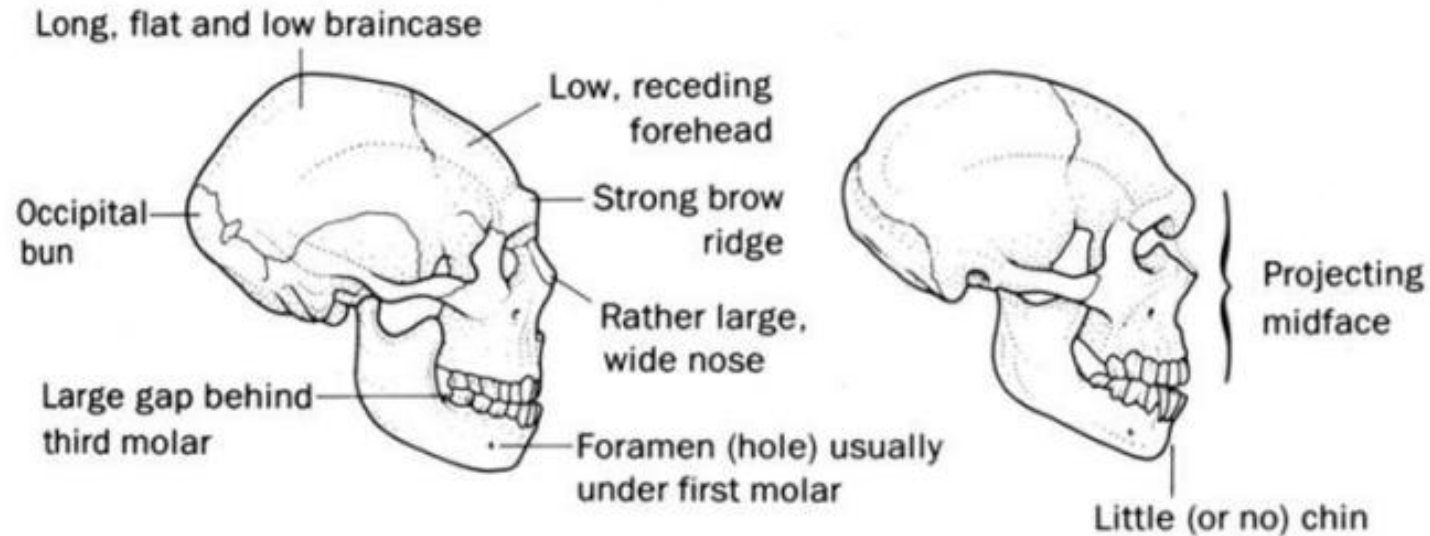
Derivated features / Apomorphies: These are present only in the Neanderthals, and allow to identify this species.



Homo neanderthalensis VS *Homo erectus*

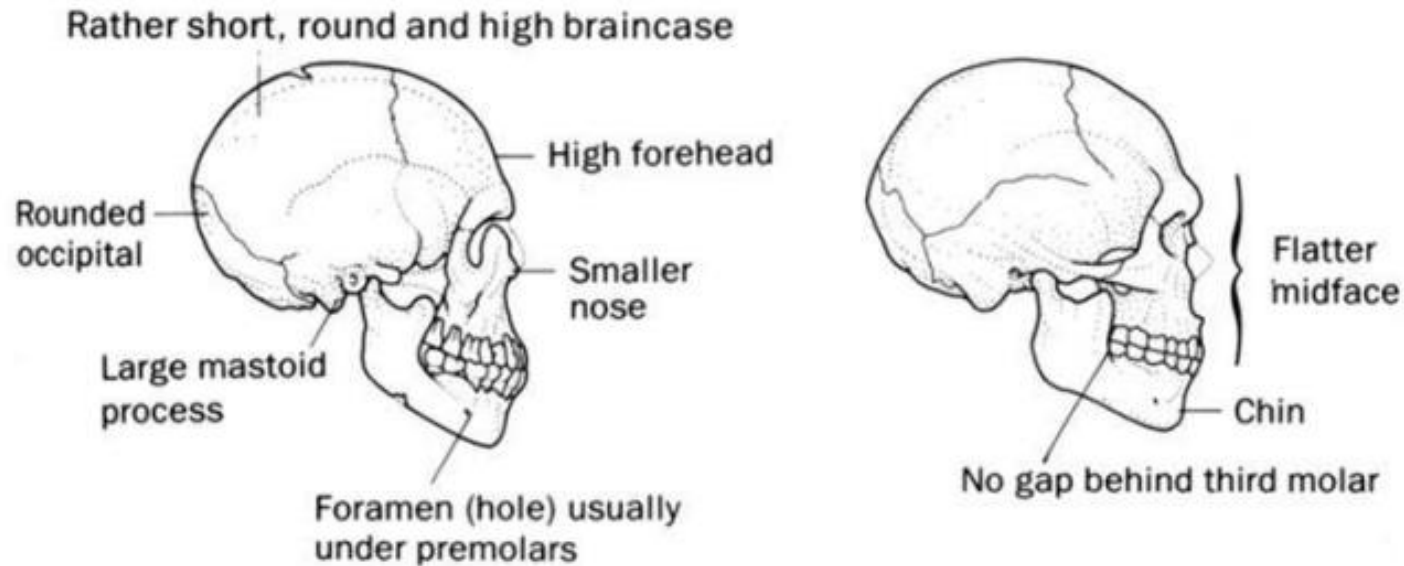


Homo neanderthalensis VS *Homo sapiens*



Shanidar 1

La Ferrassie 1



Qafzeh 9

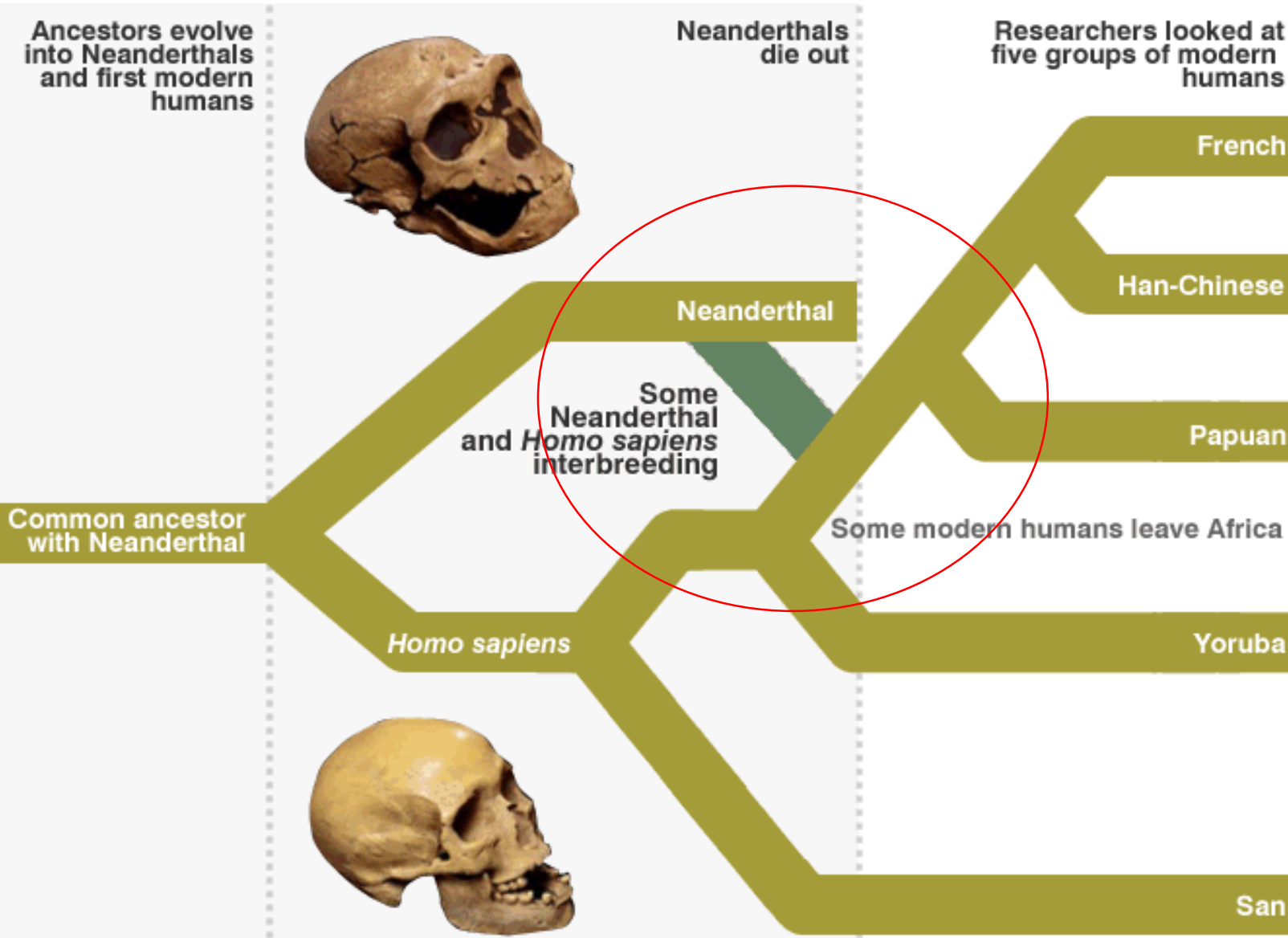
Předmostí 3



Genetica



Uno di noi?



Green et al. (2010)

- Quando le popolazioni ancestrali Neandertaliane e umane moderne hanno subito una divergenza evolutiva? *Divergence time between the ancestral Neandertal population and the modern human :*

tra 270,000 e 440,000 anni fa

- Da 1 a 4 % del genoma della popolazione Euroasiatica è derivato dai Neandertaliani. Il flusso genetico tra uomini moderni e Neandertaliani è avvenuto prima della divergenza tra gli europei , gli asiatici, e i papuani, tra 50,000 e 80,000 anni fa, in concordanza con i ritrovamenti archeologici.

From 1 to 4 % of the Eurasiatic population's genoma derives from the Neandertal. The genetic flow between modern human and Neandertal occurred before the divergence between European, Asiatic and Papuan populations, between 50,000 and 80,000 years, in correspondence with the archeological discoveries.

- L'incontro è stato puntuale da un punto di visto cronologico e localizzato solo nel Vicino Oriente.

The encounter was punctual in a chronological point of view and localized only in a the Nearest.



L'incontro in Europa



Peștera cu Oase, Romania
40 000 anni BP



(Fu et al., 2015)

Problematiche



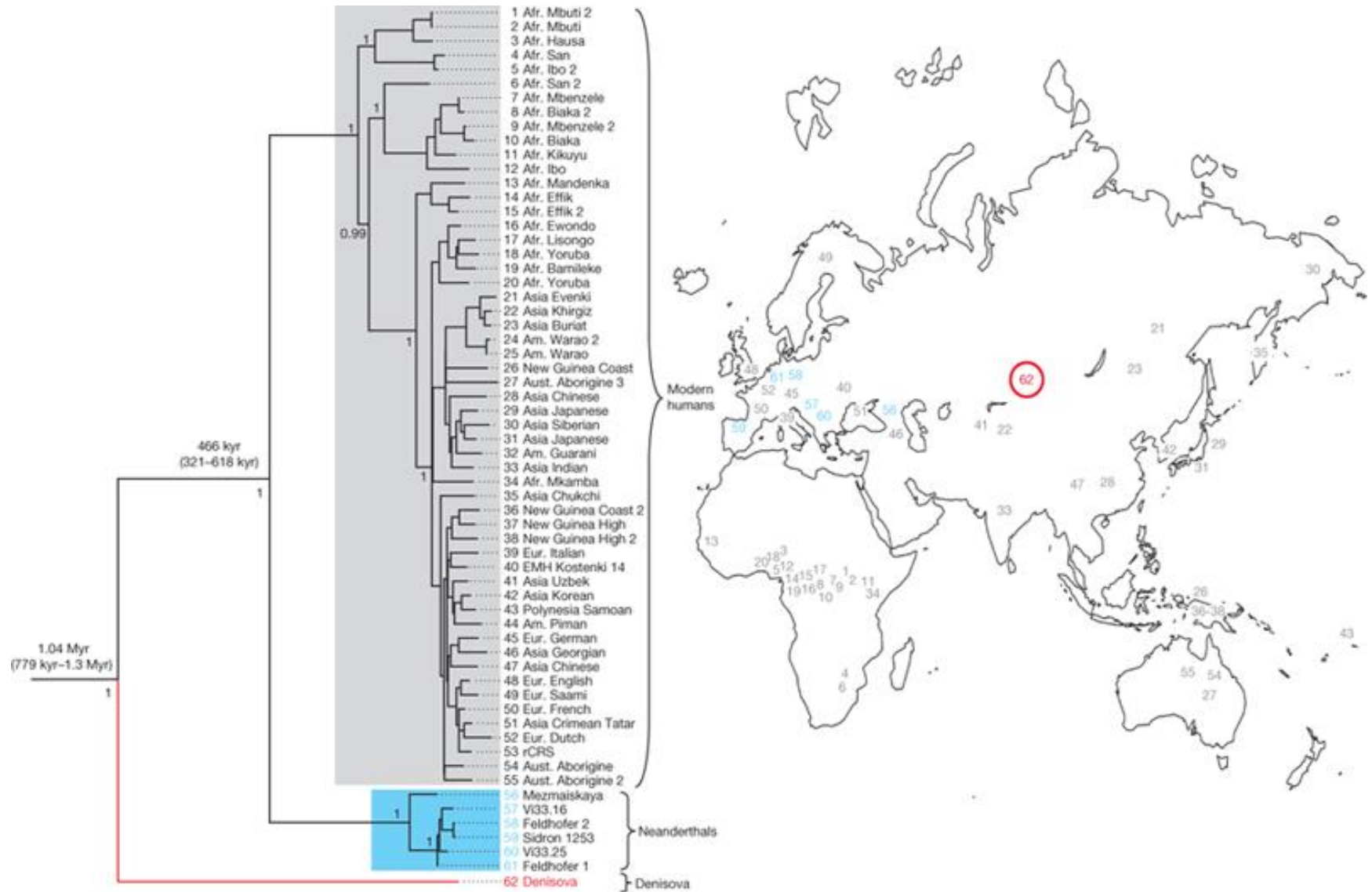
Denisova



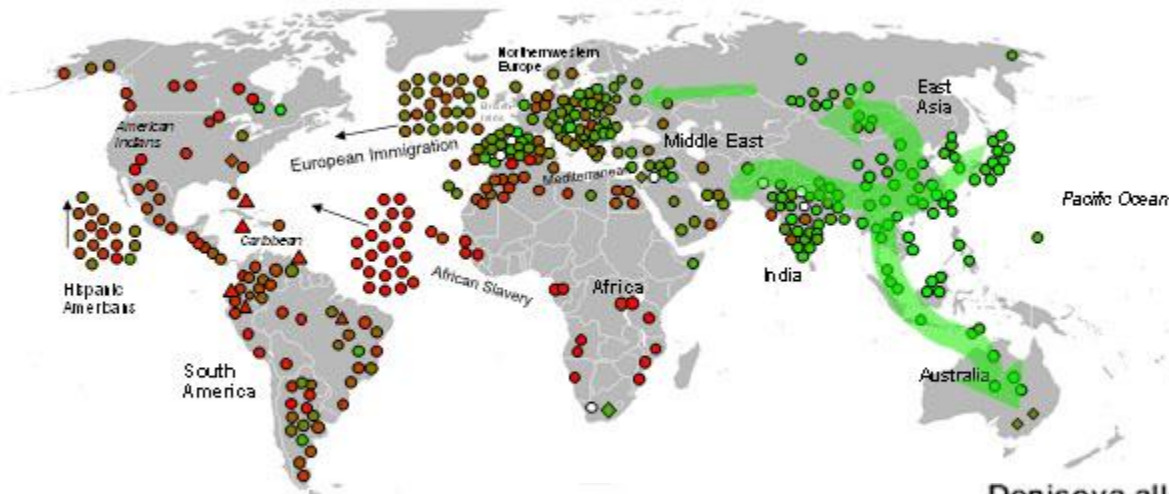
Replica of the finger bone fragment from the ancient Denisovan human who lived about 30-50 000 years ago. Scientists have obtained its complete genome. © Max Planck Institute for Evolutionary Anthropology



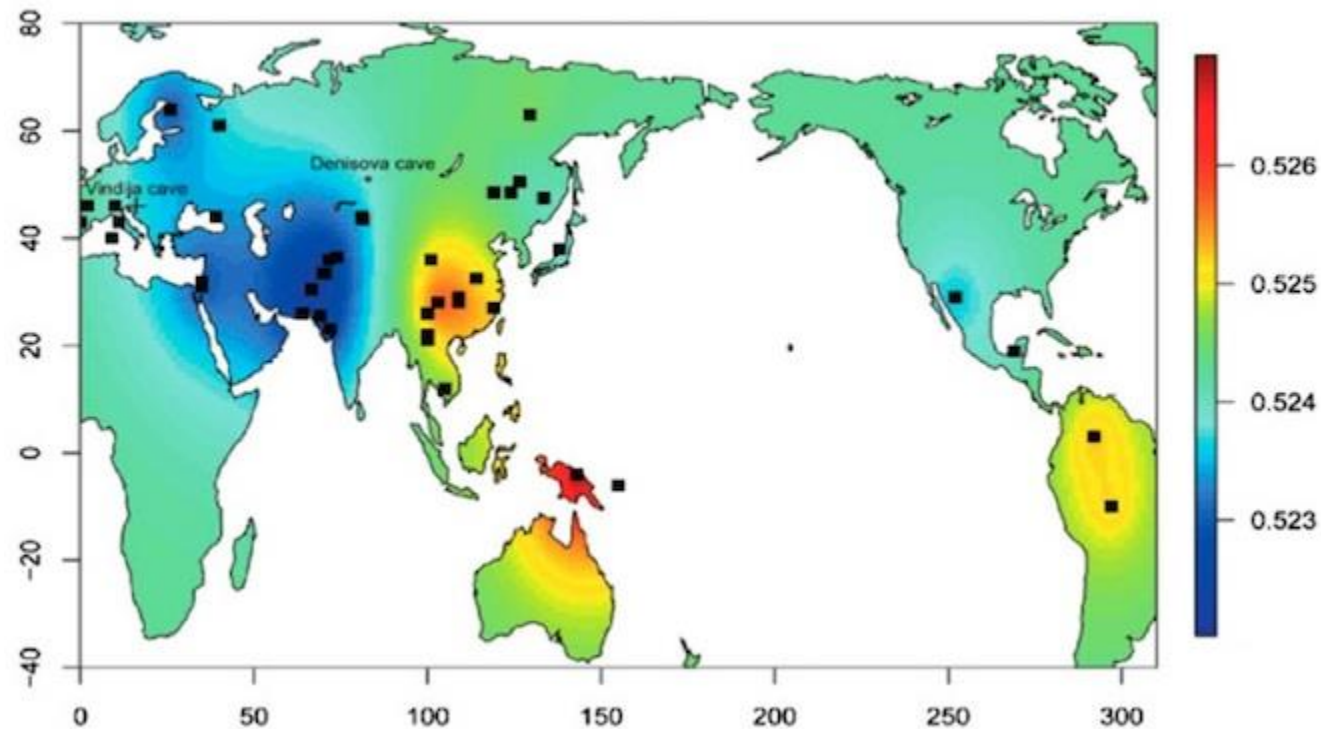
Phylogenetic tree of complete mtDNAs.

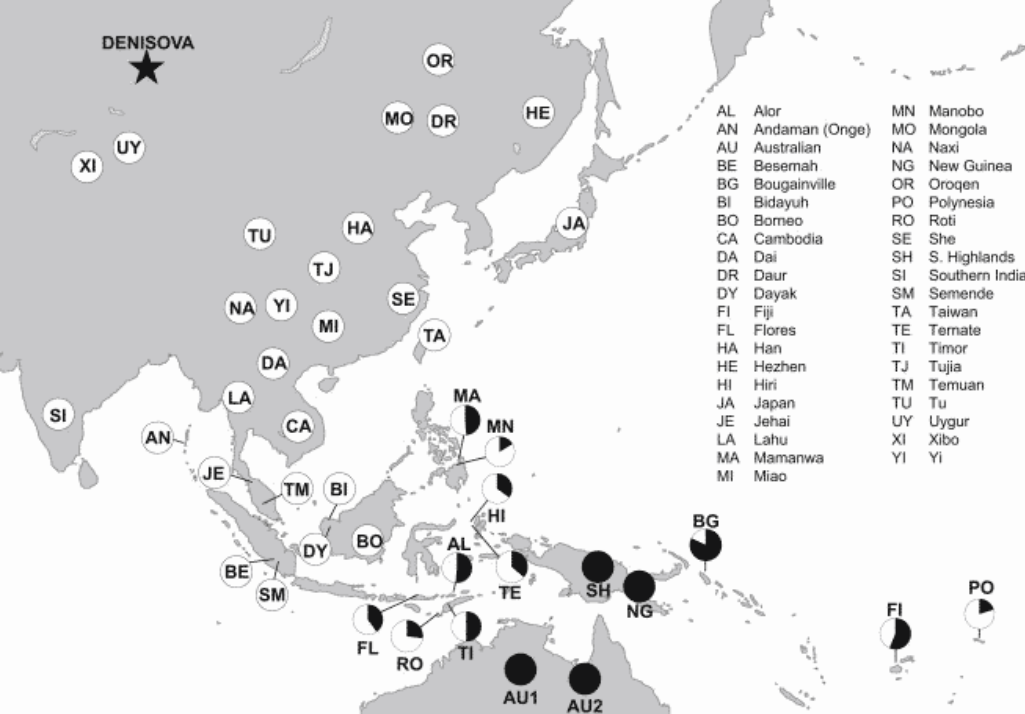


World Ancestry of the Denisovan Gene

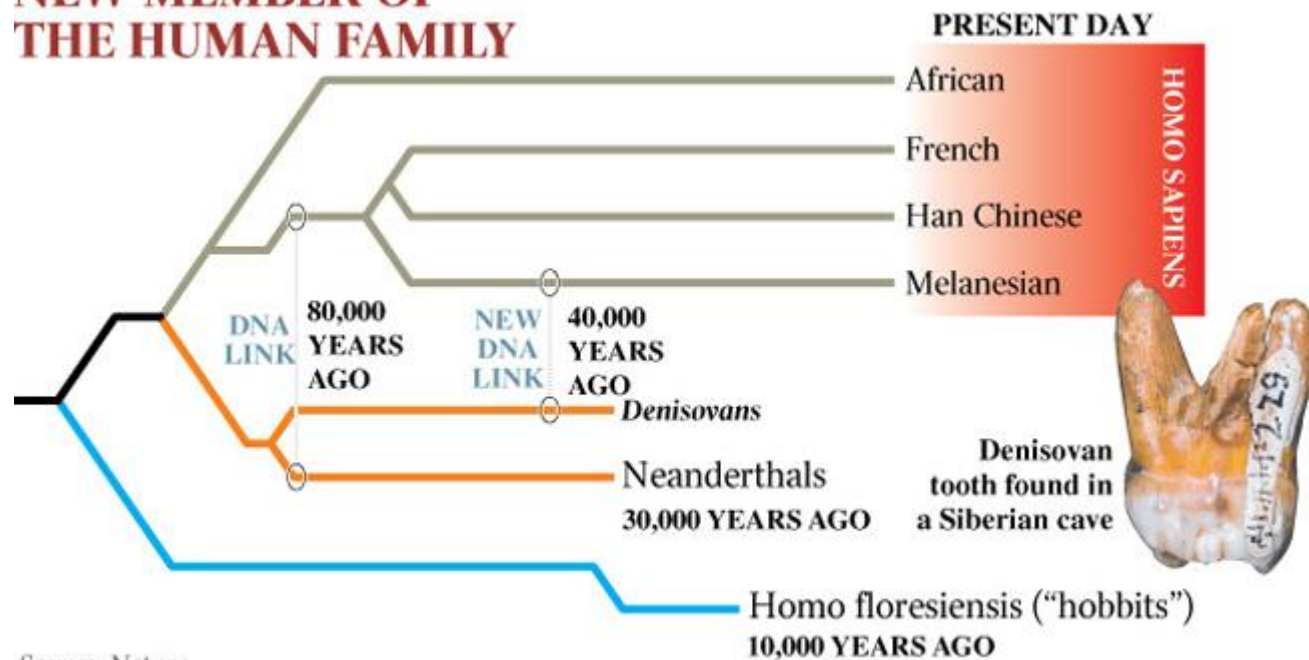


Denisova allele frequency

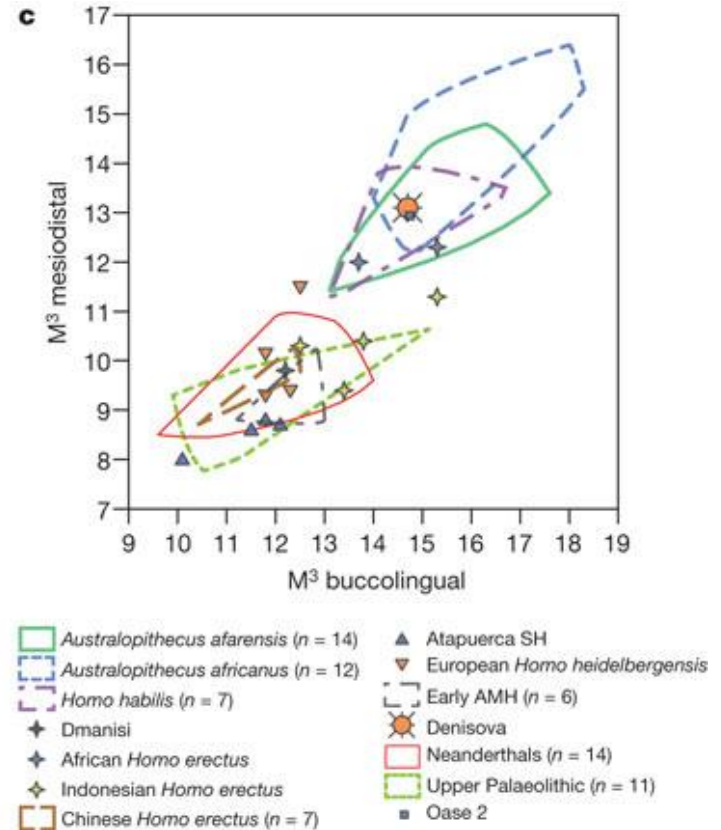
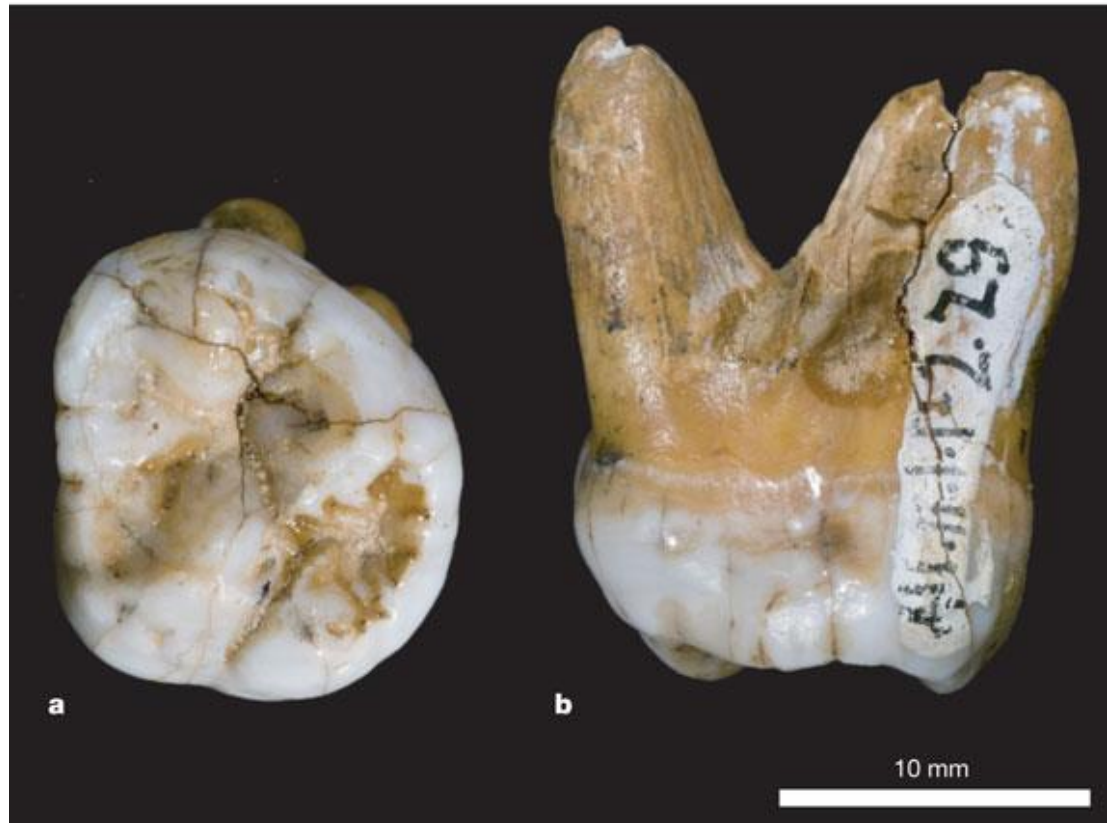




NEW MEMBER OF THE HUMAN FAMILY



Source: Nature

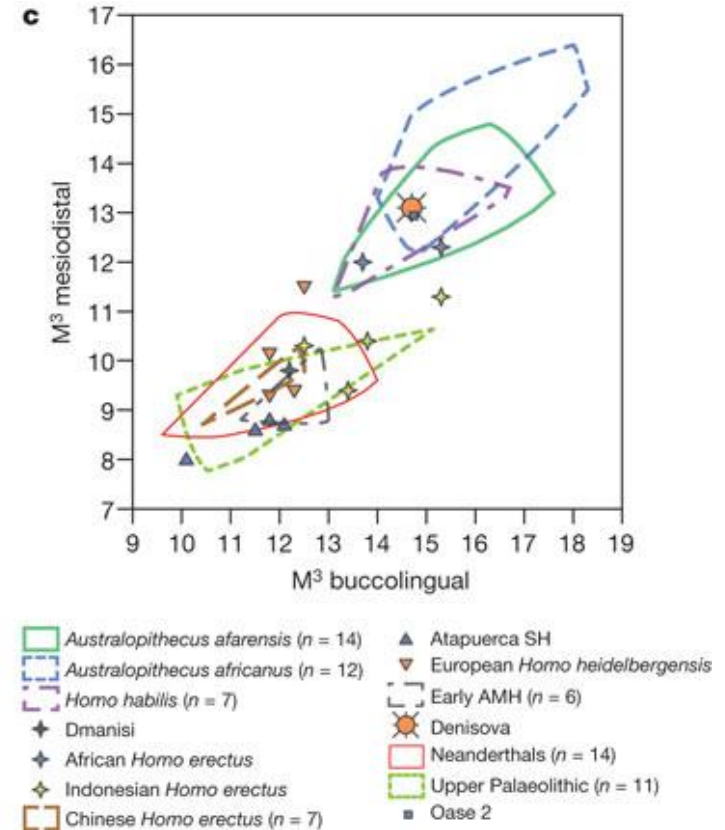
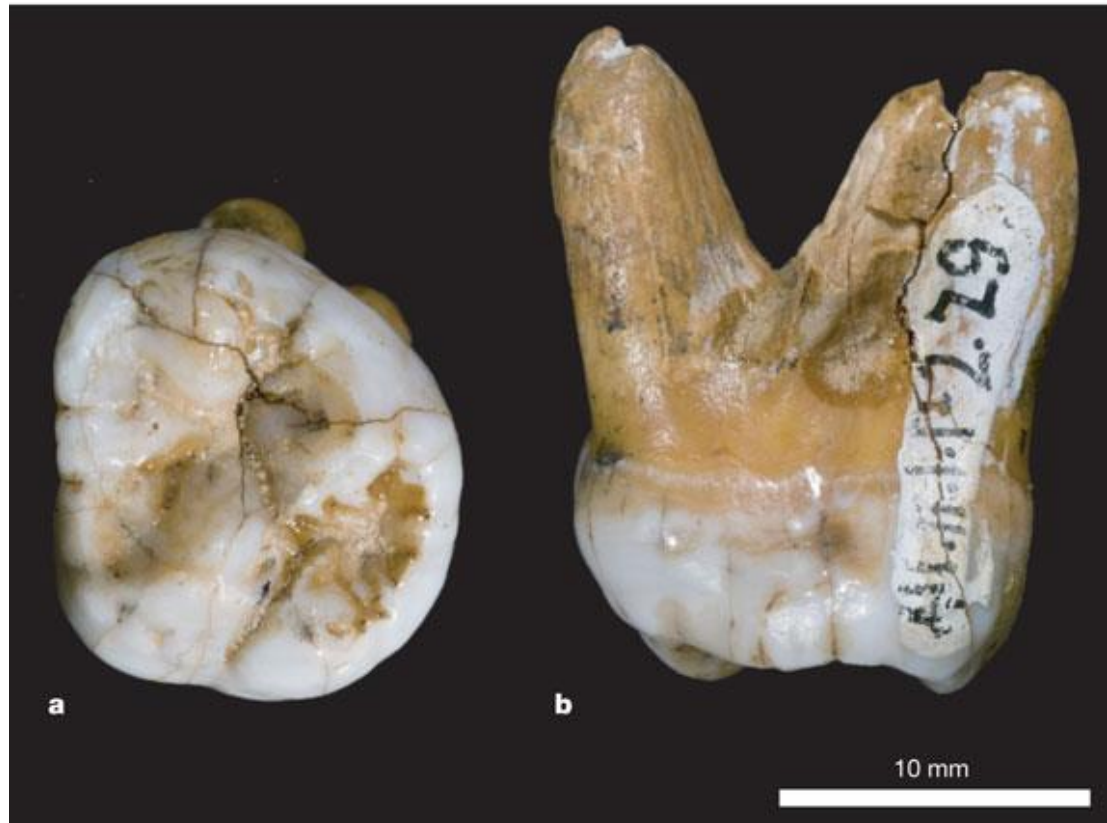


D Reich *et al.* *Nature* **468**, 1053-1060 (2010) doi:10.1038/nature09710

Il M3 o M2 ritrovato a Denisova presenta delle dimensioni al di fuori della variabilità dei taxa del genere *Homo* ed entra in quella dei *Australopithecine*.

Questo molare appoggia le evidenze del DNA: La popolazione di Denisova era distinta dei Neandertaliani tardivi e dei uomini moderni. In effetti, i tratti primitivi del dente suggeriscono che i Denisoviani potrebbero essersi separati dalla linea neandertaliana prima dei dati che abbiamo sui tratti dentari Neandertaliani in Europa occidentale (>300 ka). Non escludiamo però la possibilità che questa morfologia sia dovuta ad una regressione.

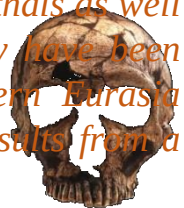




D Reich et al. *Nature* **468**, 1053-1060 (2010) doi:10.1038/nature09710

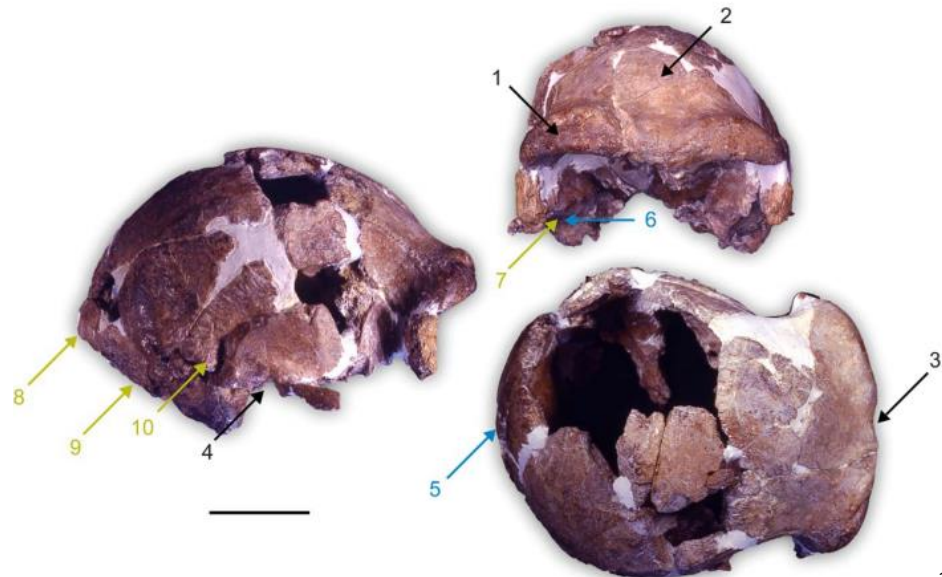
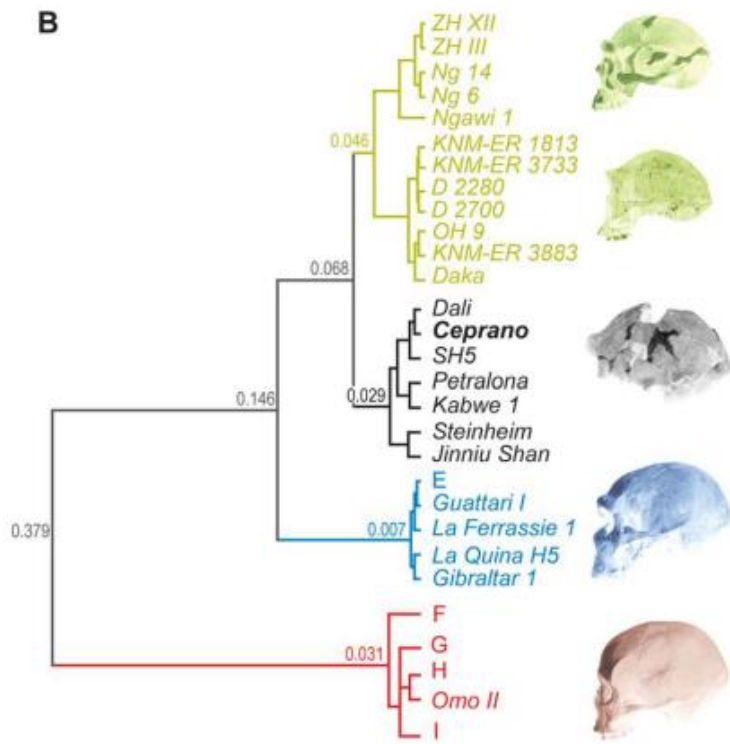
Third left molar or second upper molar. Molar outside the range of normal size variation of all fossil taxa of the genus *Homo*, with exception of *H. habilis* et *H. rudolfensis*, and comparable to Australopithecine.

The Denisova molar supports the DNA evidence that the Denisovan population is distinct from late Neanderthals as well as from modern humans. In fact, the primitive traits of the Denisova tooth suggest that Denisovans may have been separated from the Neanderthal lineage before Neanderthal dental features are documented in Western Eurasia (>300,000 years BP) although we cannot exclude the possibility that the Denisovan dental morphology results from a reversion.



Ceprano : 430 - 385 ka

(Mounier, 2012)



1 a 4

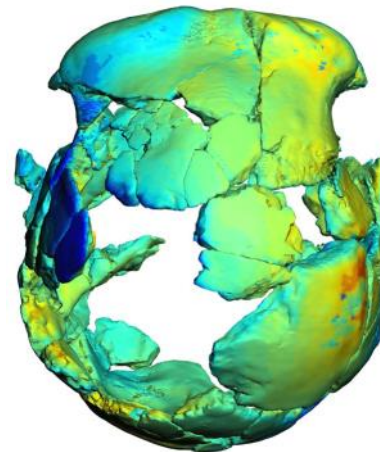
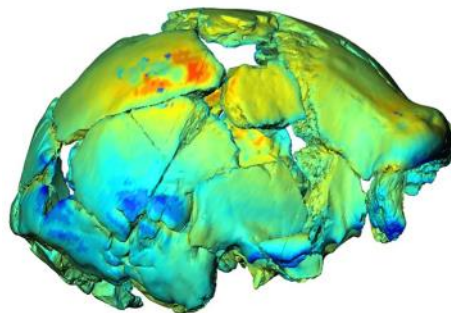
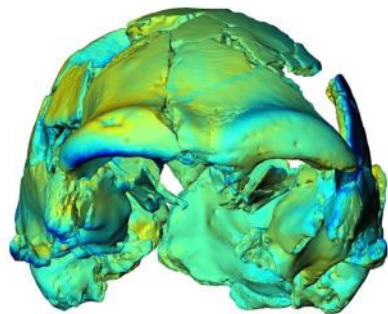
Tratti esclusivamente trovati nei specimen del P. medio

5 & 6

Tratti derivati

7 a 10

Tratti primitivi



(Di Vincenzo et al, 2017)

Sima de los Huesos: 400 – 350 ka

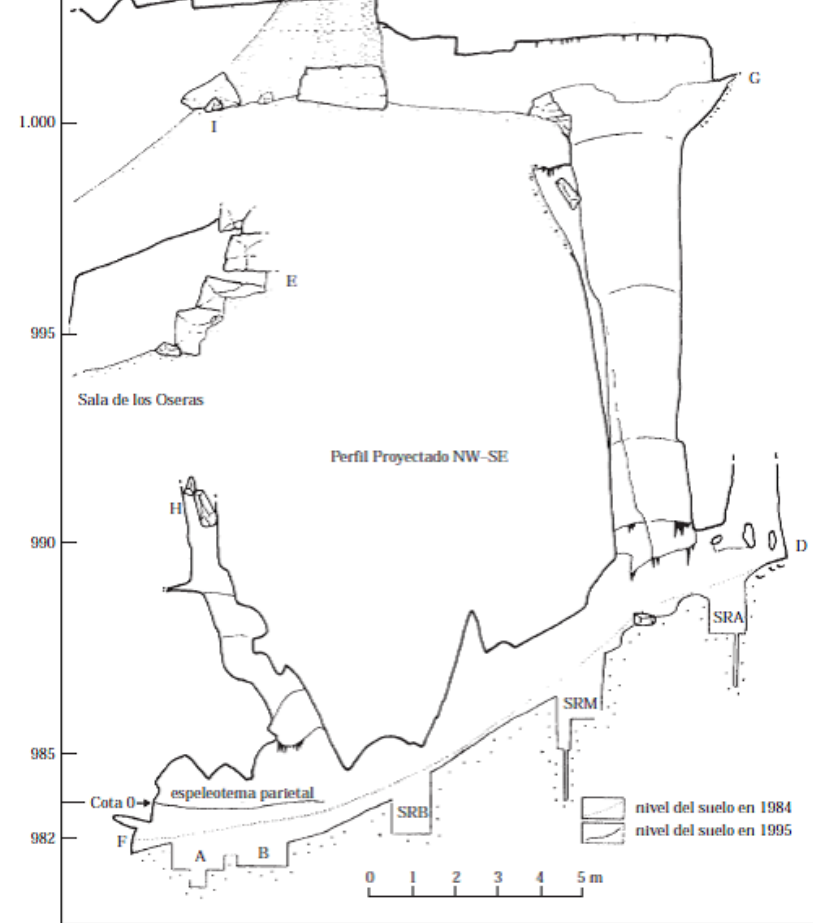
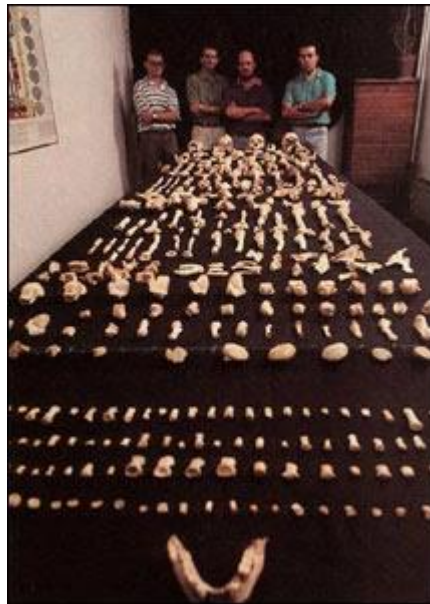


Figure 9. Sima de los Huesos profile (by G. E. Edelweiss, 1992–1999). Projection as in Figure 5. “Tapón de margas” indicates a cone of Neogene white marls coming from the outside. The levels of 1984 and 1995 floors are indicated, as well as a wall speleothem. The blind chimney in Sima de los Huesos behind (to the right of) the shaft, has not been completely drawn.



Sima de los Huesos: 350 – 300 ka

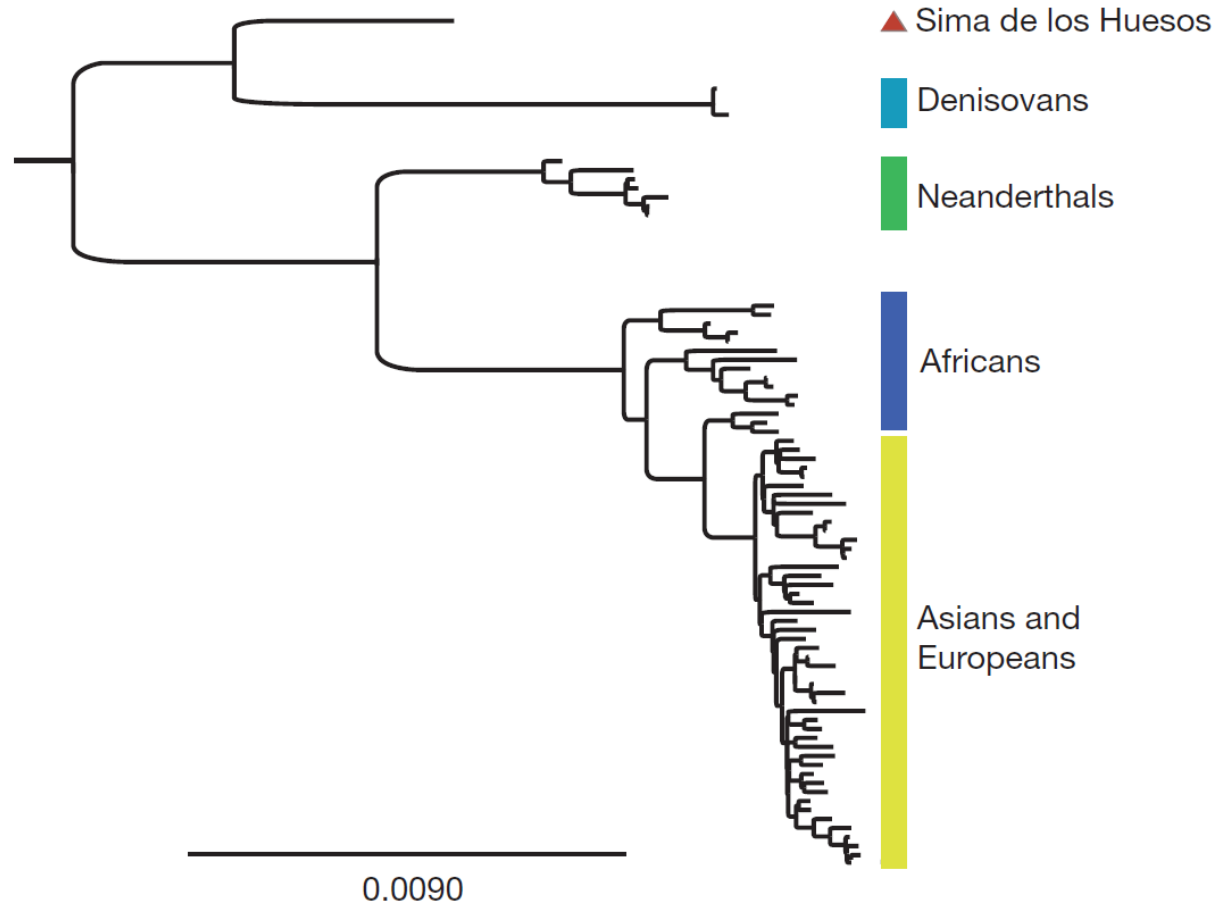


Figure 4 | Bayesian phylogenetic tree of hominin mitochondrial relationships based on the Sima de los Huesos mtDNA sequence determined using the inclusive filtering criteria. All nodes connecting the denoted hominin groups are supported with posterior probability of 1. The tree was rooted using chimpanzee and bonobo mtDNA genomes. The scale bar denotes substitutions per site.

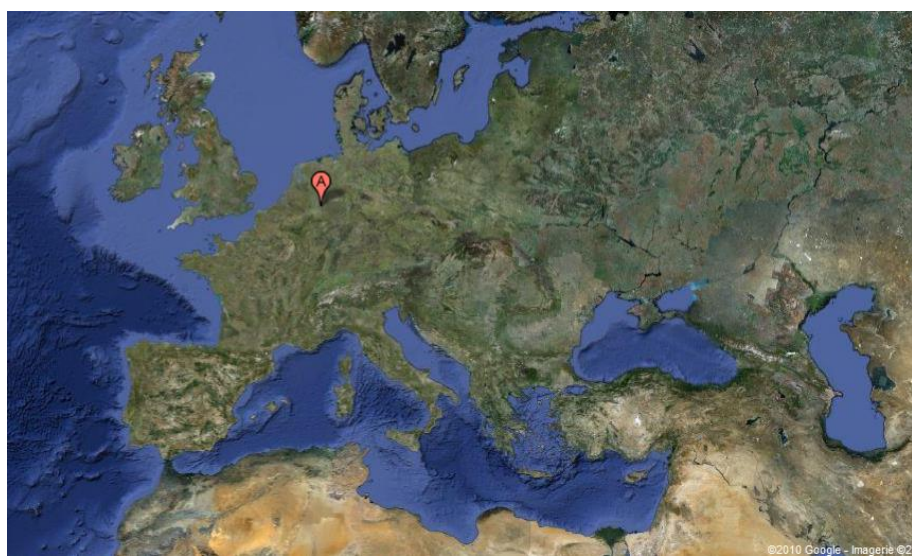
Matthias Meyer et al. in Nature (2013)



Siti Neandertaliani



La scoperta



Il primo fossile considerato come Neanderthal è stato scoperto nel 1856 nella valle di Neander, nella grotta di Feldhofer.

The first fossil considered as a Neanderthal was discovered in 1856 in the Neander Valle, in Feldhofer cave.

Al momento della scoperta gli operai trovarono sul suolo un cranio robusto, delle ossa lunghe, delle coste, un frammento di bacino e di scapola. Queste ossa, considerate dagli operai come i resti ossei di un orso delle caverne, furono portate a J.C. Fuhlrott, il maestro della regione appassionato naturalista. Fin dall'inizio Fuhlrott considerò queste ossa come quelle di un « nuovo » uomo.

When the site was discovered, the workers found a robust skull and some bones. First these bones were considered as bears bones. Later, J.C.Fuhlrott did some study and found that they were bones from a « new » Homo.



La scoperta

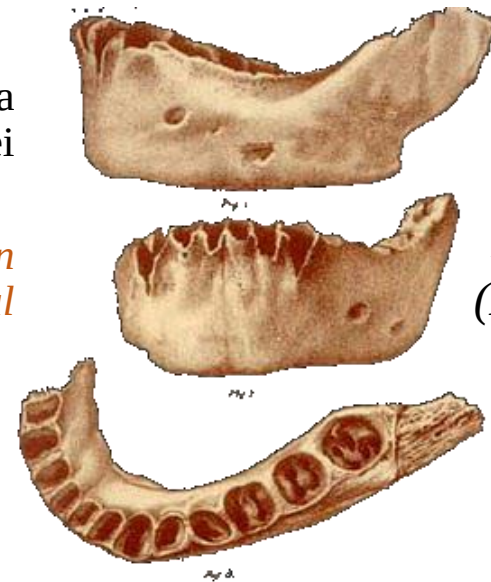
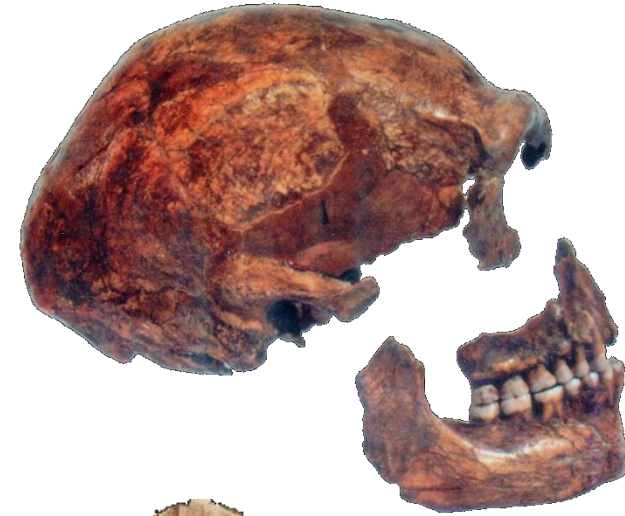
Questo fossile non fu il primo Neandertaliano portato alla luce. Altri due fossili erano già stati trovati : uno a Engis in Belgio in 1929 e uno in Spagna a Gibraltar in 1848. Ma il fossile scoperto nella valle di Neander ha confermato l'esistenza di un Uomo fossile.

This fossil weren't the first Neanderthal highlight. Two other fossil were already found: One in Engis (Belgium) in 1929 and one at Gibraltar (Spain) in 1848. But with the discovery of the Neander Valle, the existance of a human fossil was confirmed.

Altre scoperte di altri fossili in Belgio a la Naulette e a Spy nel 1966 e 1886 confermarono la presenza dei Neandertaliani in Europa.

Other discoveries in Belgium at La Naulette e a Spy in 1966 e 1886 has confirmed the presence of Neanderthal in Europa.

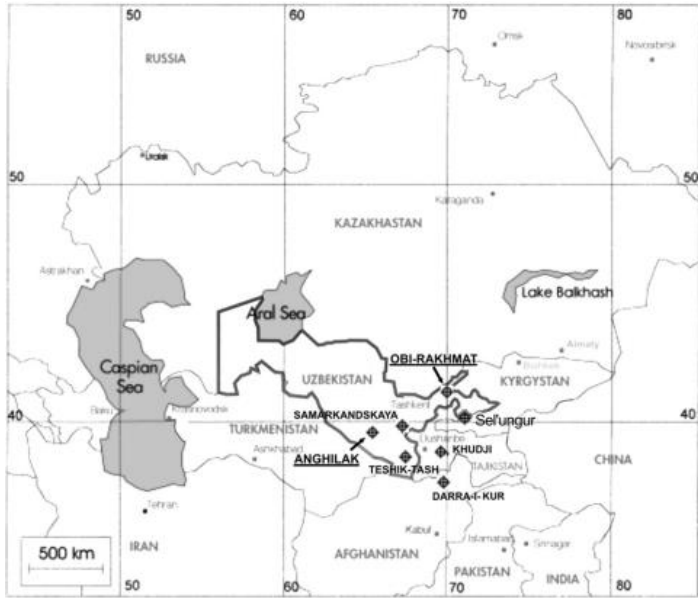
H. neandertalensis
(Spy, Belgio)



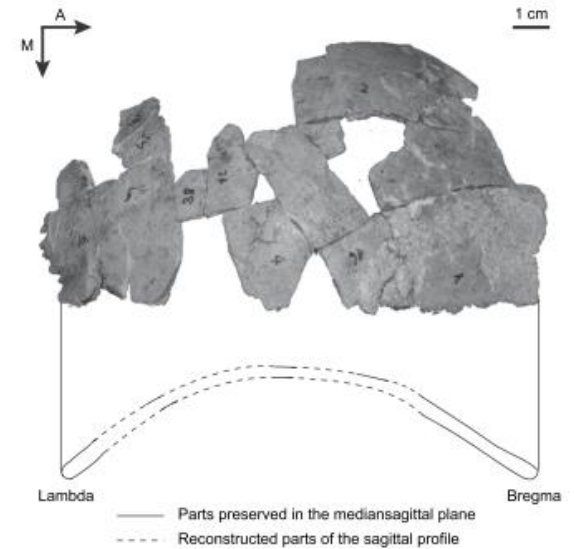
Mandibola
H. neandertalensis
(La naulette, Belgio)



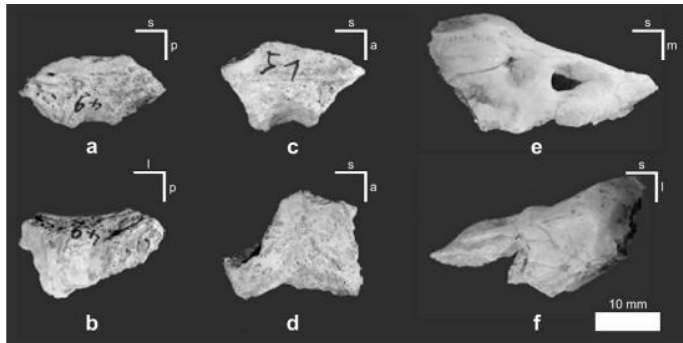
Uzbekistan: Grotta Obi-Rakhmat 60-90000 BP



OR 1 : Denti
permanenti superiori
sinistri



Ricostruzione del parietale di OR 1.



Frammenti di temporale

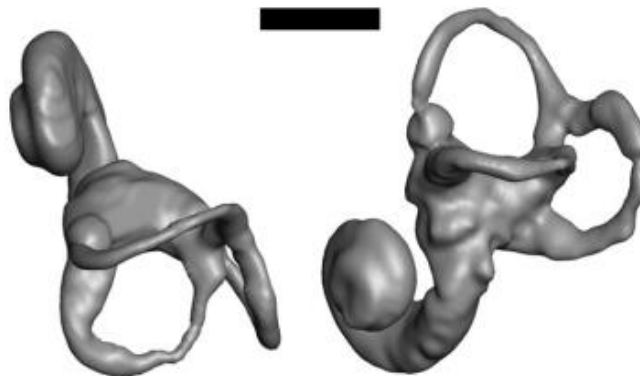
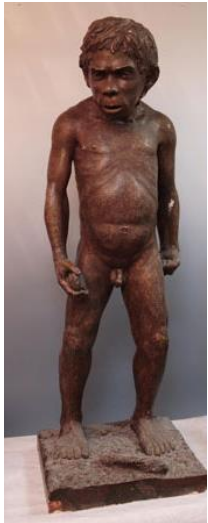


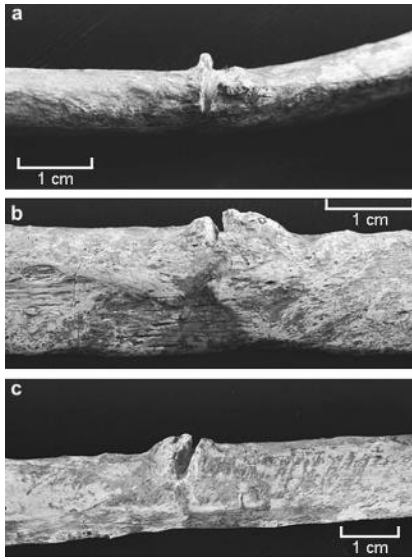
Fig. 9. Left semicircular canal of OR-1.



Uzbekistan: Teshik Tash 70000 anni



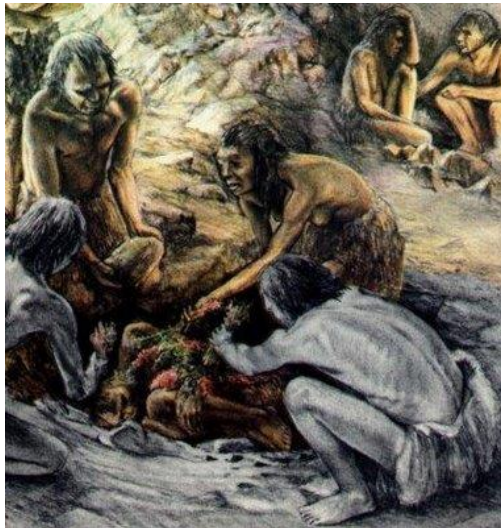
Iraq : Shanidar 50000 BP



Shanidar 3: Lesione sulla 9 costa.



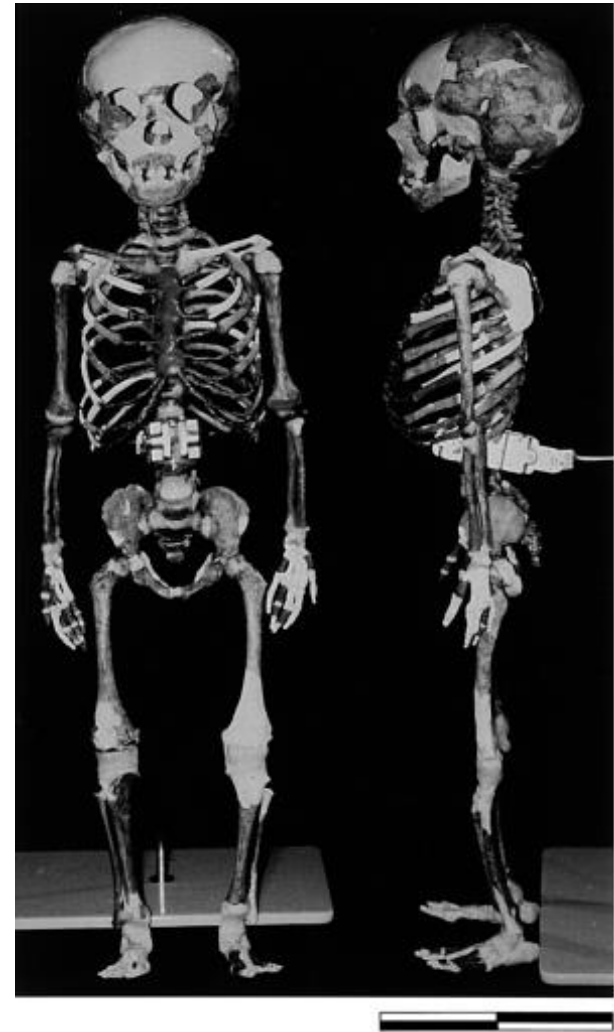
Shanidar 1



Syria : Dederyheh 50-60000 BP



Prima sepoltura di bambini



Ricostruzione dello scheletro immaturo di 2^o anni.



Israël: Kebara 48-60000 BP



Sepulture Kebara II *Moshe*



Osso ioide di Kebara II



Ricostruzione dello scheletro di Kebara II



Israël: Amud 47000 BP



Amud 1 circa 47.000 anni, il Neandertaliano più alto (174 cm) e con maggiore cc (1640 cm³)



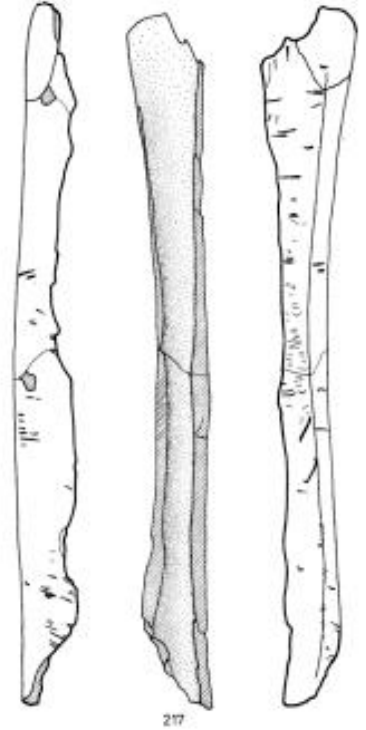
Croazia: Krapina 130 000 BP



Krapina 12 : Frammento di osso occipitale giovanile



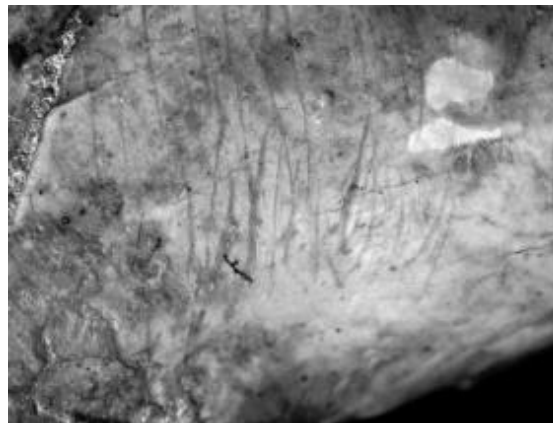
Krapina 59 : Mandibola



Tibia spaccata in 2 con tante cut marks.



emi-endocranio destro di Krapina 3



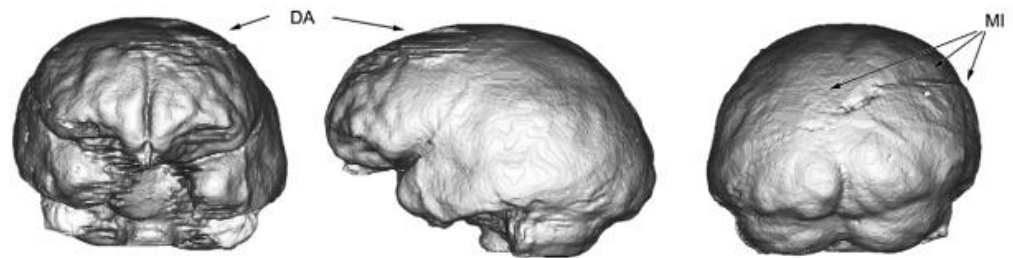
Cut marks nella sinfisi interna di K53.



Italia : Saccopastore 120-130 000 BP



Saccopastore 1



Replica digitale dell'endocranio di SCP1



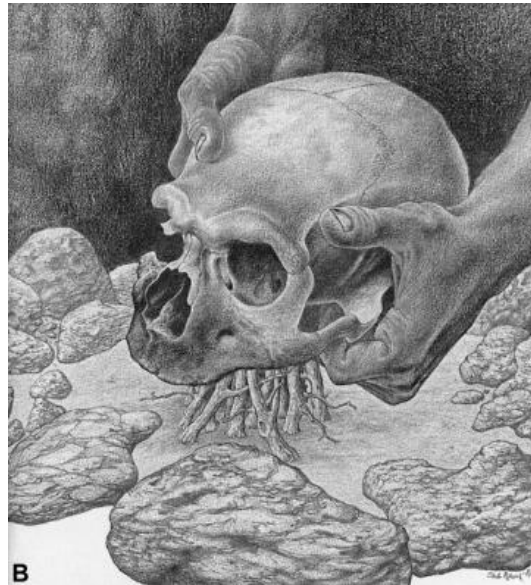
Italia : Guattari 51-57 000 BP



Guattari 1



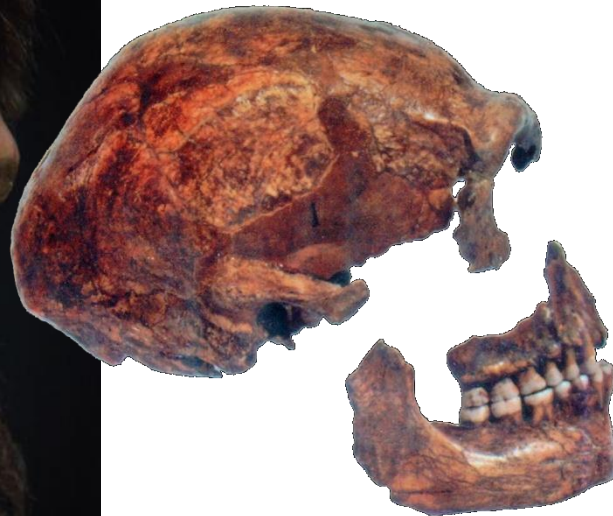
Guattari 2



Ricostruzione ipotetica del
culto del cranio



Belgium : Spy 40 000 BP



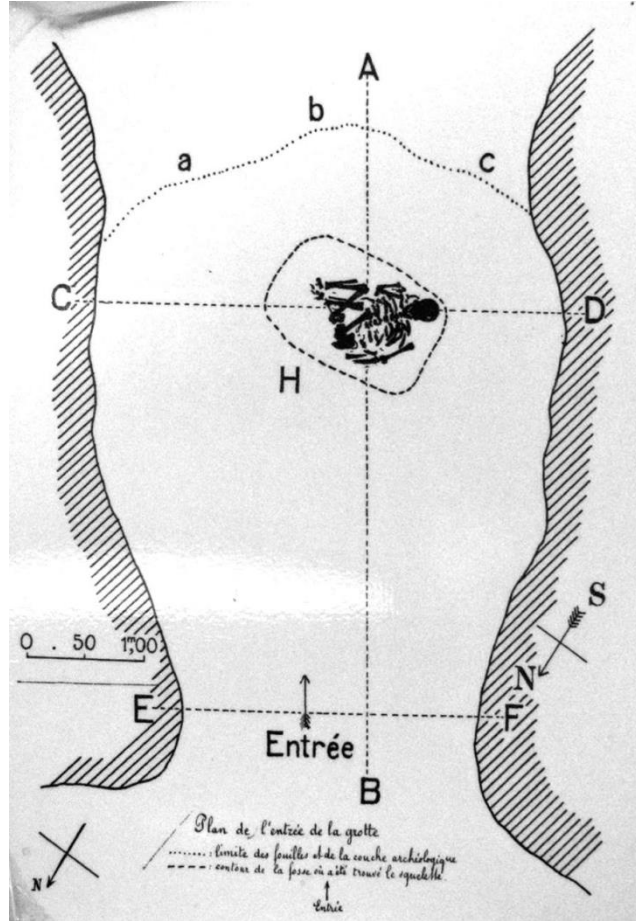
Engis 70 000 BP



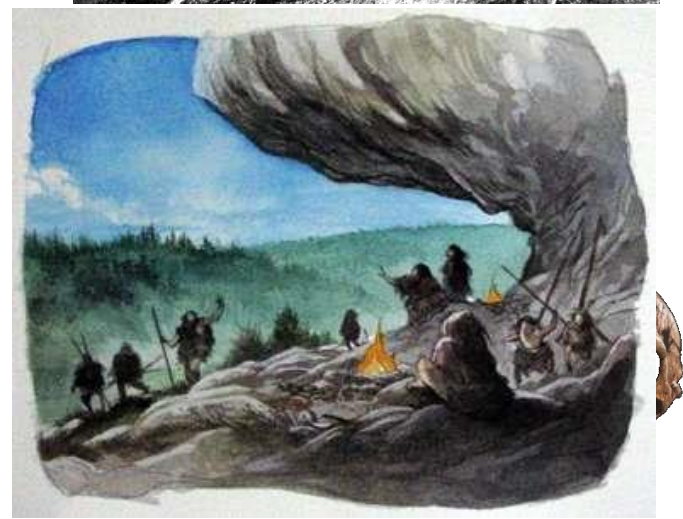
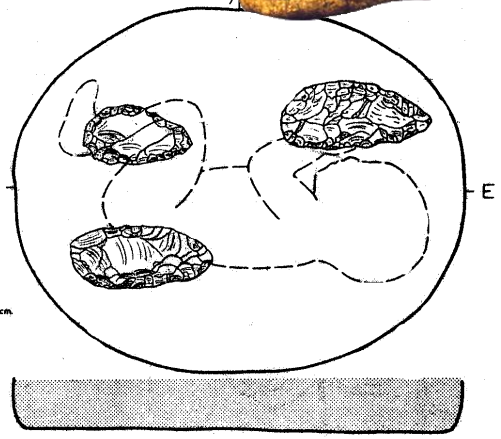
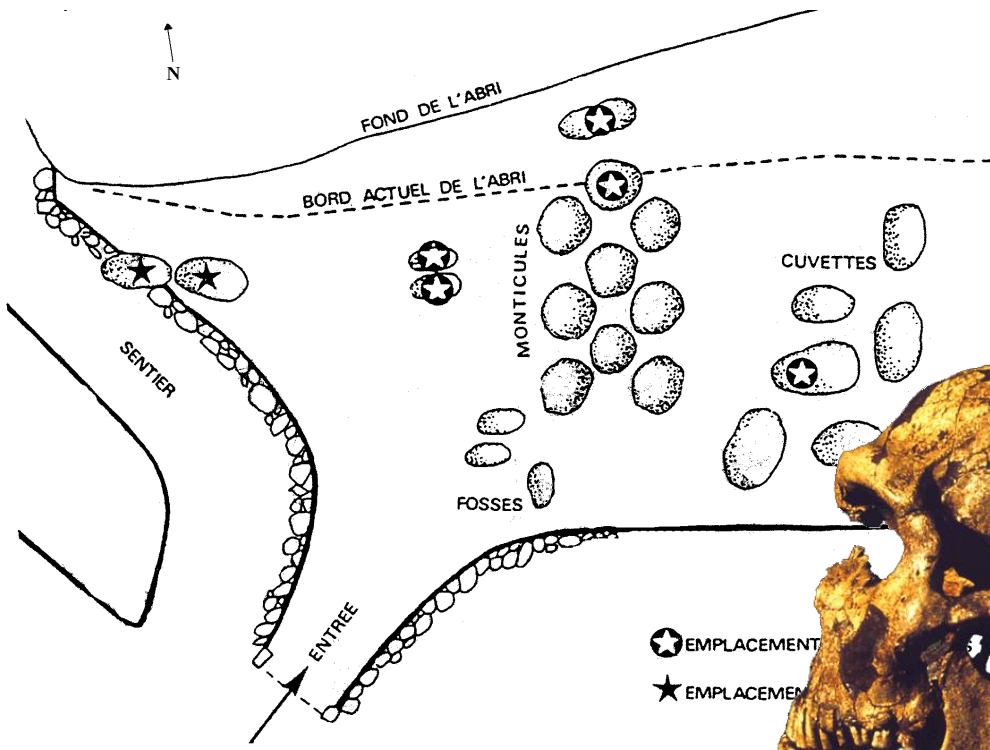
Engis 2



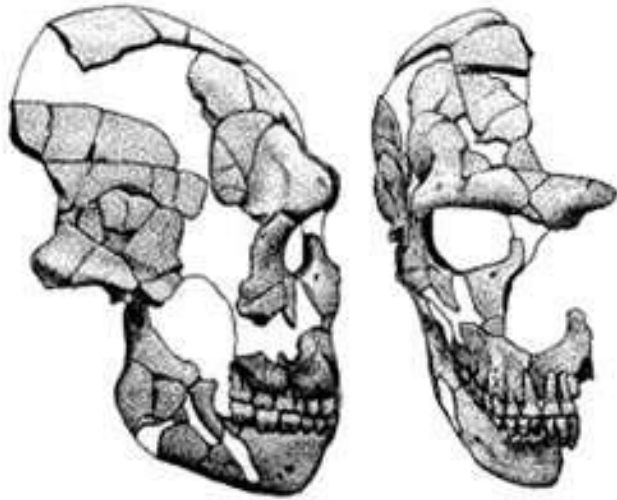
La Chapelle-aux-Saints (50 000 anni, Francia)



La Ferrassie (55 000 anni, Francia) – « Necropoli » di 8 scheletri



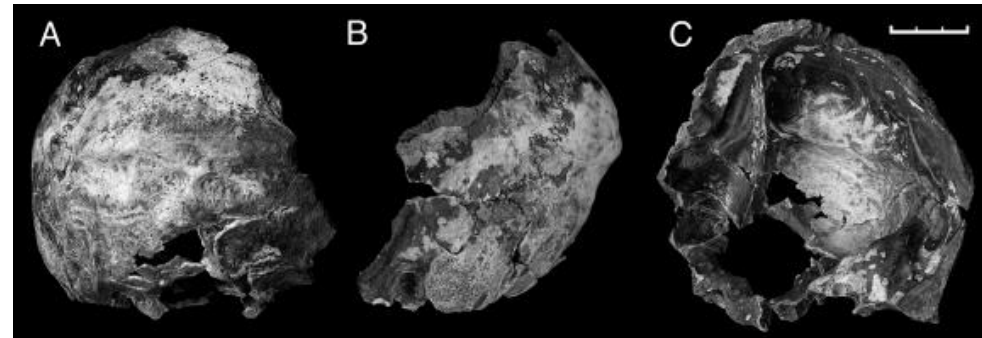
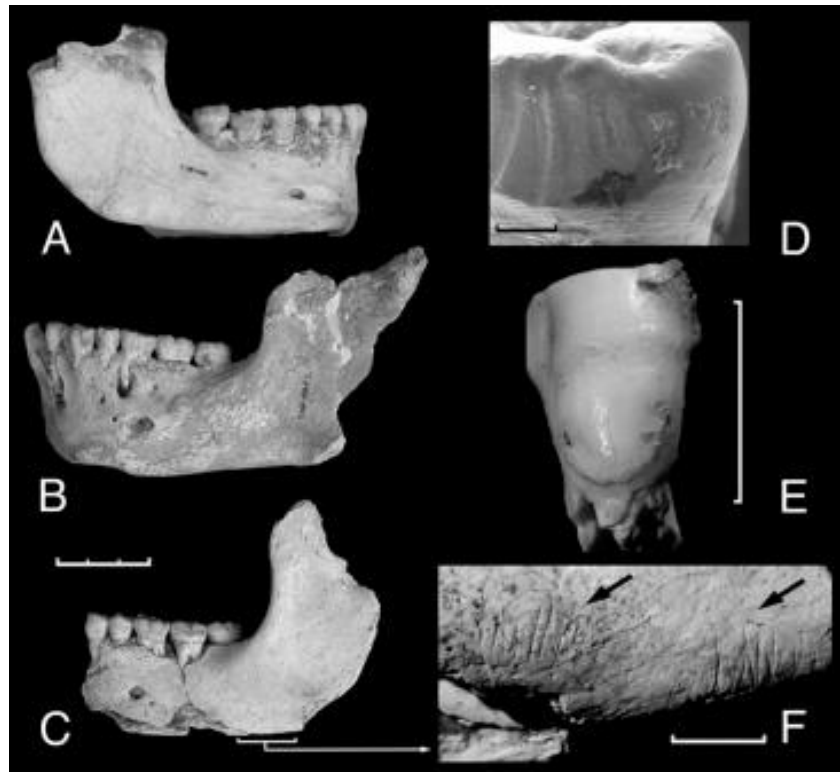
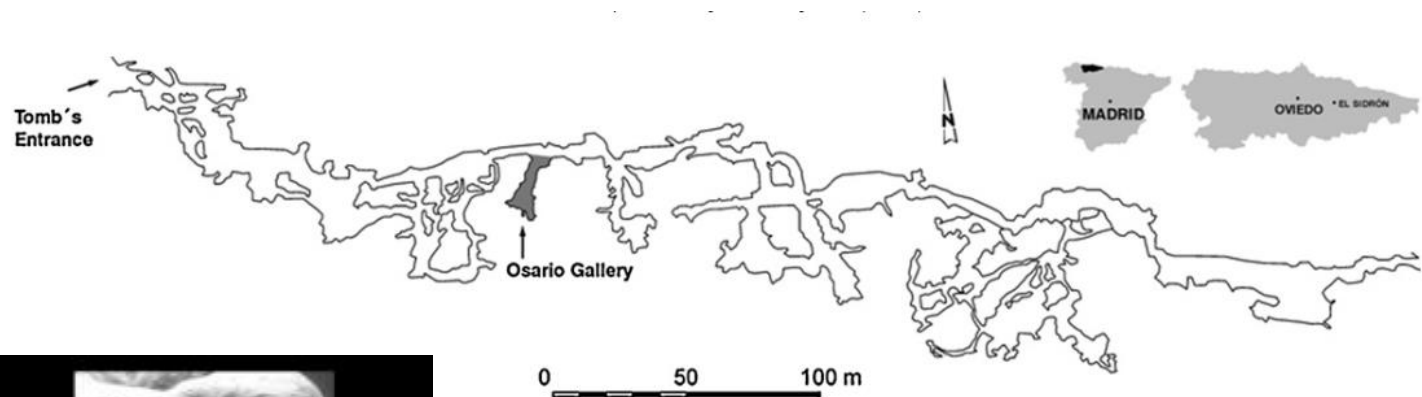
Francia : Saint-Césaire 36 000 BP



Cranio di Saint-Césaire 1



Spagna : El Sidron 43 000 BP

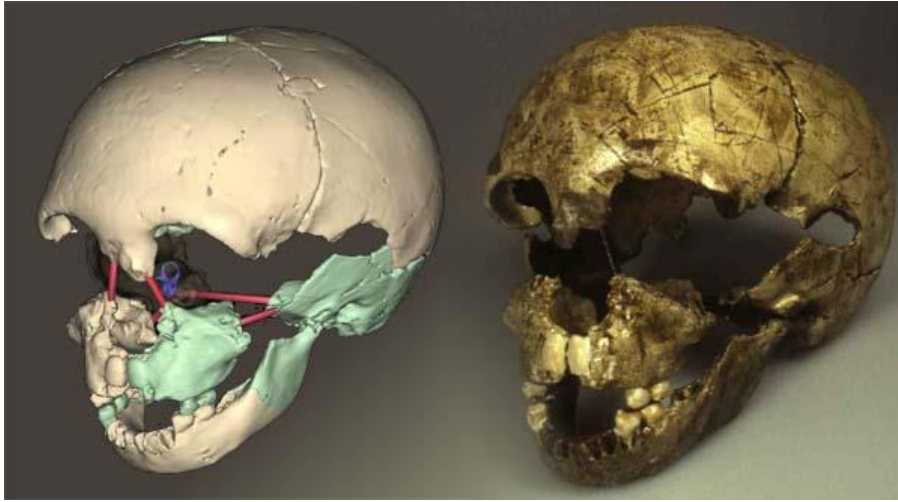


SD-1219. Regione Occipitomastoide

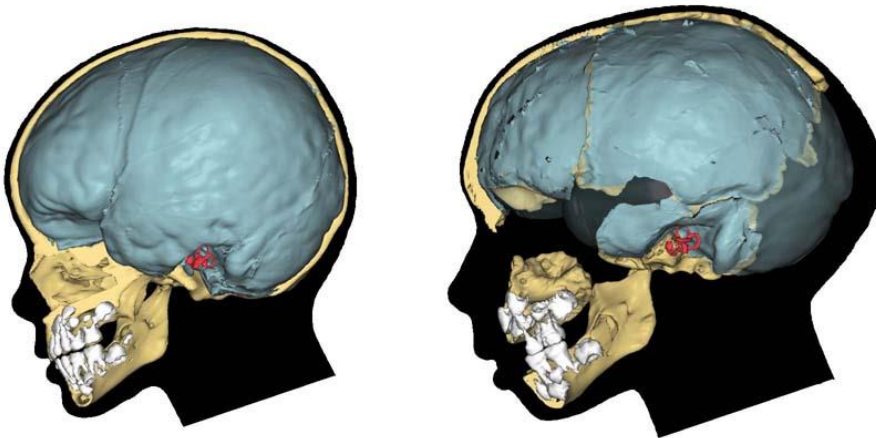
Mandibole con un'ipoplasia dello smalto e delle cut marks sul bordo basale (F)



Spagna : Gibraltat Devil's Tower 30 000 BP

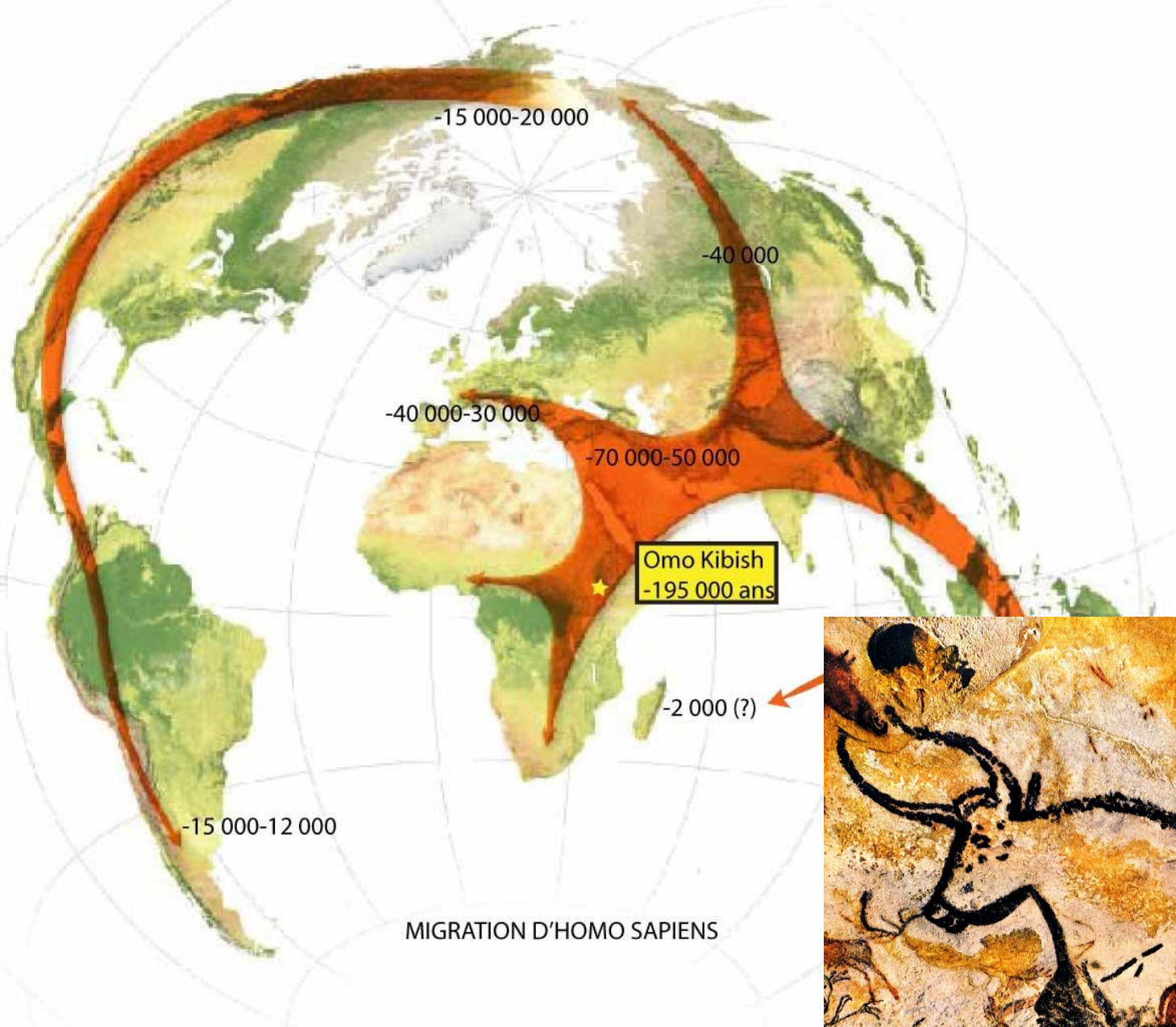


Gibraltar 2 : Cranio e
ricostruzione



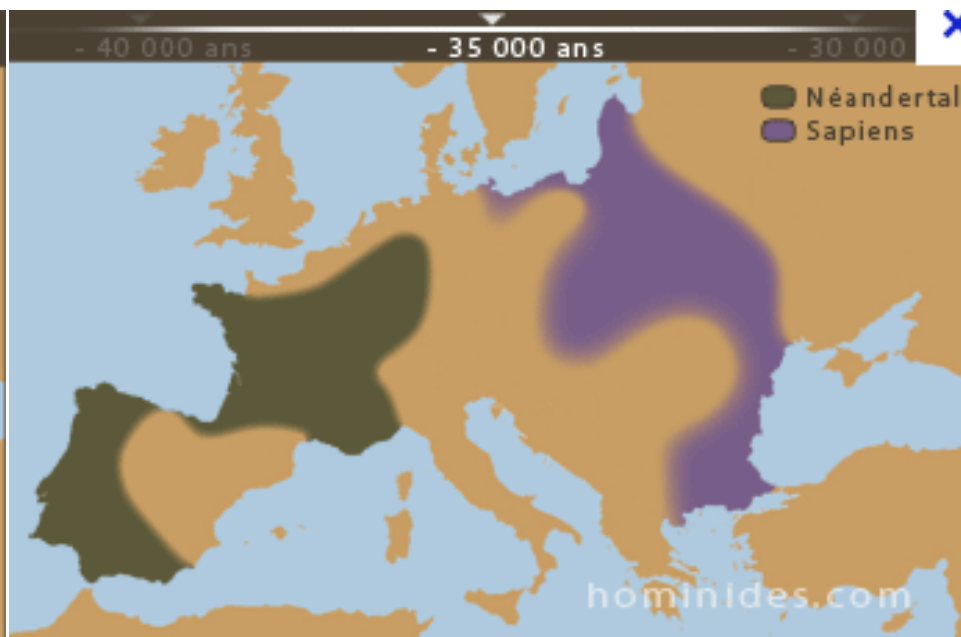
Estinzione



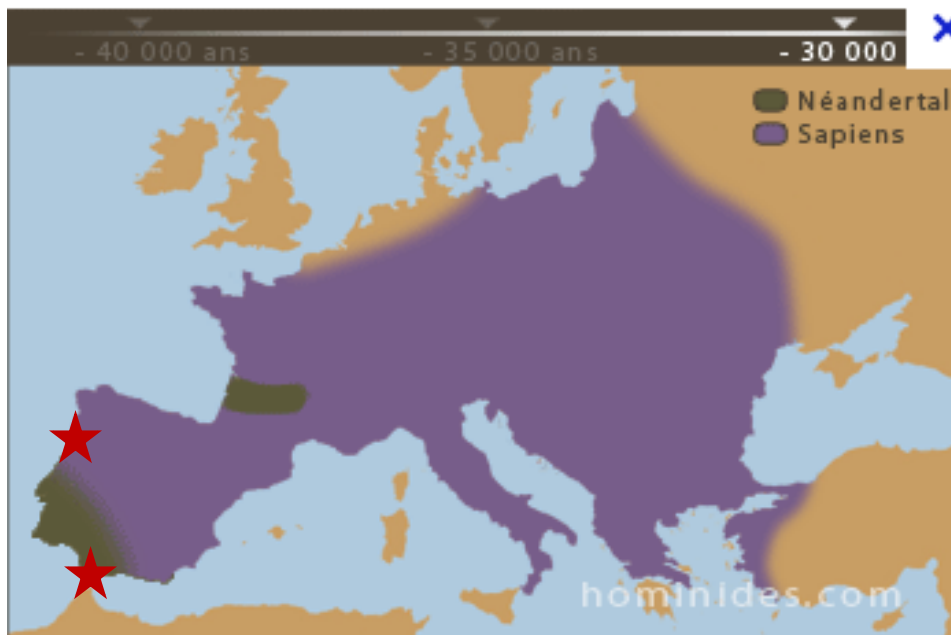




Répartition Néandertaliens et Sapiens



Répartition Néandertaliens et Sapiens



Répartition Néandertaliens et Sapiens



Enlène's Cave
15 000 ans
(Aquitaine)

Ipotesi...

Concorrenza con *Homo sapiens* che ha conquistato tutte le nicchie ecologiche.
The competition with Homo sapiens who has colonized all the ecological niche.

Homo sapiens è riuscito a estendere la caccia a vari tipi di prede
Homo sapiens was able to extend the hunting to various types of prey..

Combattimento tra *H.sapiens* e *H.neandertalensis* che si indeboliva.
Fight between H. sapiens and H.neanderthalensis who get weaker.

Genocidi dei Neandertaliani da parte dei *sapiens*.
Genocide of the Neandertal from the sapiens.

Fuga dei Neandertaliani che rifiutavano il confronto con i Cro-Magnon. Questa cultura pacifica e la mortalità infantile elevata sarebbe all'origine della loro scomparsa.
Escape of the Neandertal who refused the confrontation with the Cro-Magnon. This pacific culture and the child mortality could have been the reason to their extinction.

Malattie *Deseases*



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