Homo neanderthalensis

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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.*

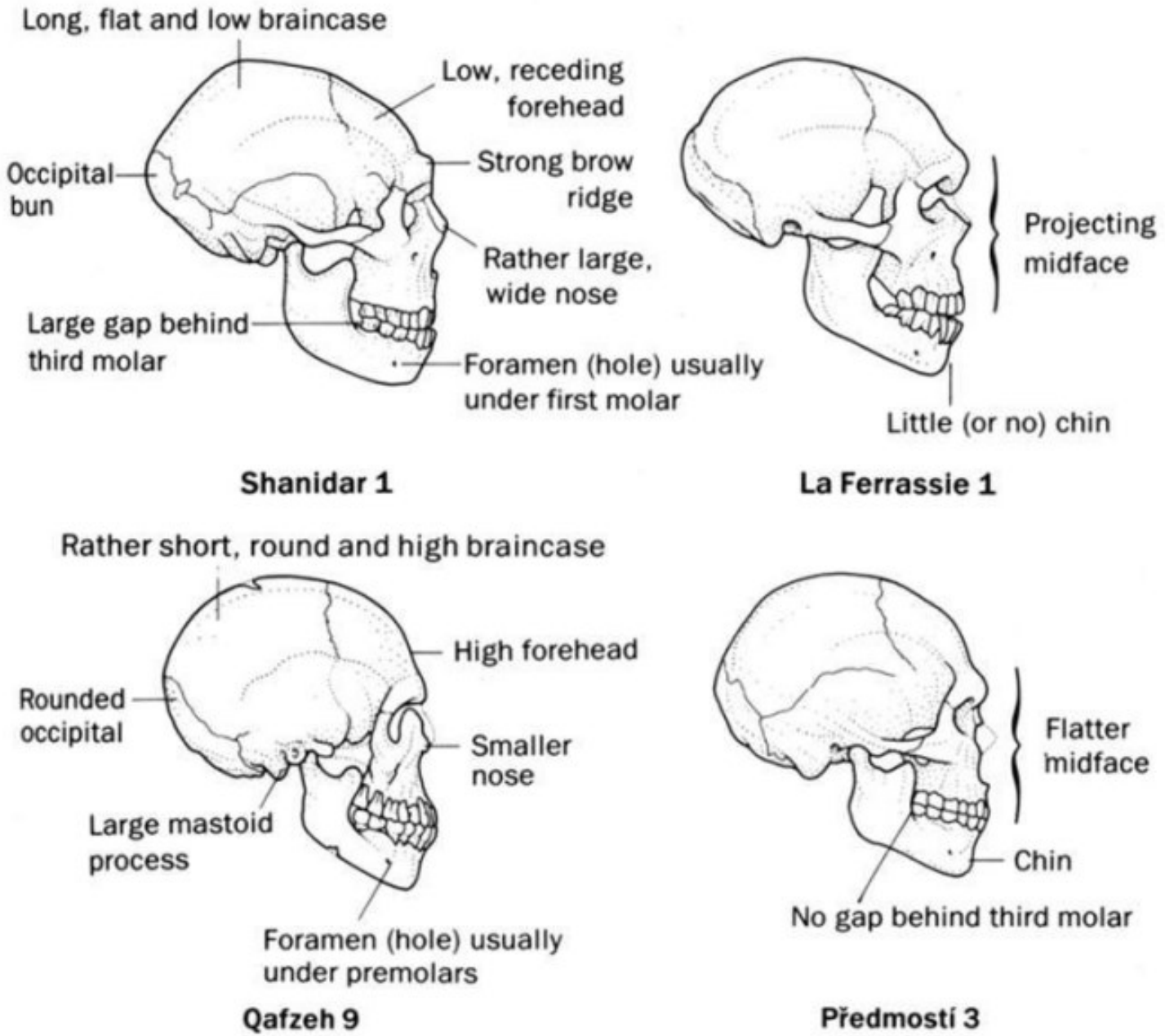
  Feature shared with Homo sapiens

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

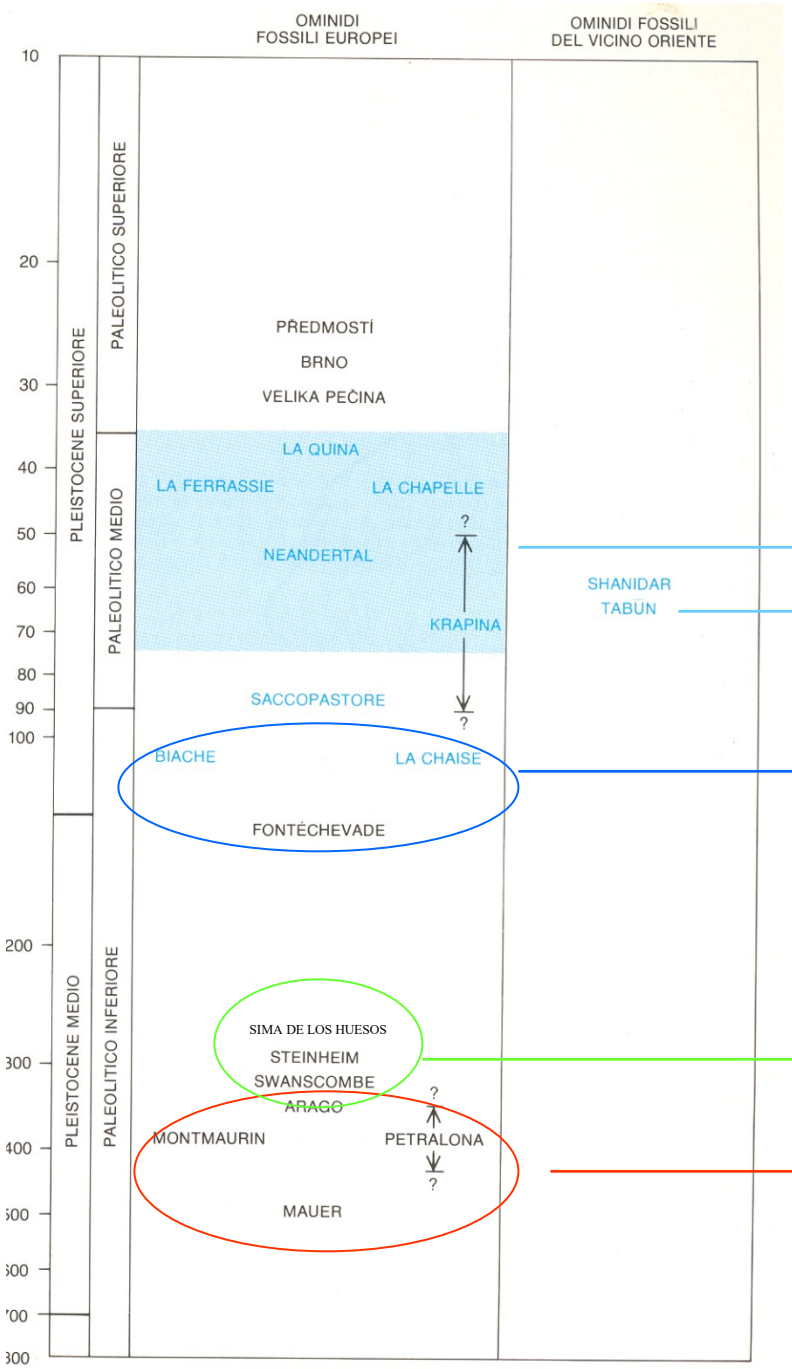
  Derivated features / Apomorphies: These are present only in the Neanderthals, and allow to identify this species.

Homo neanderthalensis VS *Homo erectus*

Homo neanderthalensis VS *Homo sapiens*



L’evoluzione



Neandertaliani classici

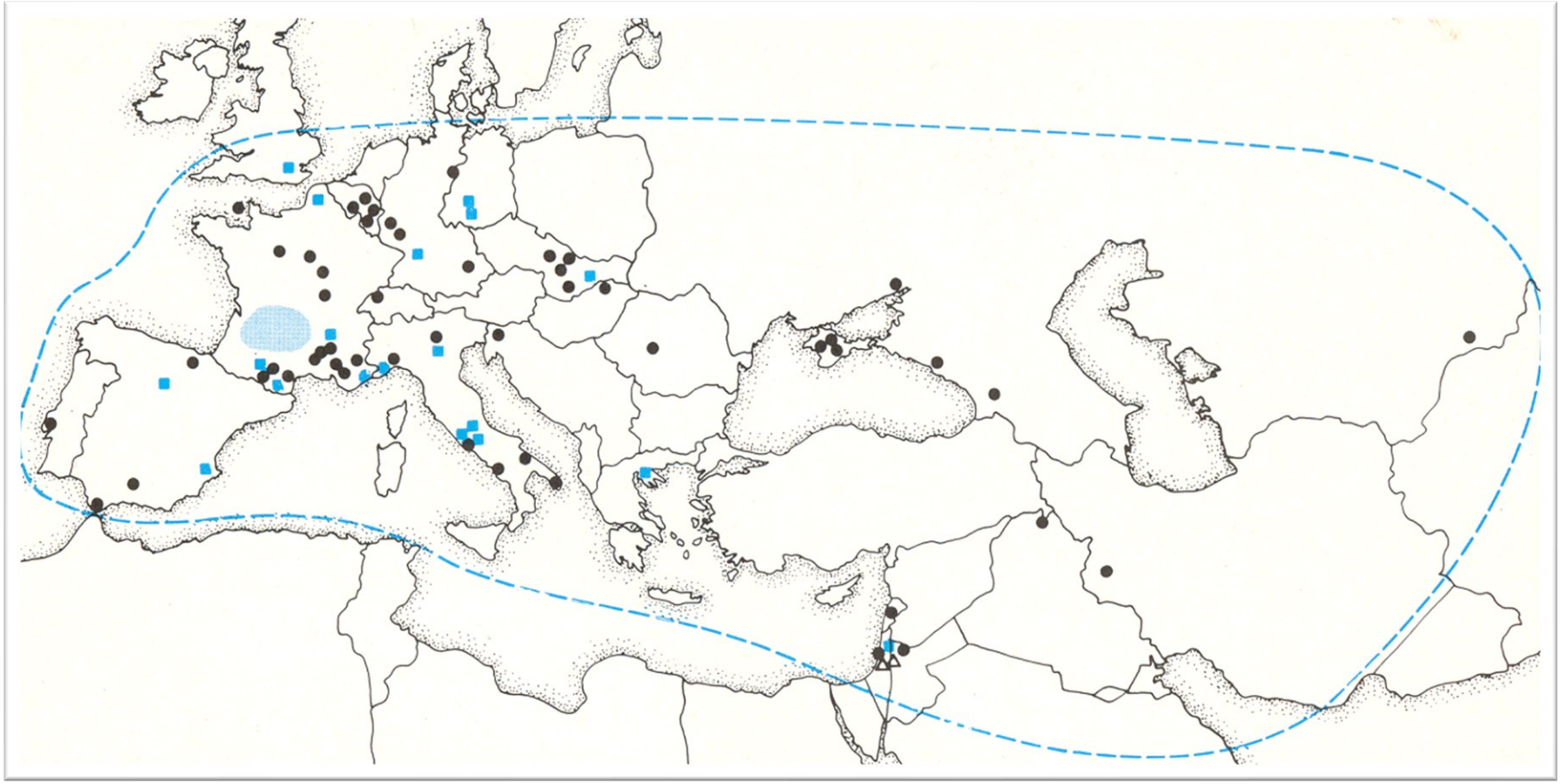
Neandertaliani orientali

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

Estenzione



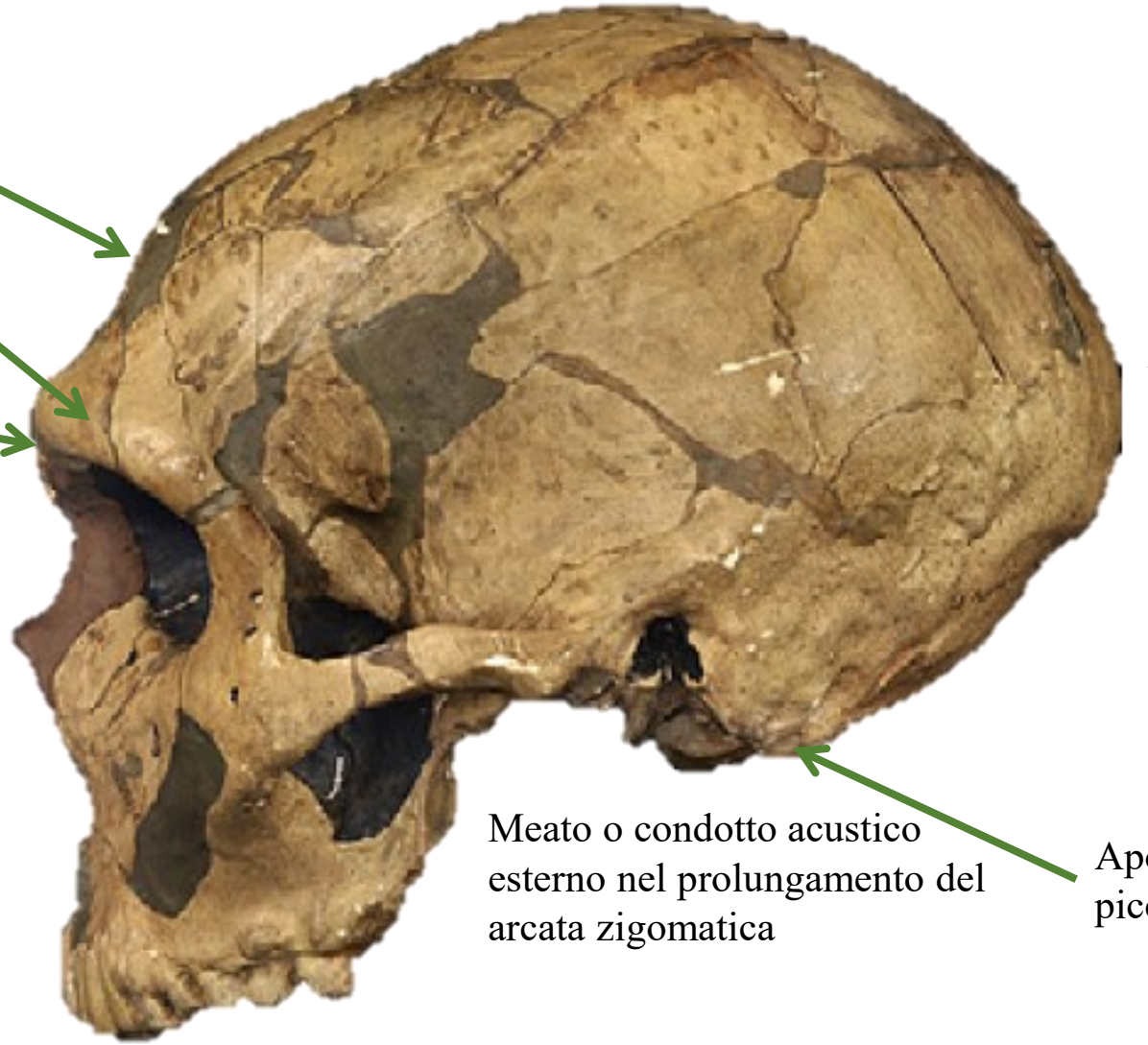
Una speciazione di questi caratteri si osserva nel tempo e nello spazio, infatti i caratteri derivati si mostrano sempre più accentuati man mano che ci si sposta verso Ovest.

→ attorno a 50000 anni in Europa occidentale, gli individui di Neanderthal presentano dei caratteri derivati più pronunciati rispetto agli individui neandertaliani dell'Europea 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 neandertal present derived features more marked compared to the Neandertal from Eastern Europe.

Grande capacità cranica 1500-1700 cm^3



Frontale sfuggente

Toro sopraorbitario

Glabella sporgente

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

«Chignon» occipitale

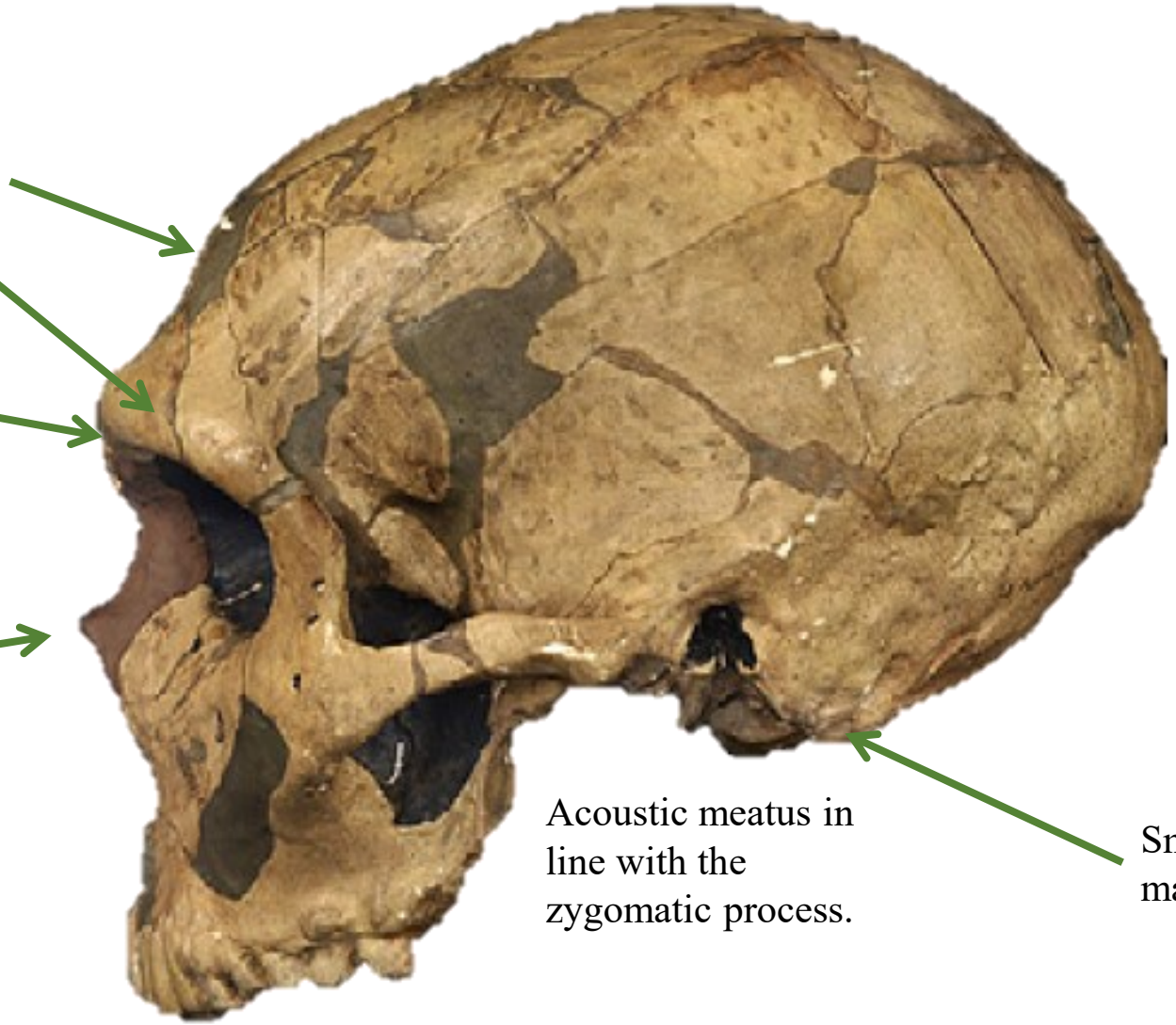
Meato o condotto acustico esterno nel prolungamento del arcata zigomatica

Apofisi mastoidee piccole e poco sviluppate

Il cranio cerebrale è allungato per compensare la faccia voluminosa

La Ferrassie 1

Important cranial capacity 1500-1700 cm^3



Receeding frontal bone

Supraorbital torus

Projected glabella

High nose, projected frontward = meso-facial prognatism

Occipital bun

Acoustic meatus in line with the zygomatic process.

Small and reduced mastoideal apophysis

Elongated cranium anteroposteriorly to compensate the large face

La Ferrassie 1

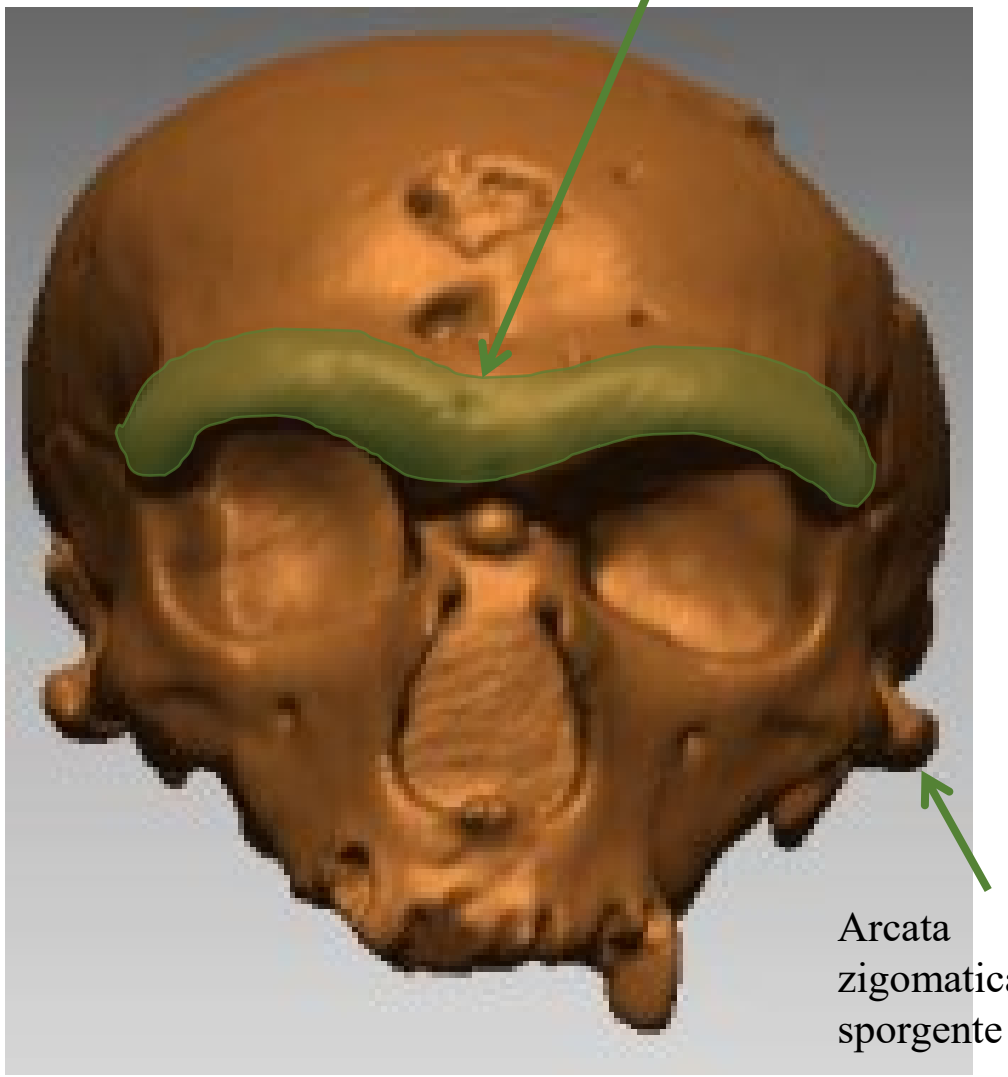
Orbite più large che alte,
arrotondate e grandi

Assenza di
fossa canina

La Ferrassie 1

Cavità nasale alta e
voluminosa

Toro sopraorbitario
continuo



Arcata
zigomatica
sporgente

La Chapelle-aux-Saints 1

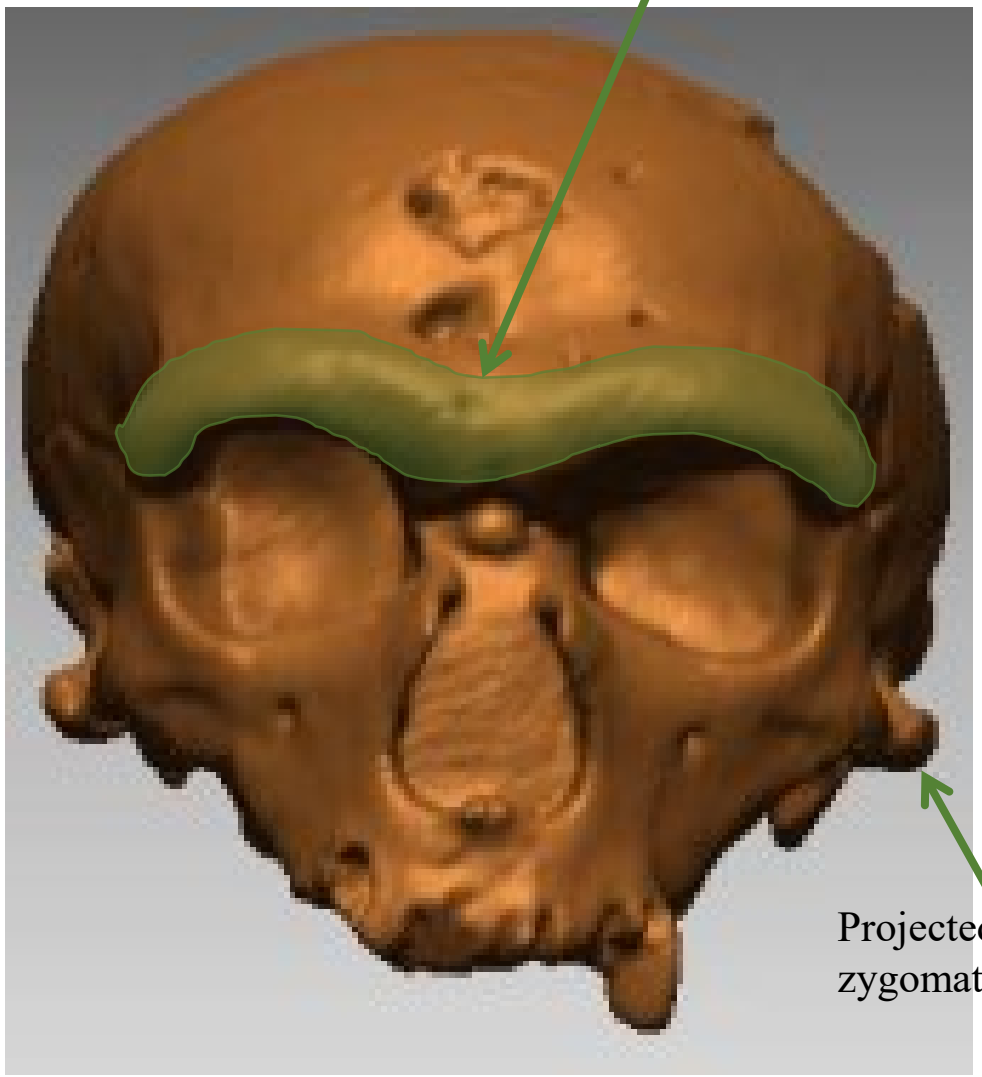
Rounded orbit, larger than wide

No canine fossa

La Ferrassie 1

Large nasal cavity

Continuous supraorbital torus



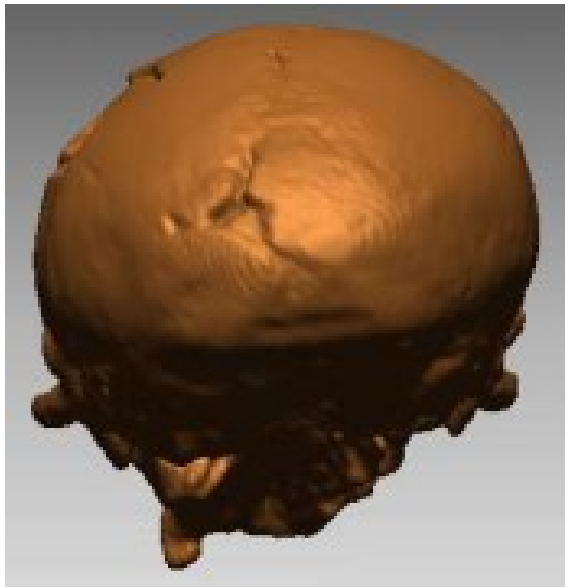
Projected zygomatics

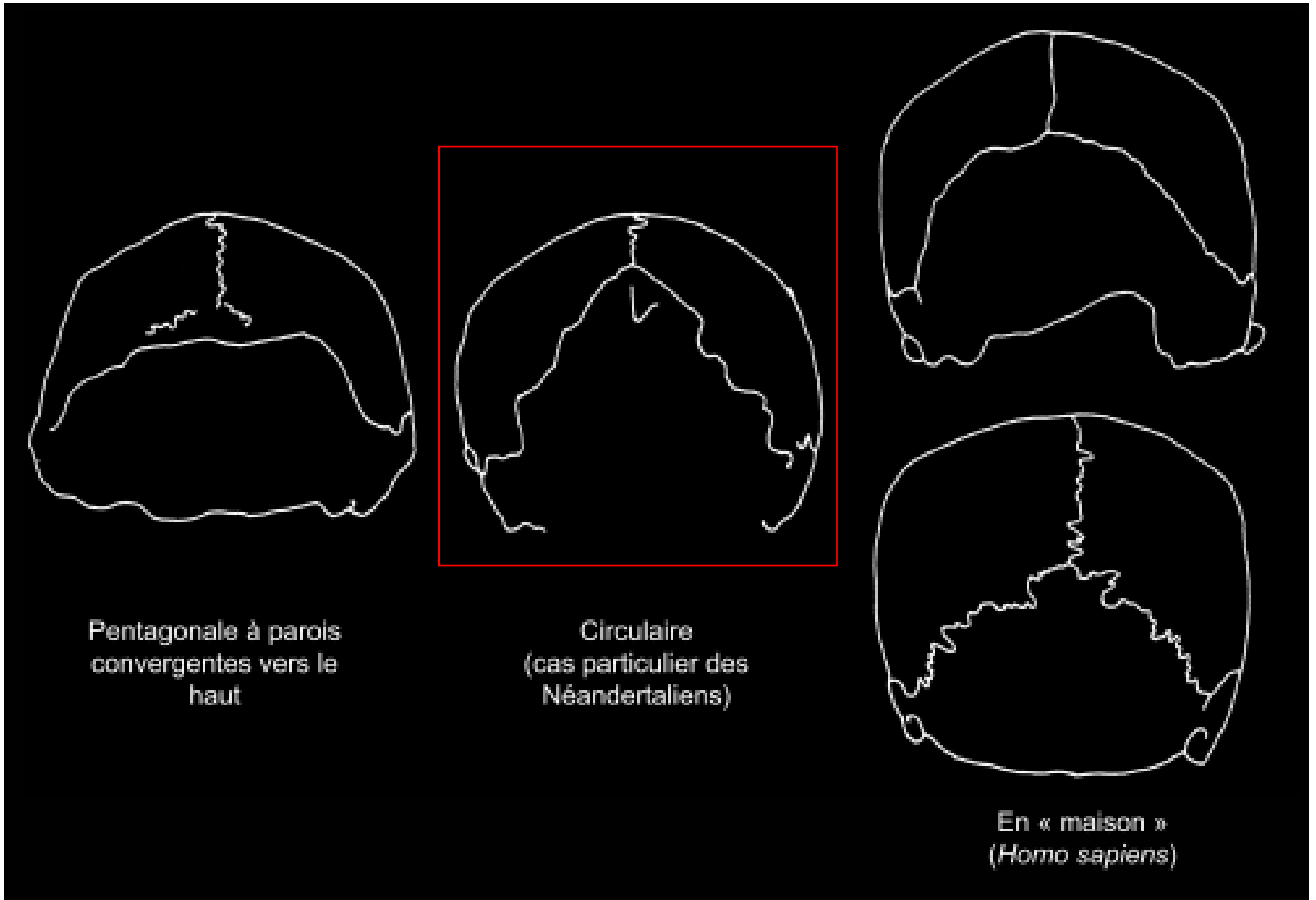
La Chapelle-aux-Saints 1

Forma circolare del cranio in vista posteriore

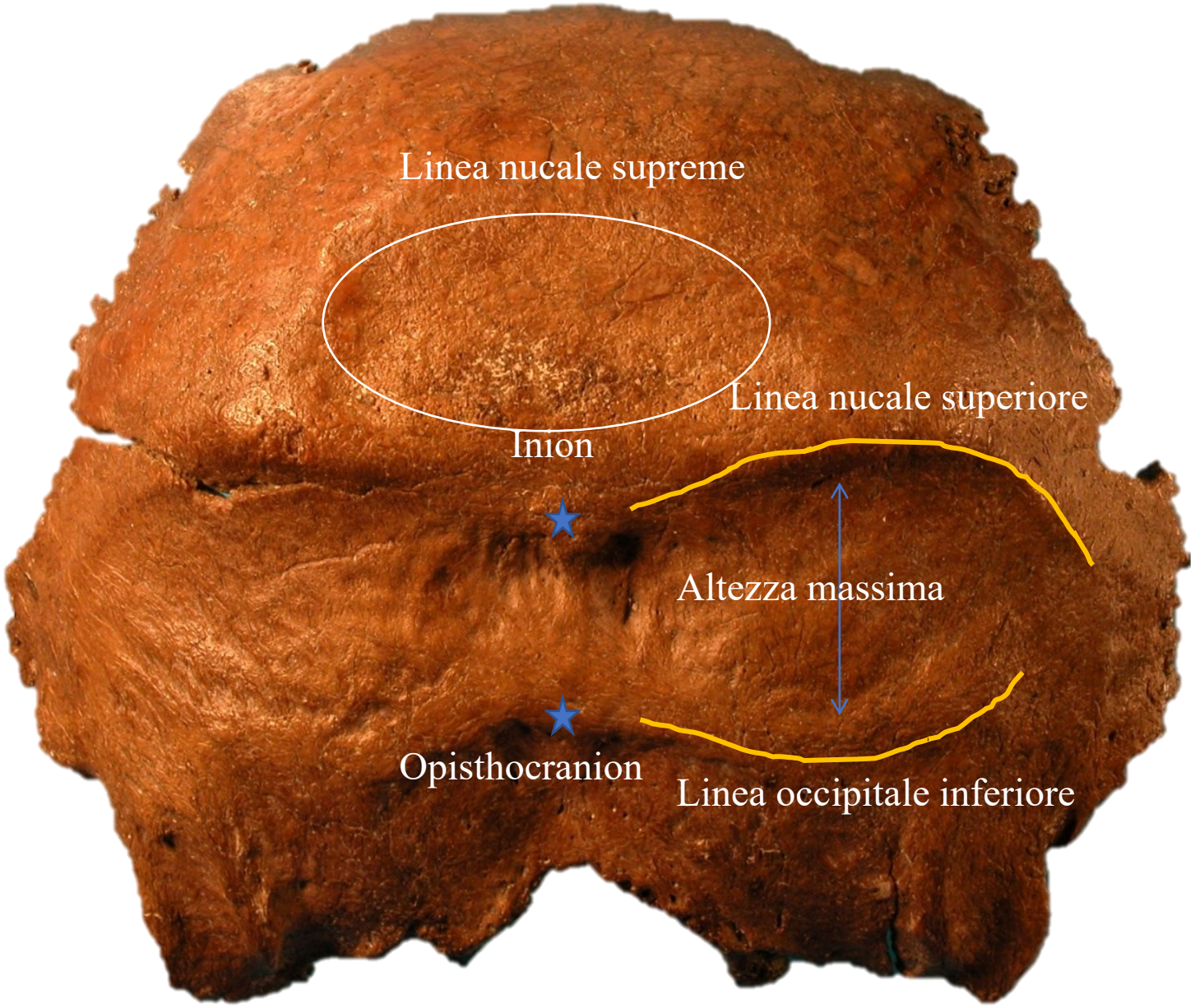
Circular shape of the cranium in posterior view

Chignon occipitale

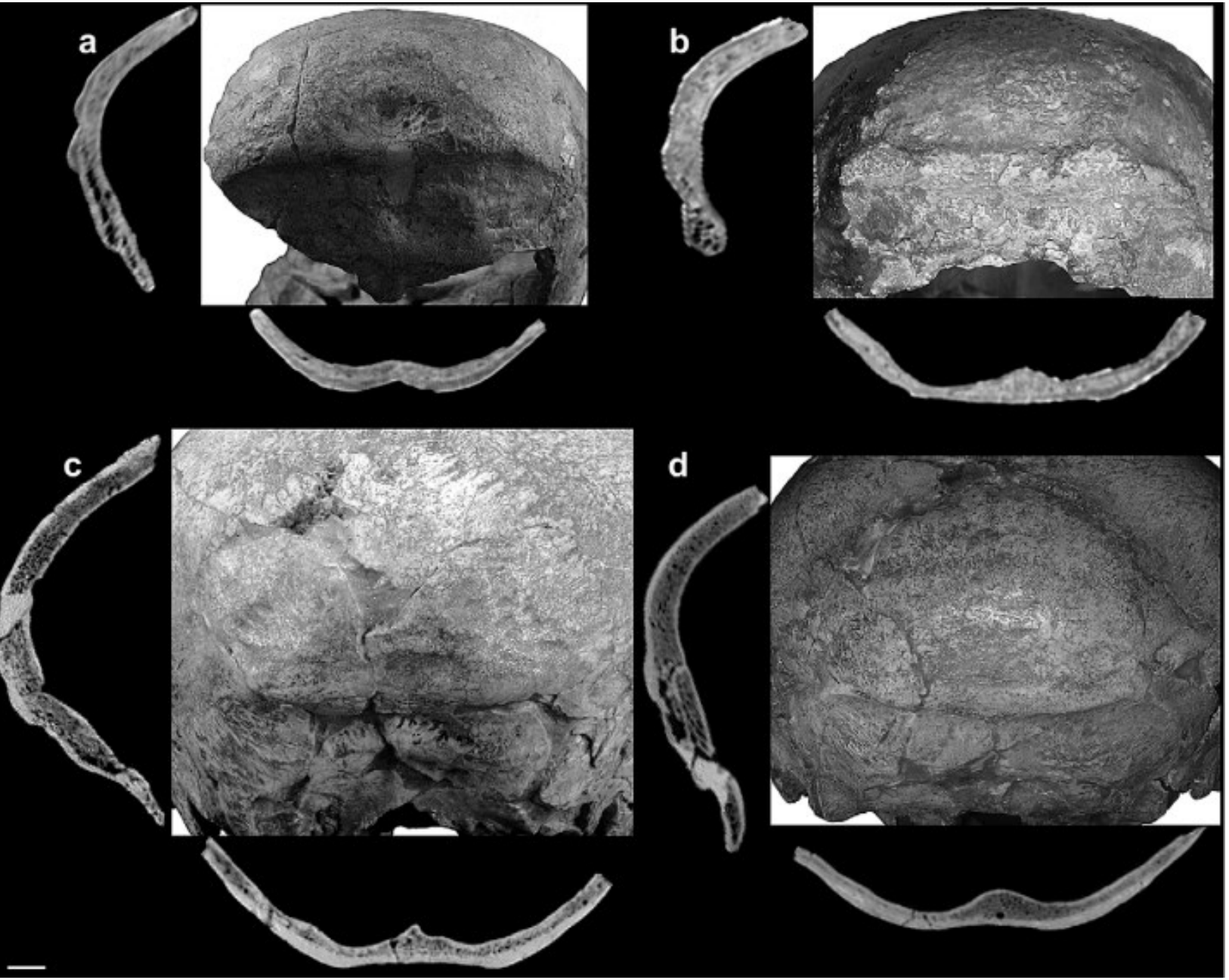




Fossa soprainiaca / *suprainiac fossa*



Salzgitter-Lebenstedt 1 (Germania)

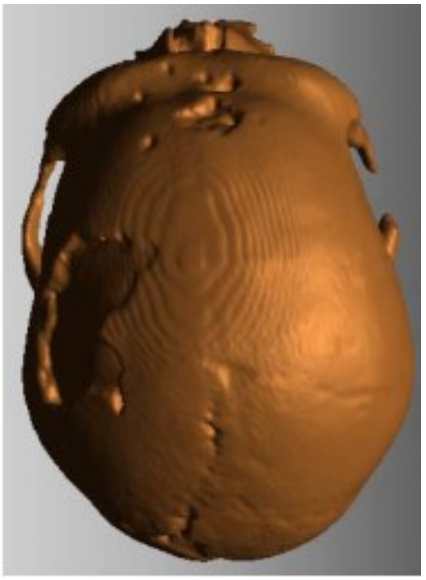


(Balzeau, 2010)

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

La fossa soprainiaca 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 is a Neandertal derivated feature find in all the sample, it can be individualized early in the individual growth and is present early in the differentation of the lineage.

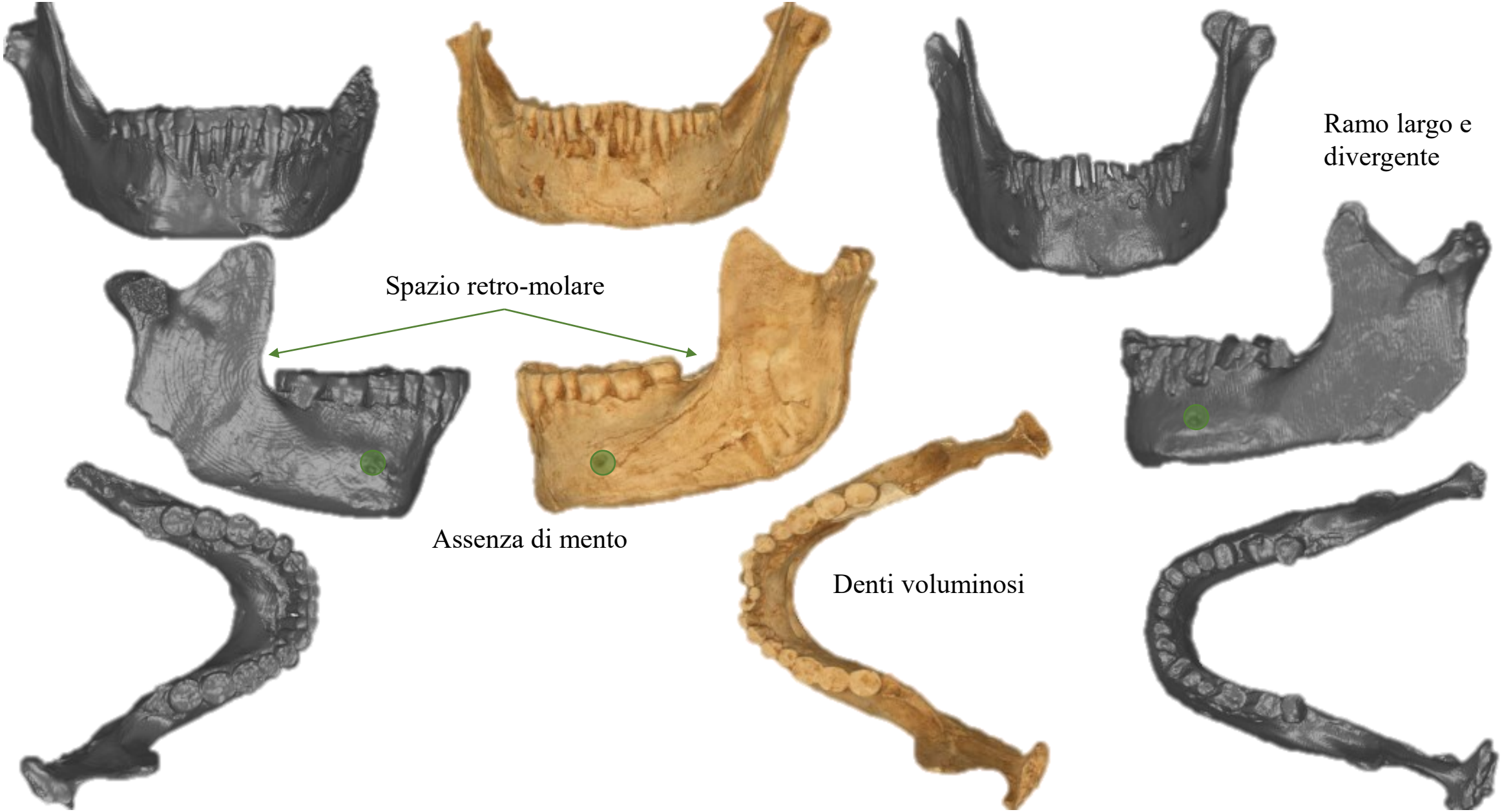


Homo neanderthalensis
(La Chapelle-aux-Saints 1)

Cranio allungato / *elongated cranium*

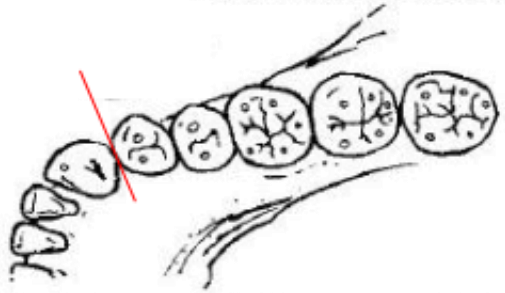
Zigomi sporgenti / *prominent zygomatic*

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


Ramo largo e divergente
Spazio retro-molare
Assenza di mento
Denti voluminosi
Foramen mentoniero spostato indietro

Australopithecus africanus

Less Robust Mandible

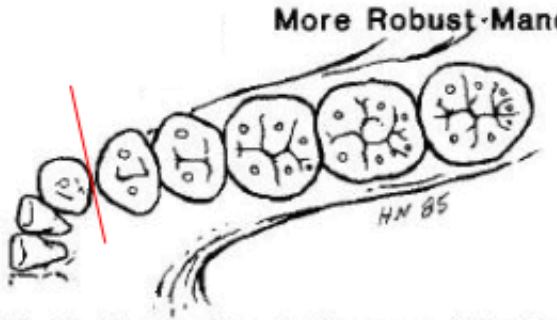


Relatively Larger Incisors and Canines

Relatively Smaller Premolars and Molars

Paranthropus

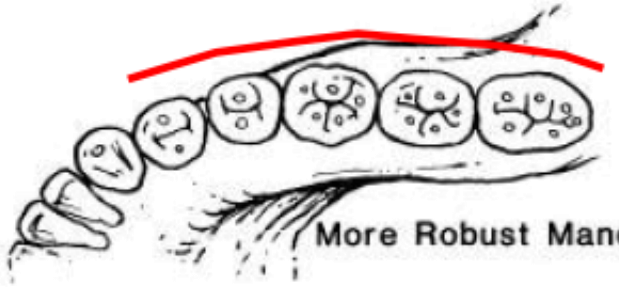
More Robust Mandible



Relatively Smaller Incisors and Canines

Relatively Larger Premolars and Molars

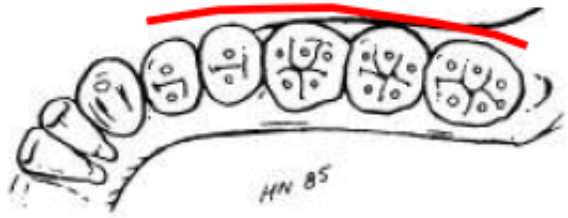
Homo habilis



More Robust Mandible

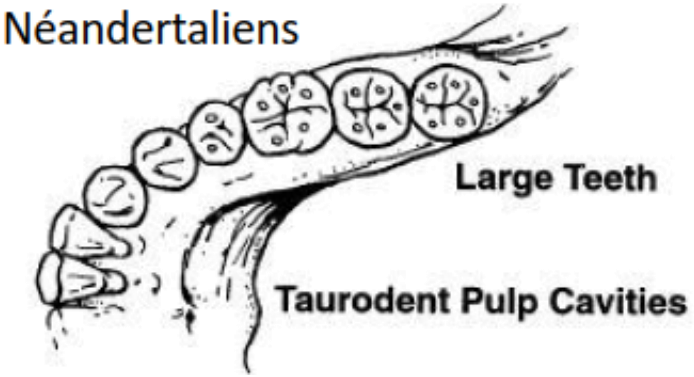
Larger Premolars and Molars

Homo erectus



Smaller Premolars and Molars

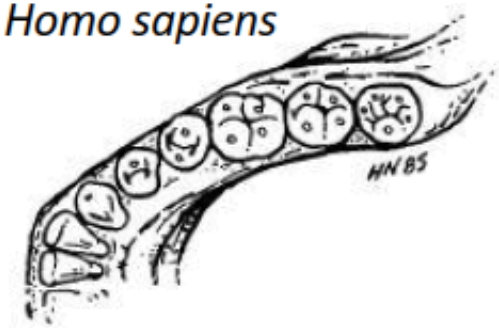
Néandertaliens

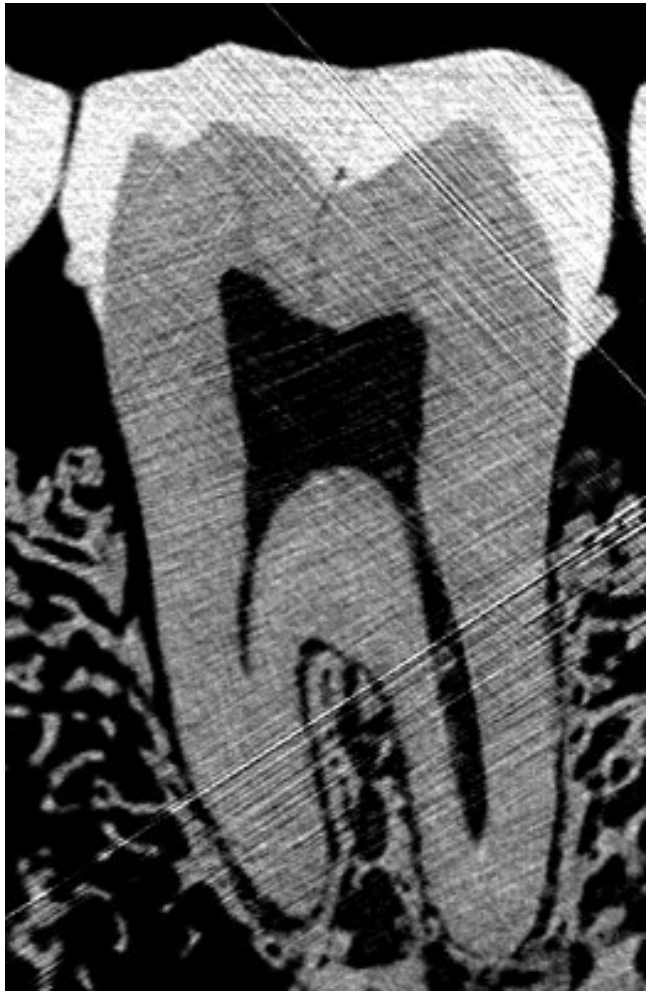


Large Teeth

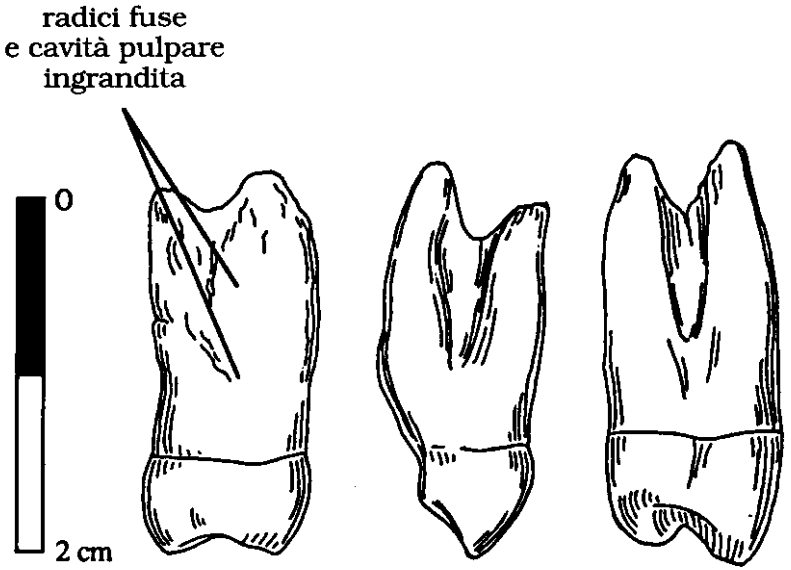
Taurodent Pulp Cavities

Homo sapiens

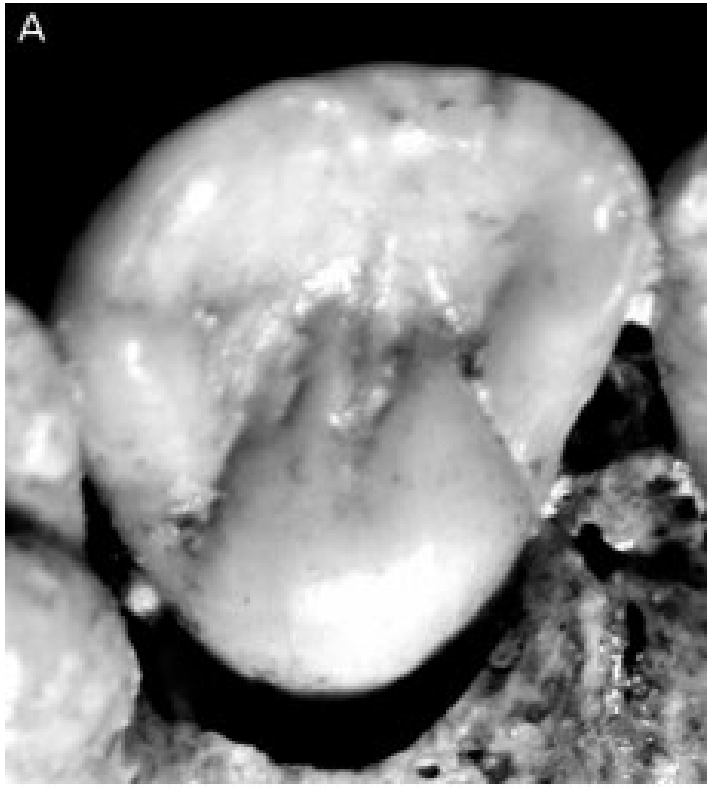




Taurodontismo: Grande cavità pulpare

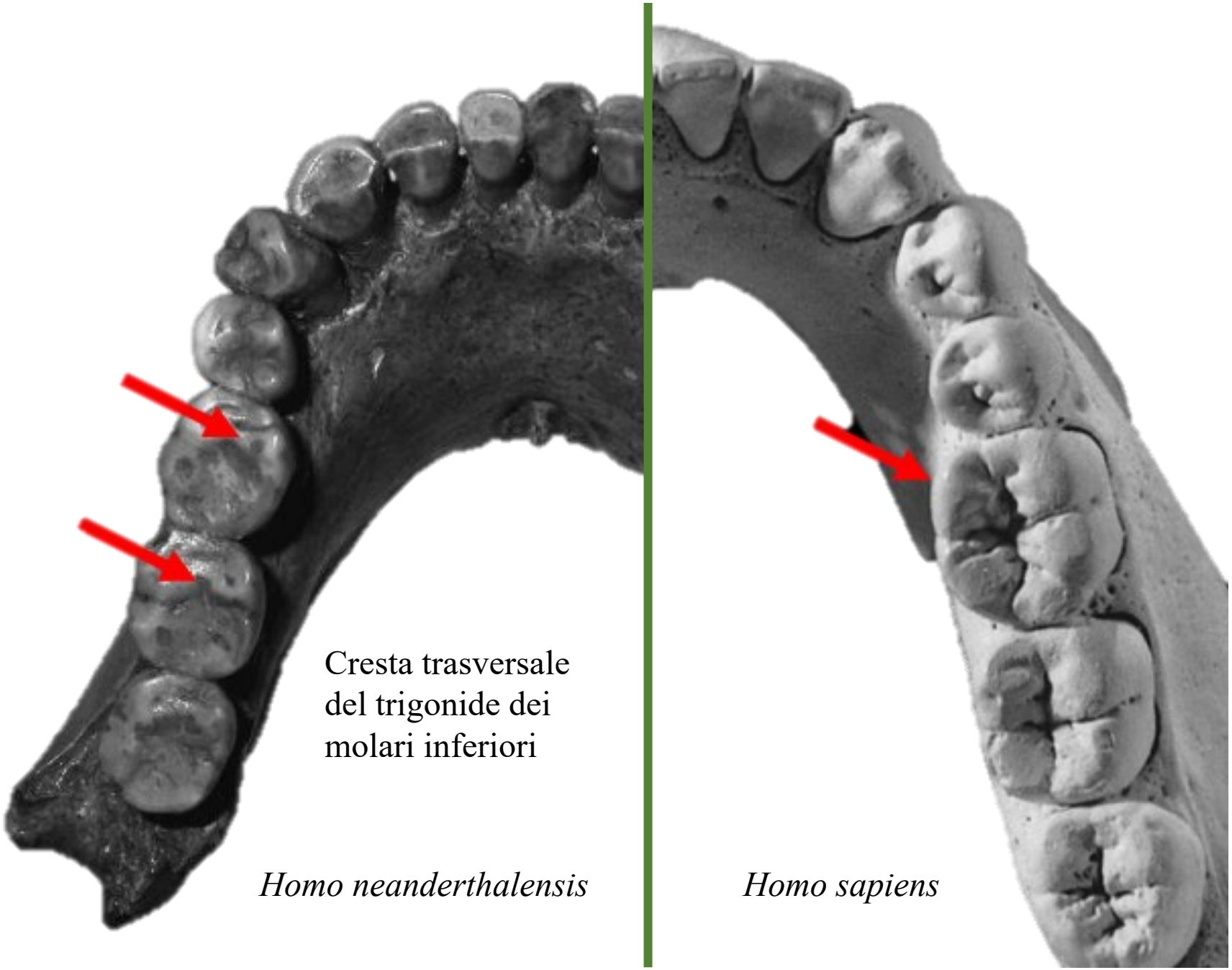


Denti premolari e molari taurodonti di Krapina



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

- Dimensione: *Homo* più antico > Neanderthal > *Homo sapiens*
- Incisivi di grandi dimensione
- Incisivi superiori a forma di spatola
- Usura importante dei incisivi
- Spessore ridotto dello smalto
- Taurodontismo



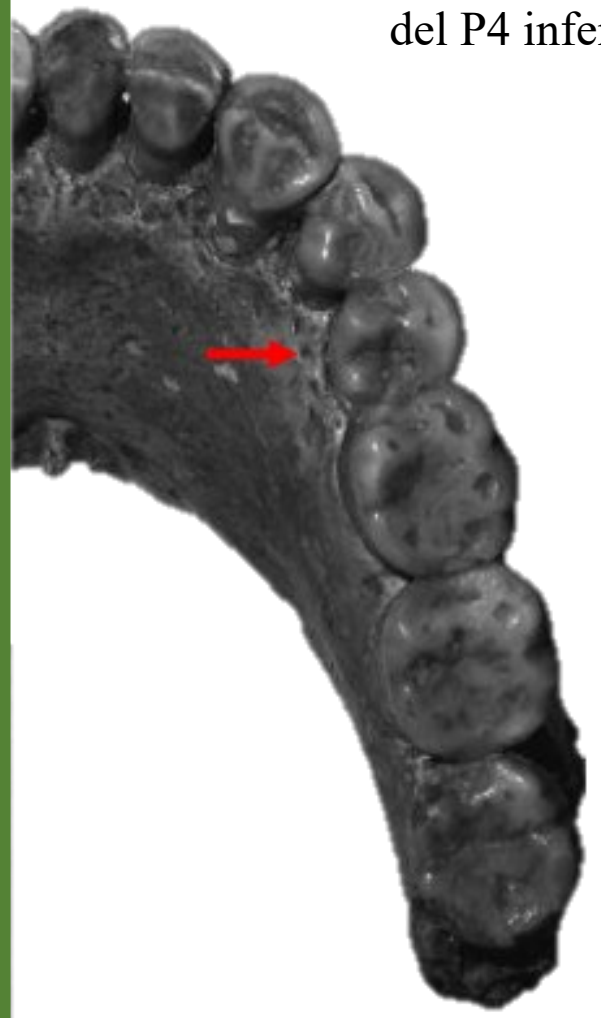
Cresta trasversale del trigonide dei molari inferiori

Homo neanderthalensis

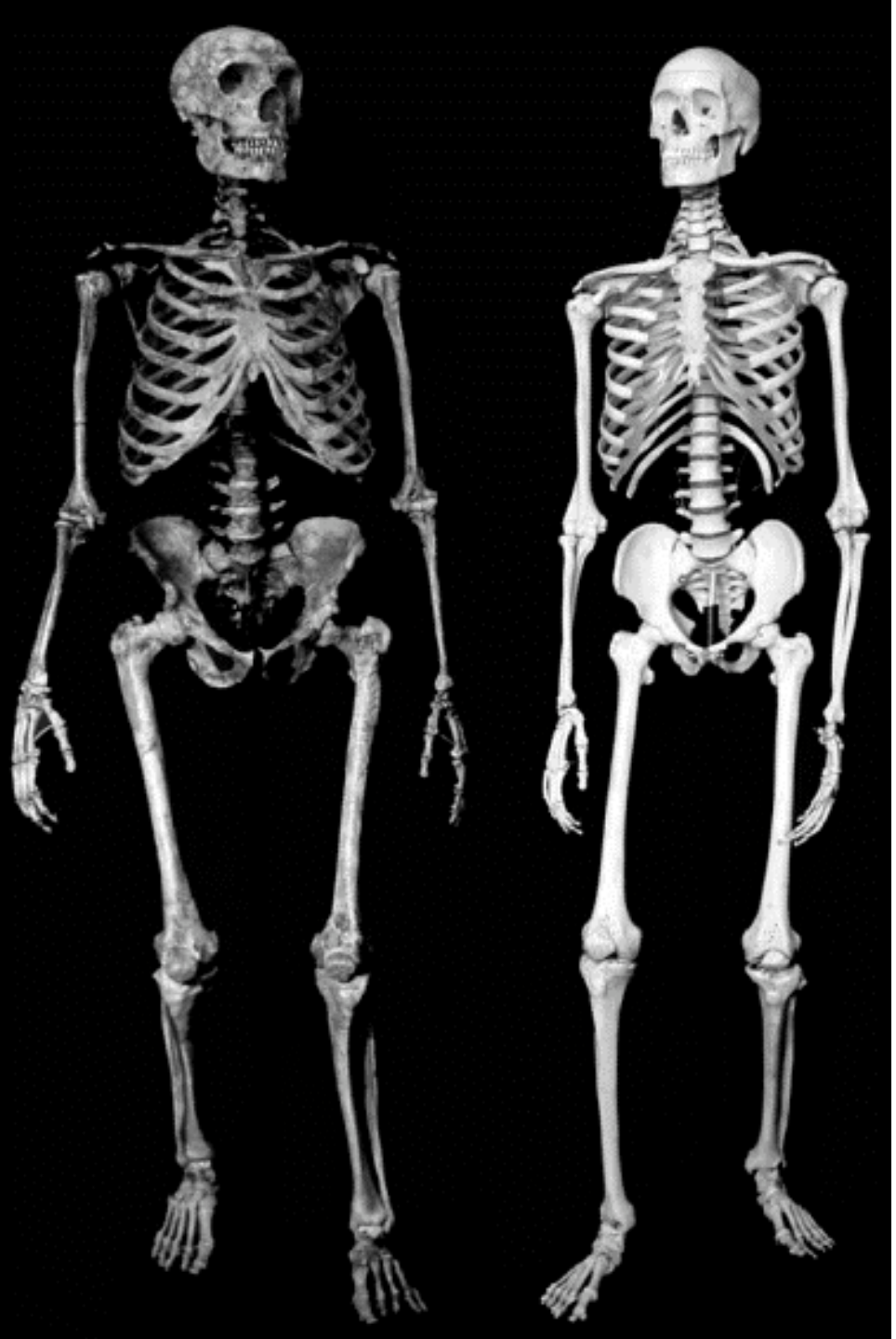
Homo sapiens

Asimmetria della superficie linguale del P4 inferiore

Homo sapiens



Homo neanderthalensis



1,65m – 1,55m

Scheletro robusto con inserzioni muscolari robuste.
Robust skeletton 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 musclulature well developped

Torace largo, sviluppato lateralmente e verso l'avanti
Large thorax, lateraly and frontward developped

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

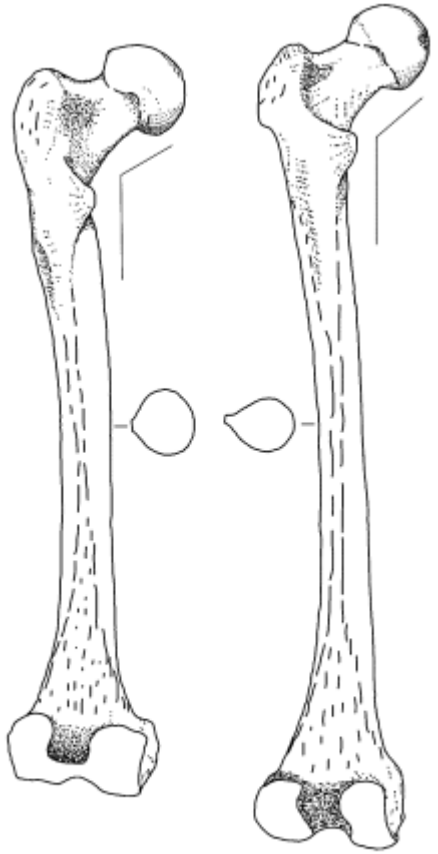


Fig. 1. Distinctive features of the Neandertal femur. (*Left*) The Neandertal 1 (Feldhofer Cave Neandertal) femur. (*Right*) The Skhul IV near-modern human femur. Relative to near-modern humans, the Neandertal femur has larger articulations (head and distal end), a thicker and rounder shaft, and a lower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

(Weaver, 2003)

Evoluzione della linea neandertaliana

Il modello di evoluzione dei Neanderthal è detto ad accrezione: questo gruppo di ominidi si é 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 a un adattamento a delle condizioni climatiche fredde :

Larga cavità nasale

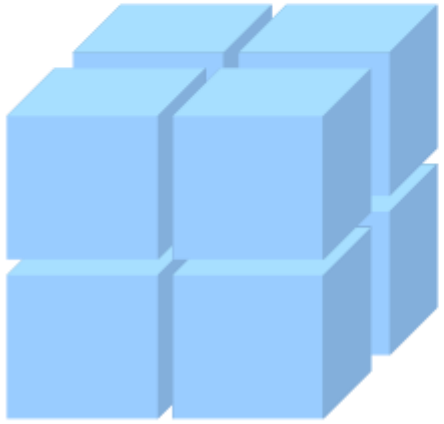
Robustezza

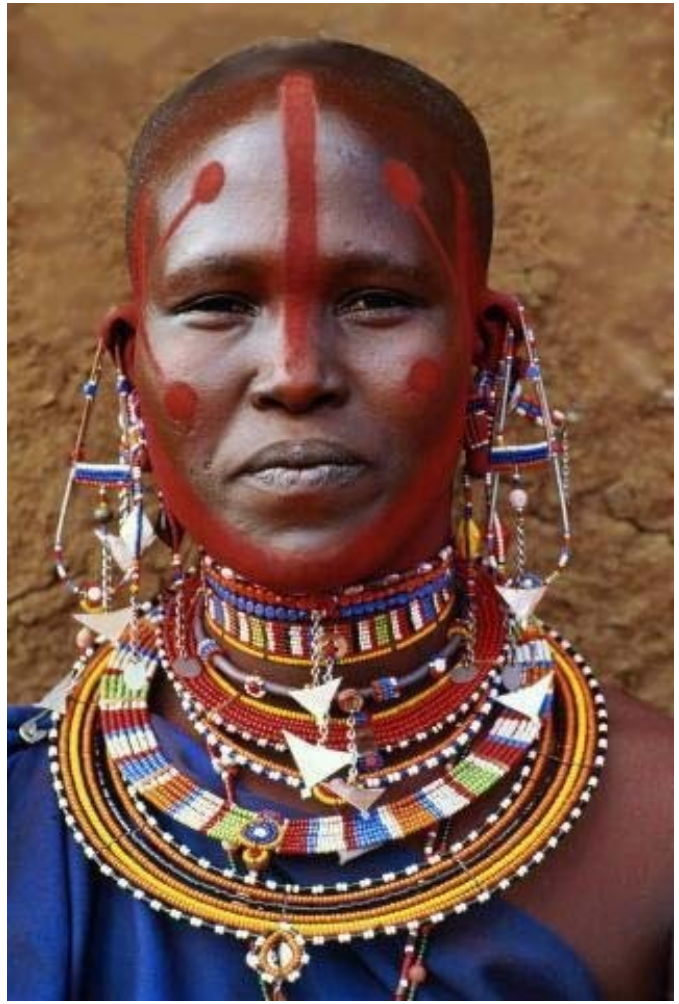
Morfologia tarchiata

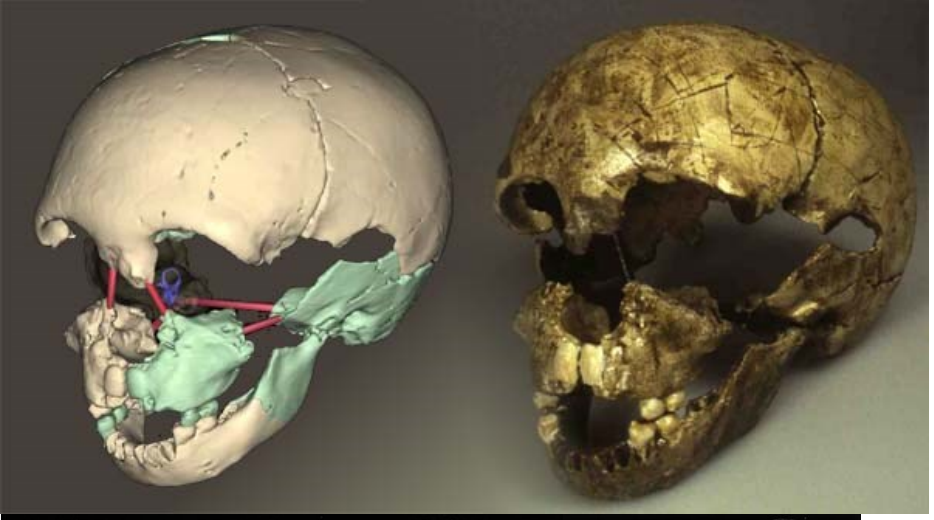
Adattamento al freddo

Regola di Allen : In un clima freddo, gli individui tendono ad essere piu 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)

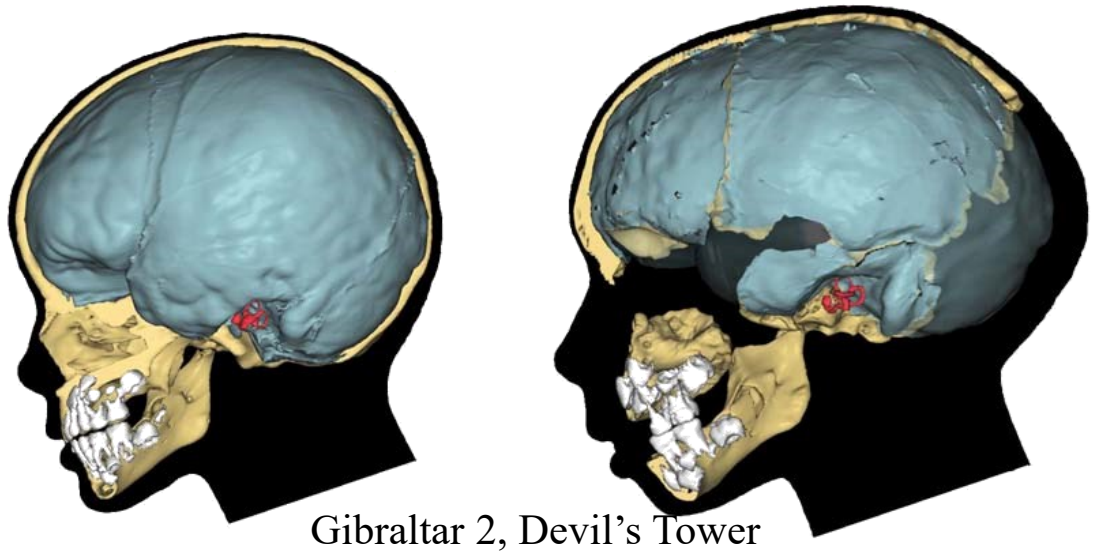
In cold climat, individuals tends to have shorter limbs than the one from warmer climates, in this way the heat rentention is more effective (ratio corporeal mass/exposed surface)



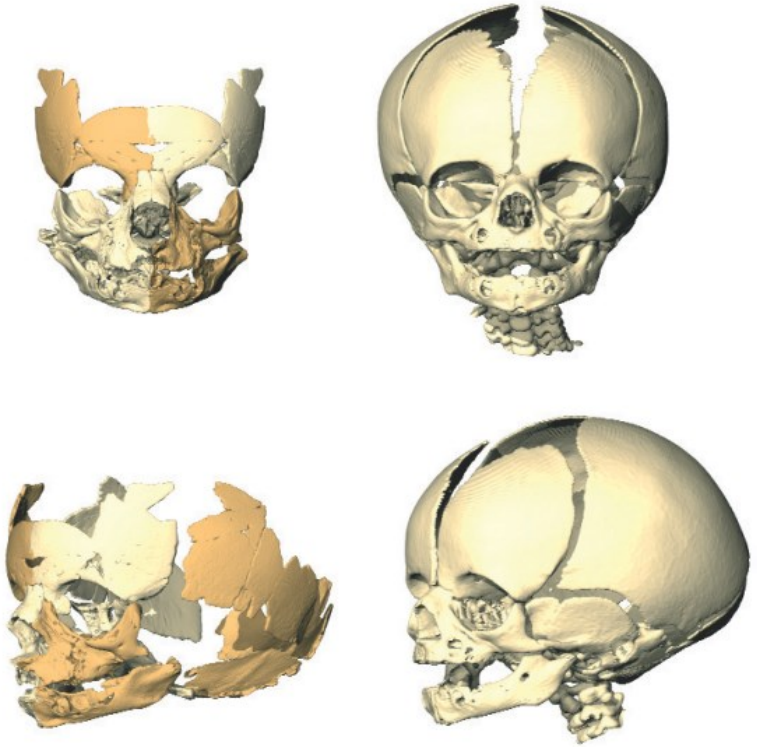




Dederiyeh, Syria



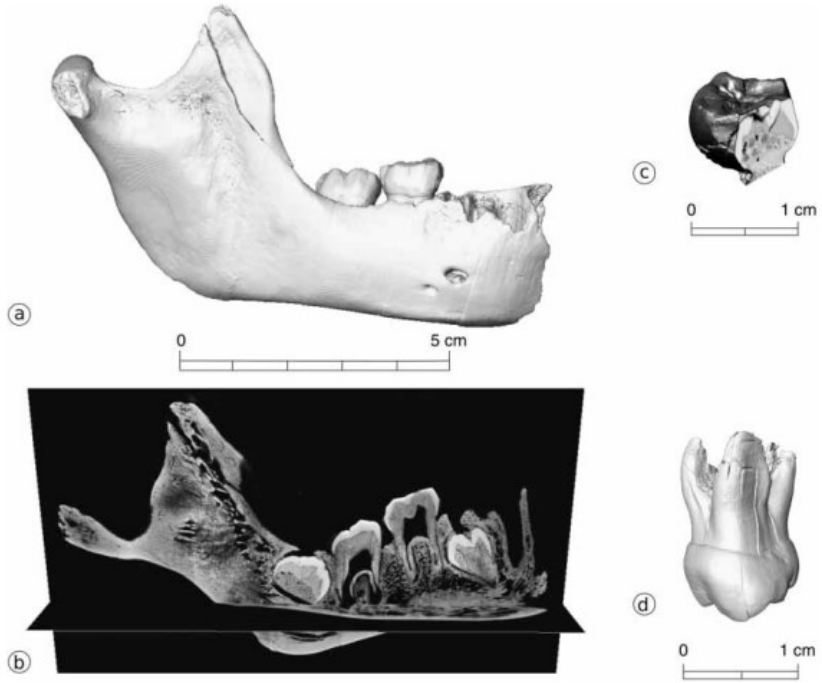
Gibraltar 2, Devil's Tower



(Gunz *et al.*, 2011)

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

Ontogenesi

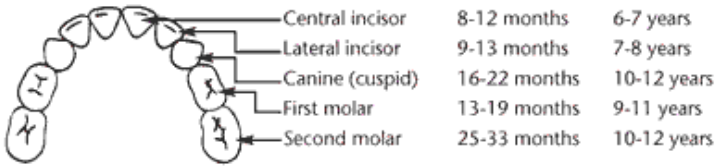


(a and b) Right hemi-mandible from Scladina (Scla 4A-1). (c) Probable Neandertal deciduous molar from Couvin. (d) deciduous second upper molar from Engis 2

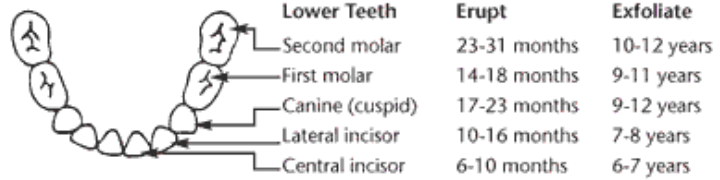
Sequenze d'eruzione dei denti permanenti: differenze tra *sapiens* e *Neanderthal*
Homo sapiens: M1 – I1- I2 – P1 – C-P2-M2-M3
Homo neanderthalensis: M1-I1-I2-C-M2-P1-P2-M3

Eruzione dei denti in *Homo sapiens*

PRIMARY DENTITION

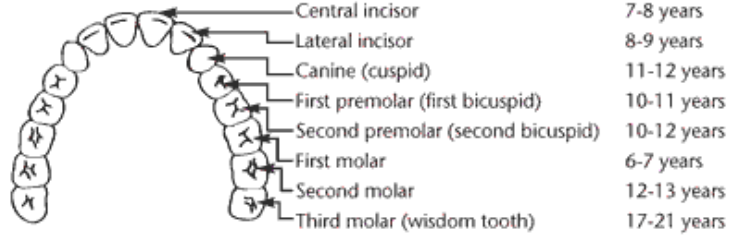


Upper Teeth	Erupt	Exfoliate
Central incisor	8-12 months	6-7 years
Lateral incisor	9-13 months	7-8 years
Canine (cuspid)	16-22 months	10-12 years
First molar	13-19 months	9-11 years
Second molar	25-33 months	10-12 years

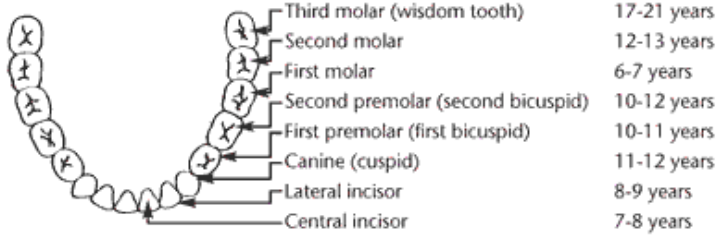


Lower Teeth	Erupt	Exfoliate
Second molar	23-31 months	10-12 years
First molar	14-18 months	9-11 years
Canine (cuspid)	17-23 months	9-12 years
Lateral incisor	10-16 months	7-8 years
Central incisor	6-10 months	6-7 years

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.

Early life of Neanderthals

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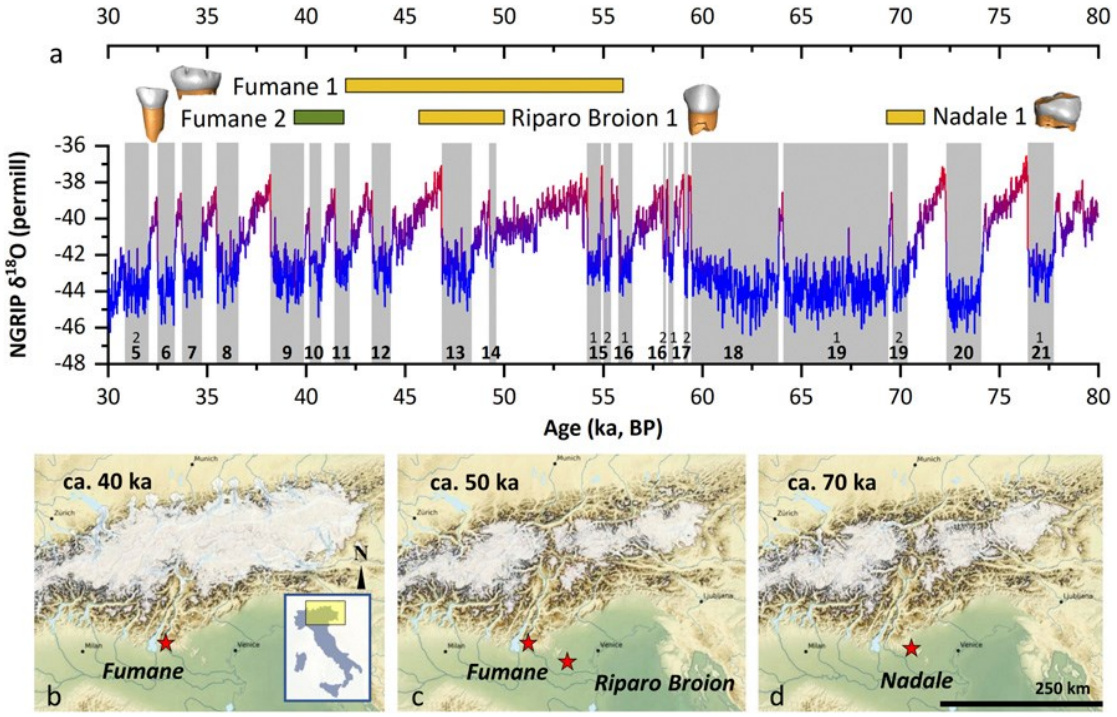
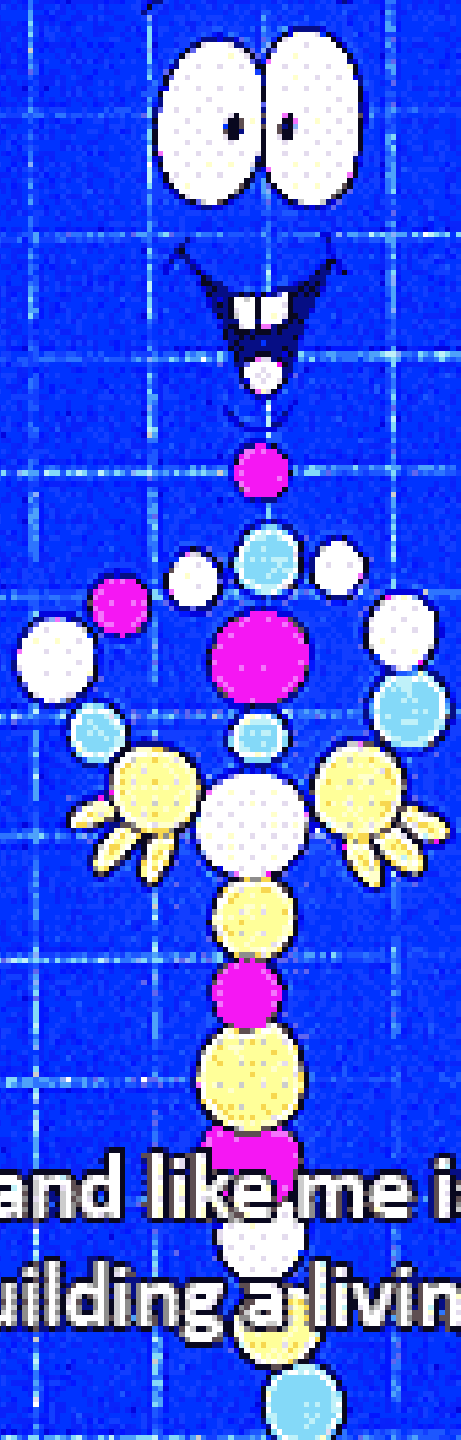
The early onset of **weaning** in modern humans has been linked to the high nutritional demand of brain development that is intimately connected with infant physiology and growth rate**. In Neanderthals, ontogenetic patterns in early life are still debated, with some studies suggesting an accelerated development and others indicating only subtle differences vs. modern humans**. Here we report the onset of weaning and rates of enamel growth using an unprecedented sample set of three late (~70 to 50 ka) Neanderthals and one Upper Paleolithic modern human from northeast- ern Italy via spatially resolved **chemical/isotopic analyses** and histomorphometry of deciduous teeth. Our results reveal that **the modern human nursing strategy, with onset of weaning at 5 to 6 mo, was present among these Neanderthals.** This evidence, combined with dental development akin to modern humans, highlights their **similar metabolic constraints during early life** and excludes late weaning as a factor contributing to Neanderthals' demise.



Genetica



A DNA strand like me is a blueprint for building a living thing!

Ancestors evolve into Neanderthals and first modern humans

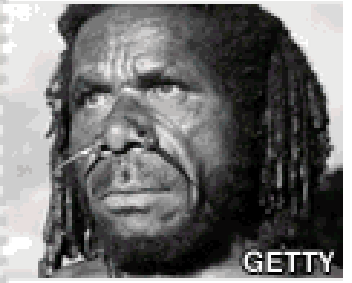
Neanderthals die out

Researchers looked at five groups of modern humans

French

Han-Chinese

Papuan



Some modern humans leave Africa

Yoruba

San

Neanderthal

Some Neanderthal and *Homo sapiens* interbreeding

Common ancestor with Neanderthal

Homo sapiens

Science journal

Note: Time periods not to scale

- 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.

Green et al. (2010)

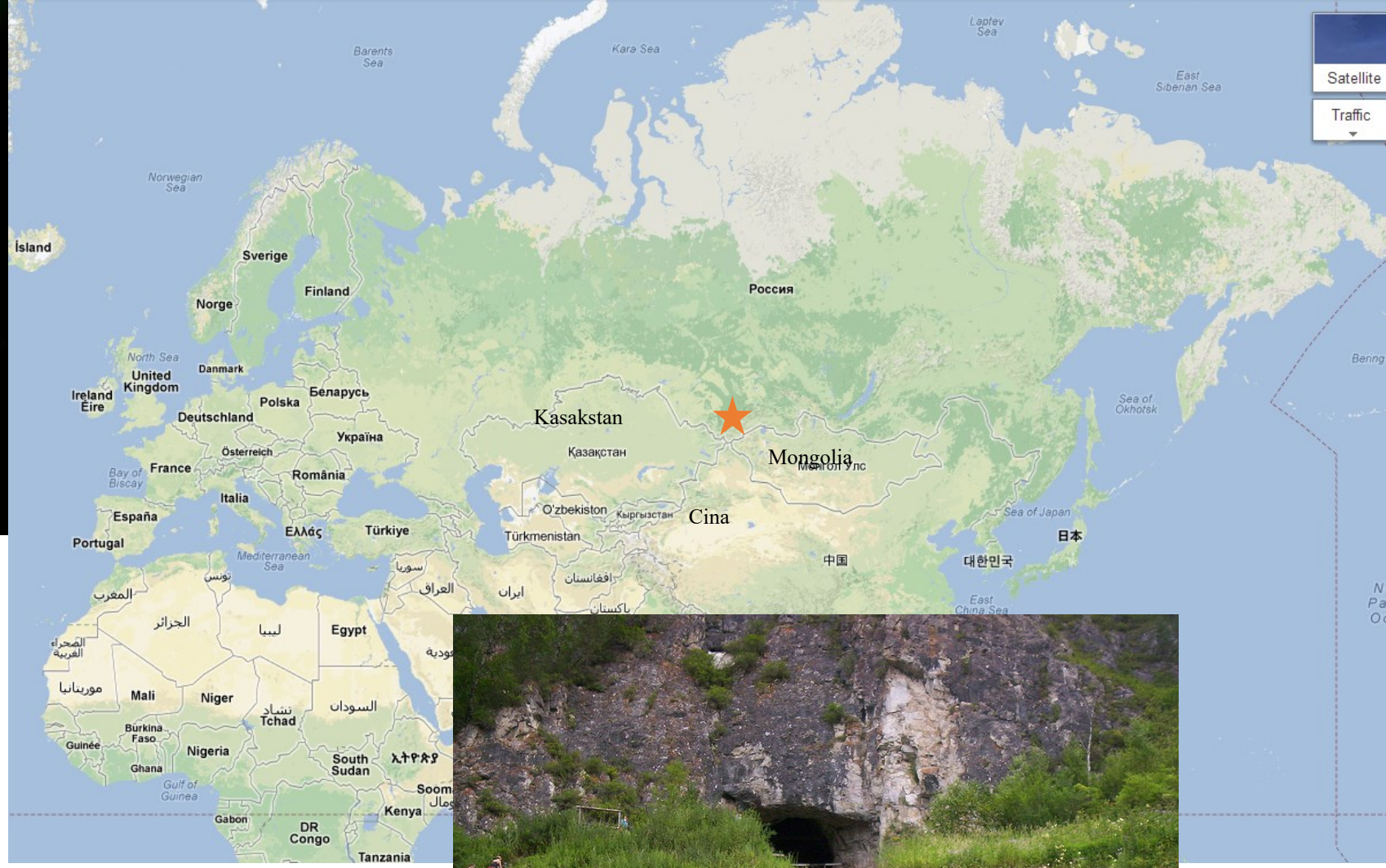
L’incontro in Europa

Peștera cu Oase, Romania
40 000 anni BP

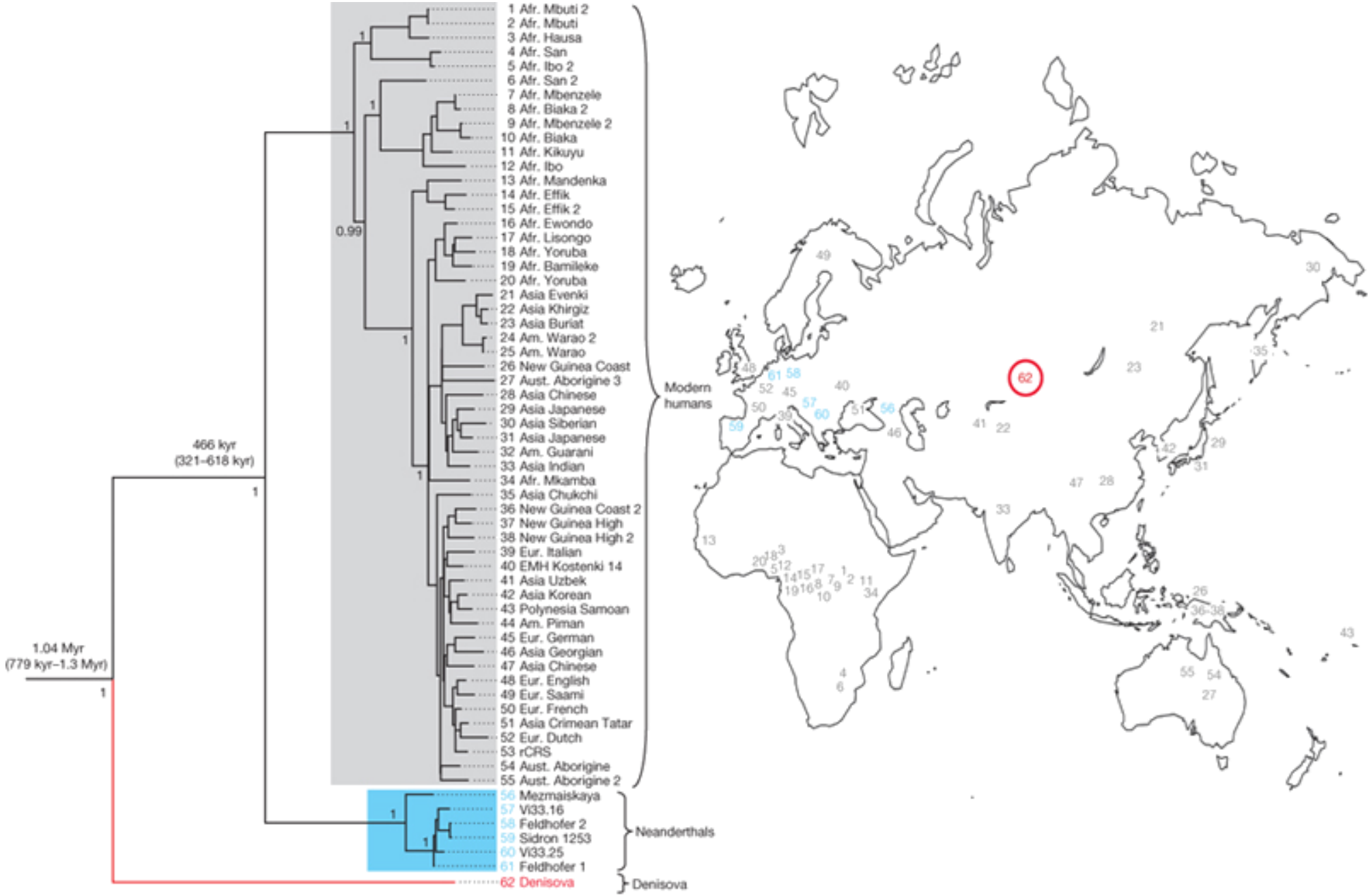
(Fu et al., 2015)

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

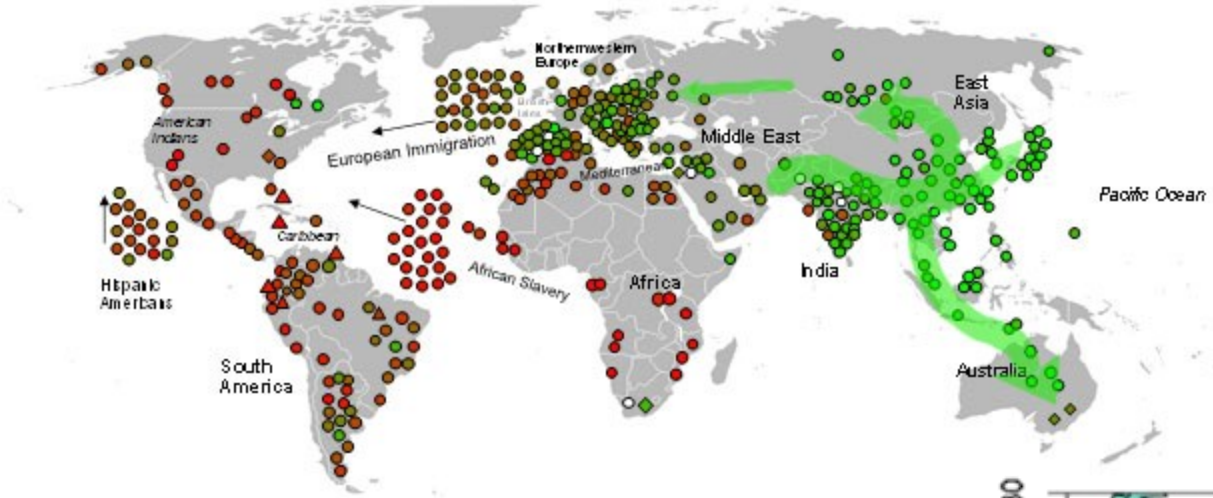


Phylogenetic tree of complete mtDNAs.

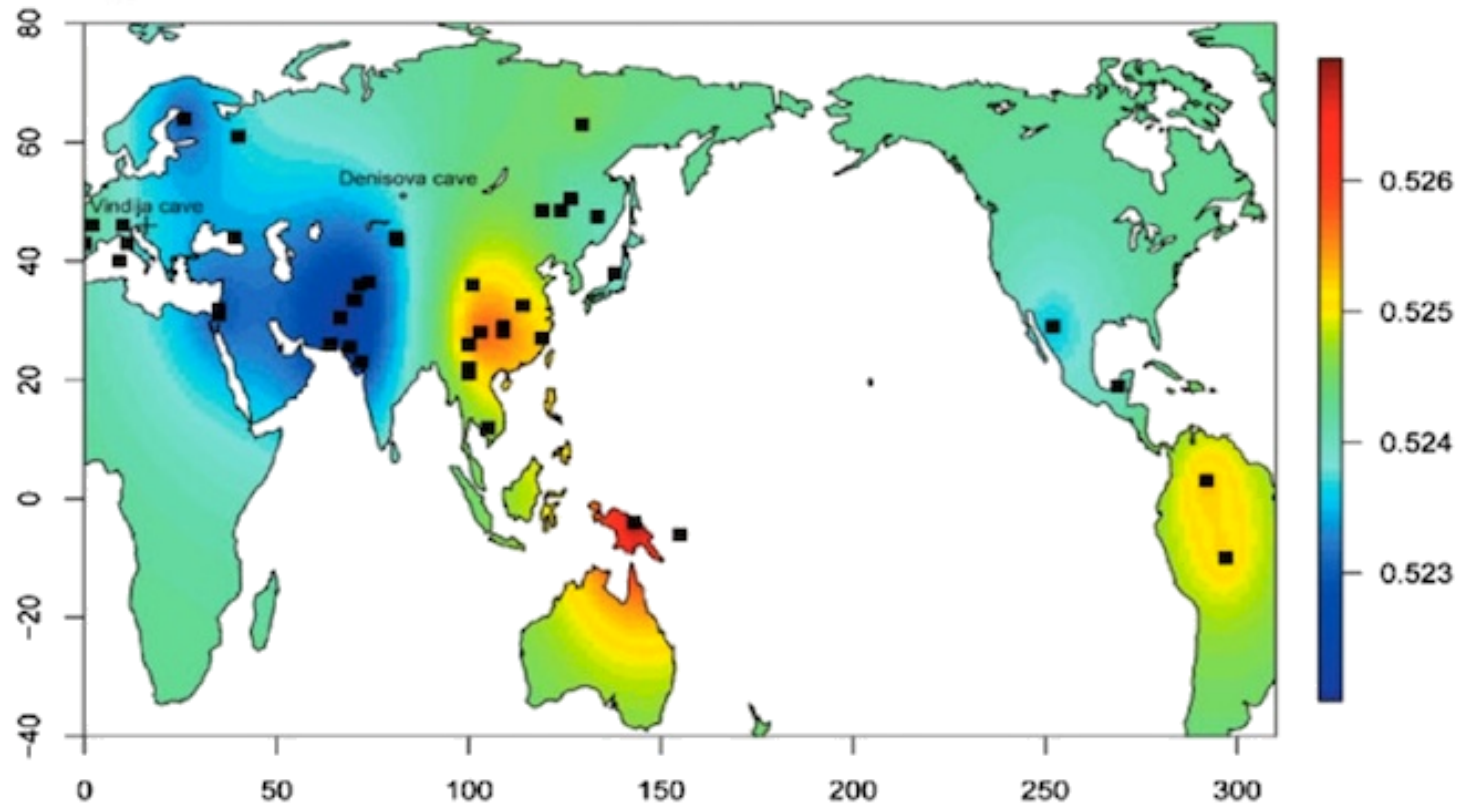


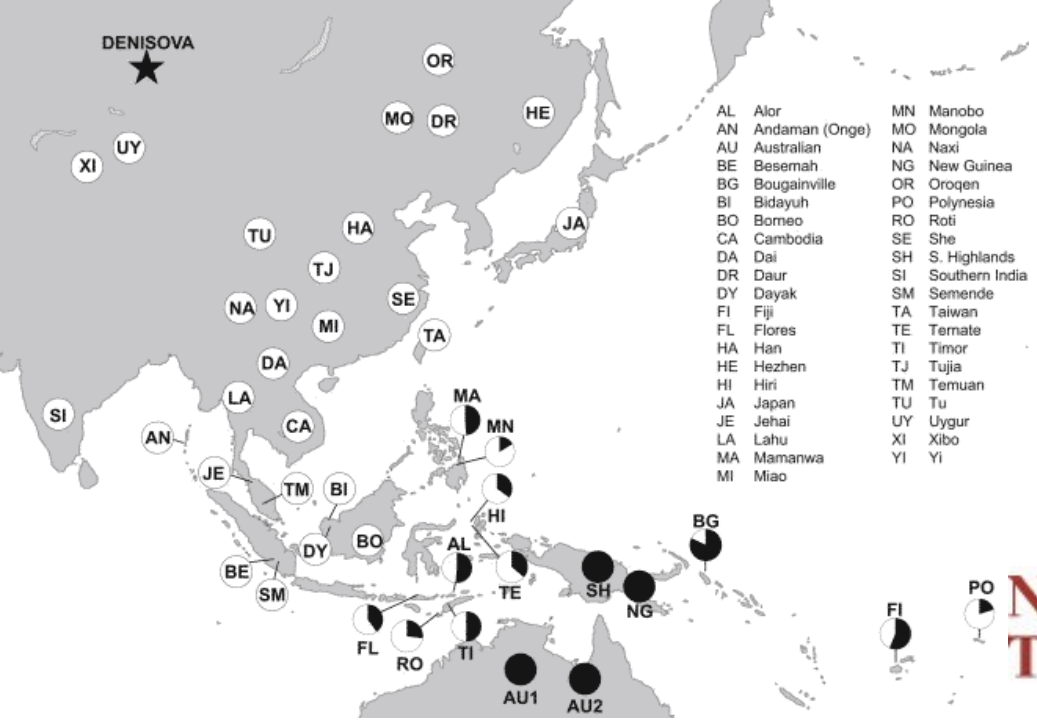
J Krause *et al. Nature* **464**, 894-897 (2010) doi:10.1038/nature08976

World Ancestry of the Denisovan Gene



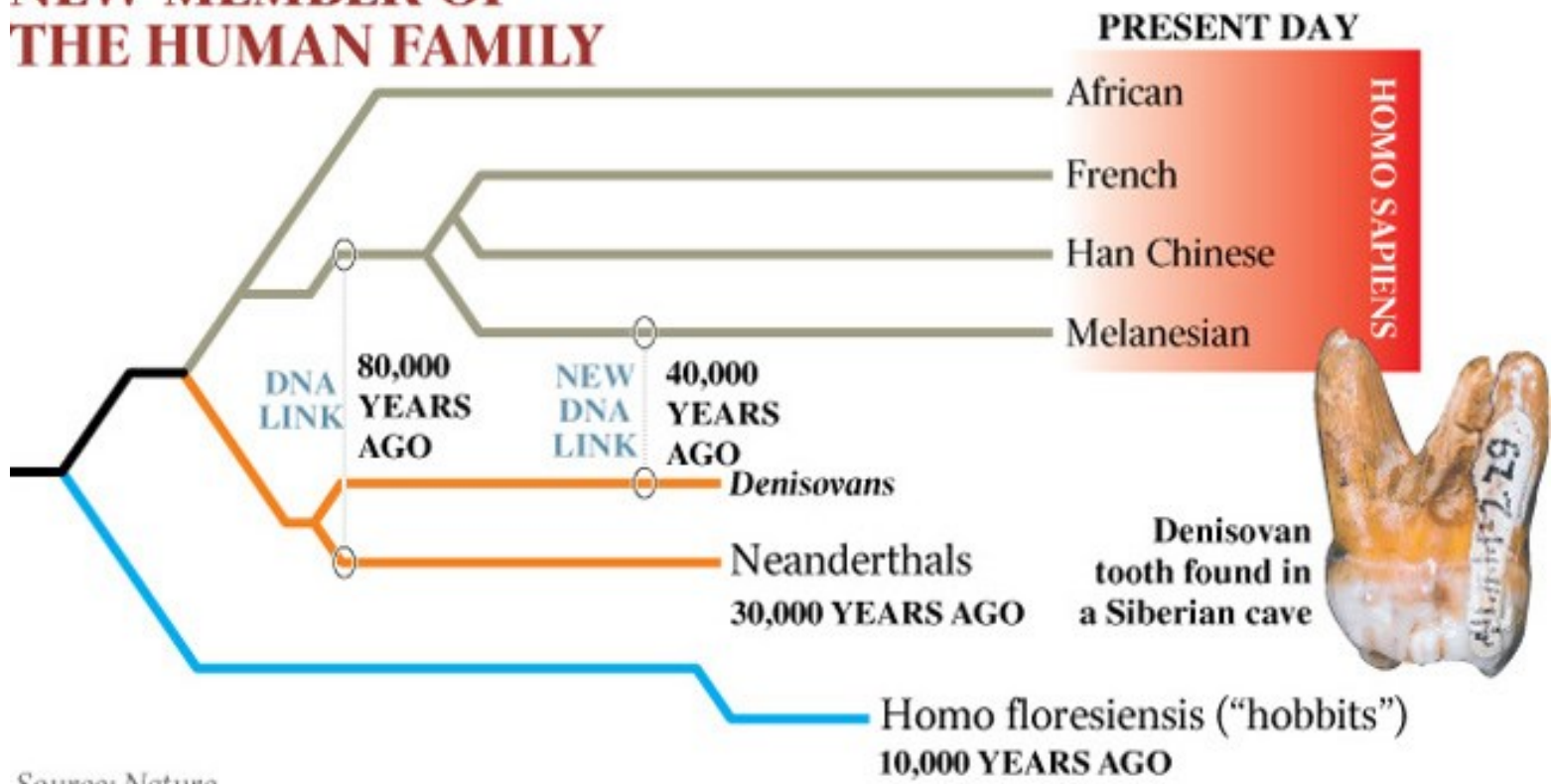
Denisova allele frequency





AL	Alor	MN	Manobo
AN	Andaman (Onge)	MO	Mongola
AU	Australian	NA	Naxi
BE	Besemah	NG	New Guinea
BG	Bougainville	OR	Oroqen
BI	Bidayuh	PO	Polynesia
BO	Borneo	RO	Roti
CA	Cambodia	SE	She
DA	Dai	SH	S. Highlands
DR	Daur	SI	Southern India
DY	Dayak	SM	Semende
FI	Fiji	TA	Taiwan
FL	Flores	TE	Ternate
HA	Han	TI	Timor
HE	Hezhen	TJ	Tujia
HI	Hiri	TM	Temuan
JA	Japan	TU	Tu
JE	Jehai	UY	Uygur
LA	Lahu	XI	Xibo
MA	Mamanwa	YI	Yi
MI	Miao		

NEW MEMBER OF THE HUMAN FAMILY



Source: Nature

Denisova vs Sima de los Huesos

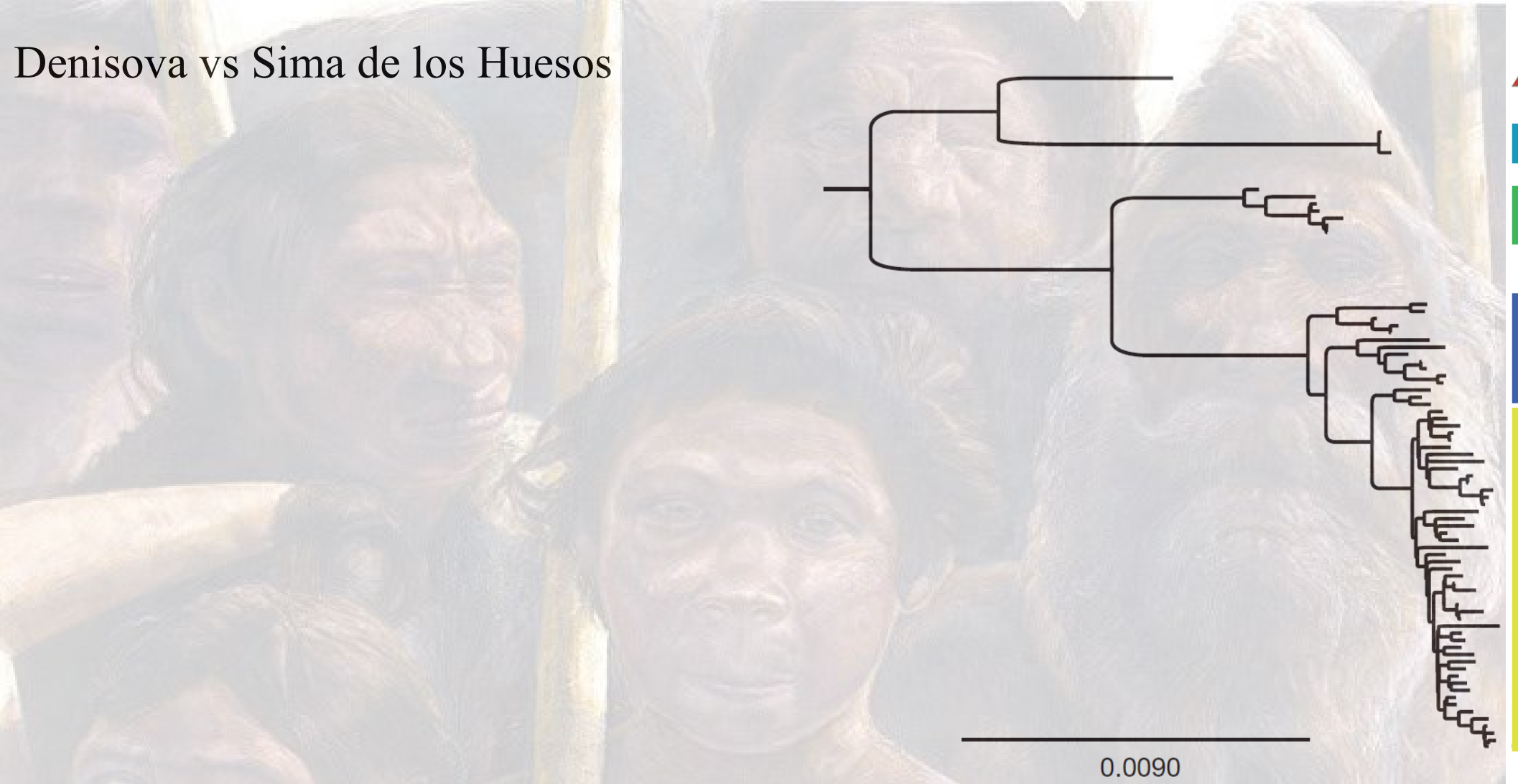
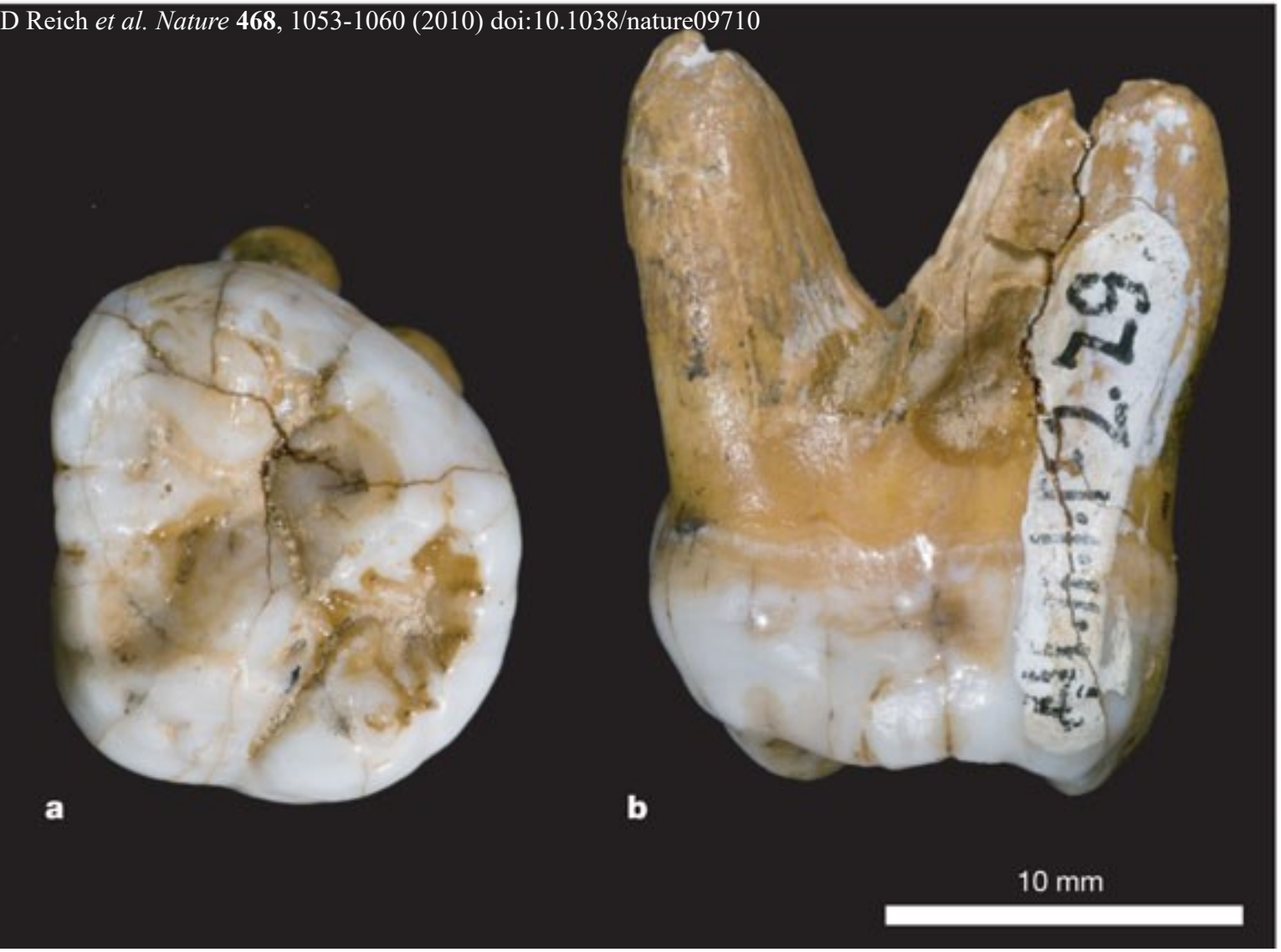


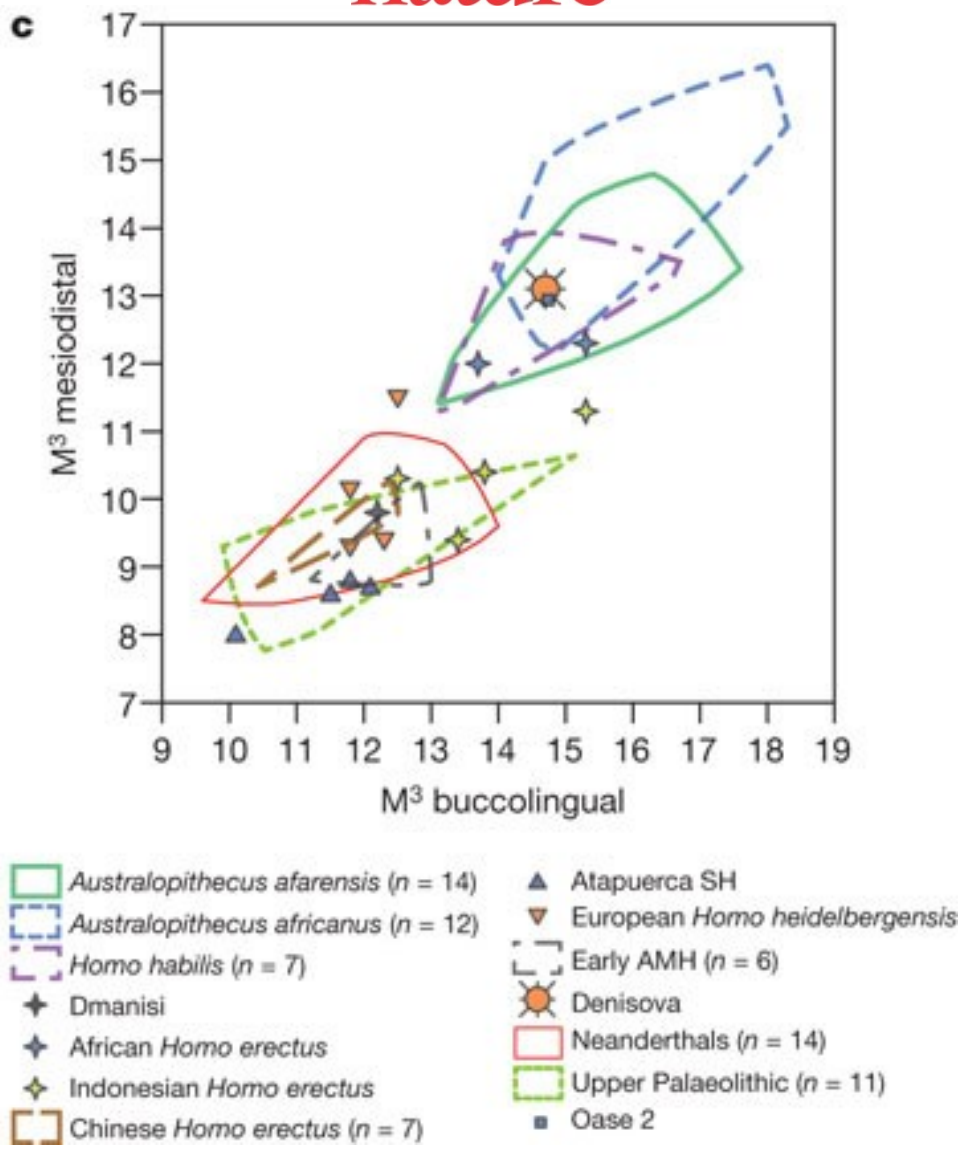
Figure 4 | Bayesian phylogenetic tree of hominin mitochondrial relationships based on the Sima de los Huesos mtDNA sequence determined using the inclusive filtering criteria. All nodes connecting the denoted hominin groups are supported with posterior probability of 1. The tree was rooted using chimpanzee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

Matthias Meyer et al. in Nature (2013)

Morphology of the Denisova molar.

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





Il M3 o M2 ritrovato a Denisova presenta delle dimensione al di fuori della variabilità dei taxa del genere *Homo* ed entra in quella dei Autralopitecine.
Questo molare appoggia le evidenze del DNA: La popolazione di Denisova era distinta dei Neandertaliani tardivi e dei uomini moderni. In effetti, i tratti primitive del dente suggeriscono che i Denisoviani potrebbero essersi separati della linea neandertaliana prima dei dati che abbiamo sui tratti dentari Neandertaliani in Europa occidentale (>300 ka). Non escludiamo pero la possibilità che questa morfologia sia dovuta ad una regressione.

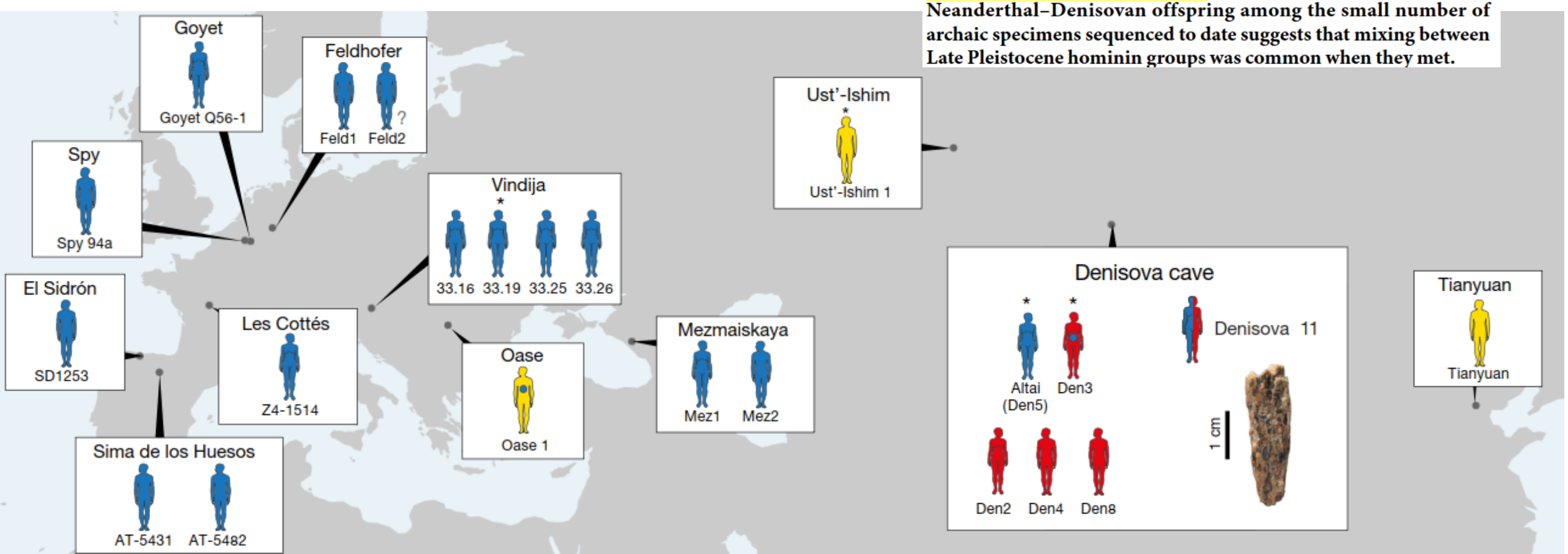
LETTER

https://doi.org/10.1038/s41586-018-0455-x

The genome of the offspring of a Neanderthal mother and a Denisovan father

Viviane Slon[1,7]*, Fabrizio Mafessoni[1,7], Benjamin Vernot[1,7], Cesare de Filippo[1], Steffi Grote[1], Bence Viola[2,3], Mateja Hajdinjak[1], Stéphane Peyrégne[1], Sarah Nagel[1], Samantha Brown[4], Katerina Douka[4,5], Tom Higham[5], Maxim B. Kozlikin[3], Michael V. Shunkov[3,6], Anatoly P. Derevianko[3], Janet Kelso[1], Matthias Meyer[1], Kay Prüfer[1] & Svante Pääbo[1]*

Neanderthals and Denisovans are extinct groups of hominins that separated from each other more than 390,000 years ago[1,2]. Here we present the genome of 'Denisova 11', a bone fragment from Denisova Cave (Russia)[3] and show that it comes from an individual who had a Neanderthal mother and a Denisovan father. The father, whose genome bears traces of Neanderthal ancestry, came from a population related to a later Denisovan found in the cave[4–6]. The mother came from a population more closely related to Neanderthals who lived later in Europe[2,7] than to an earlier Neanderthal found in Denisova Cave[8], suggesting that migrations of Neanderthals between eastern and western Eurasia occurred sometime after 120,000 years ago. The finding of a first-generation Neanderthal–Denisovan offspring among the small number of archaic specimens sequenced to date suggests that mixing between Late Pleistocene hominin groups was common when they met.



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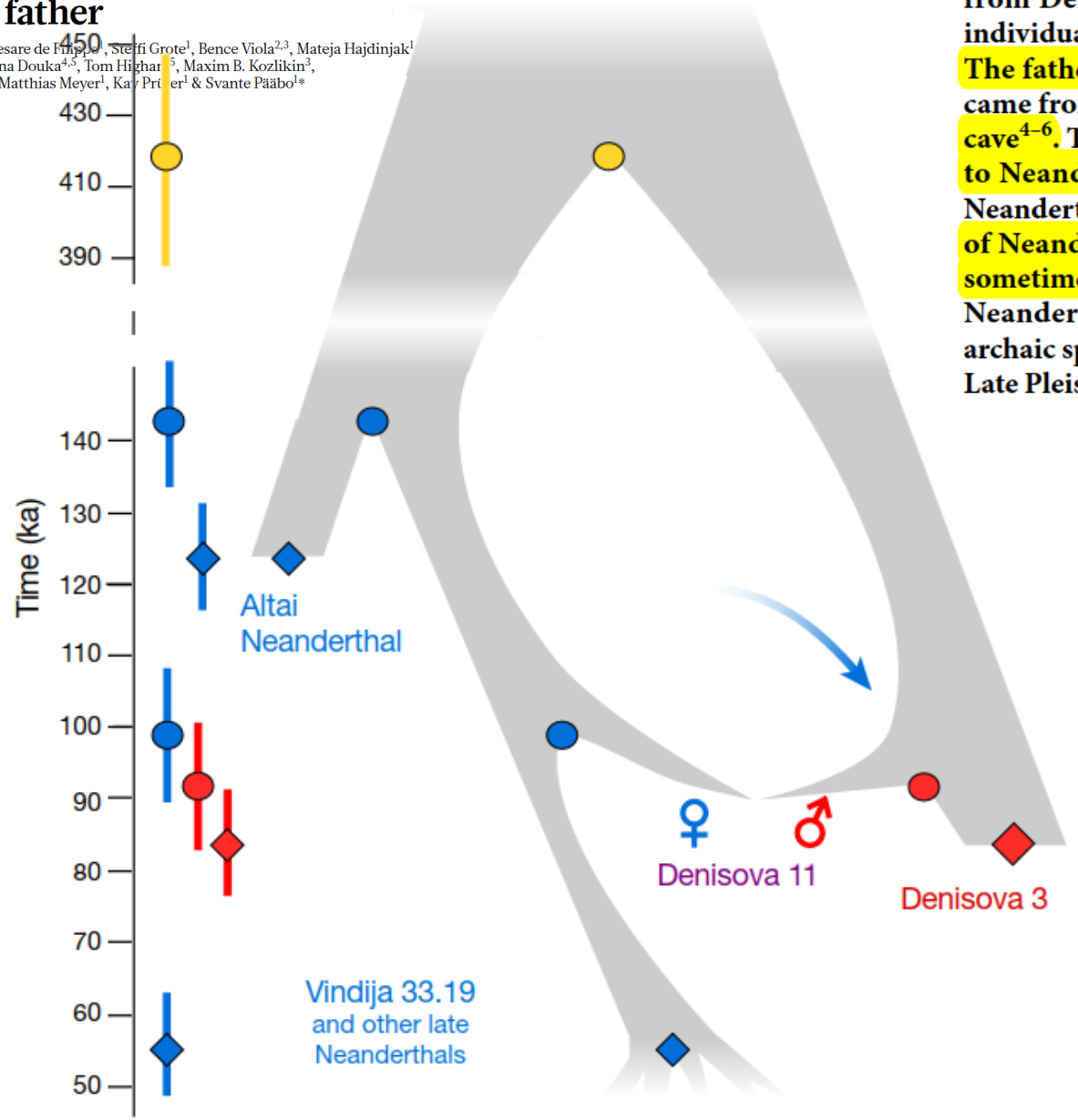
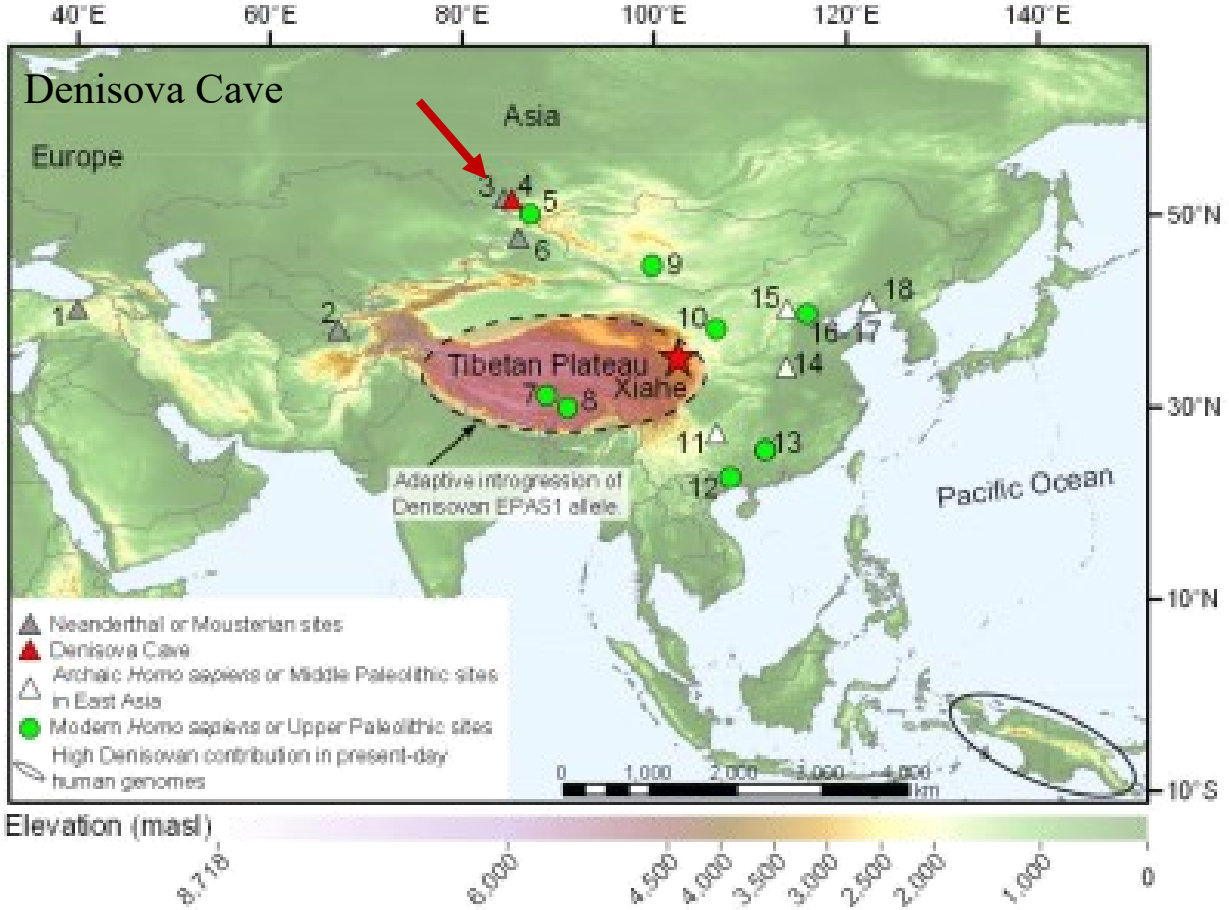


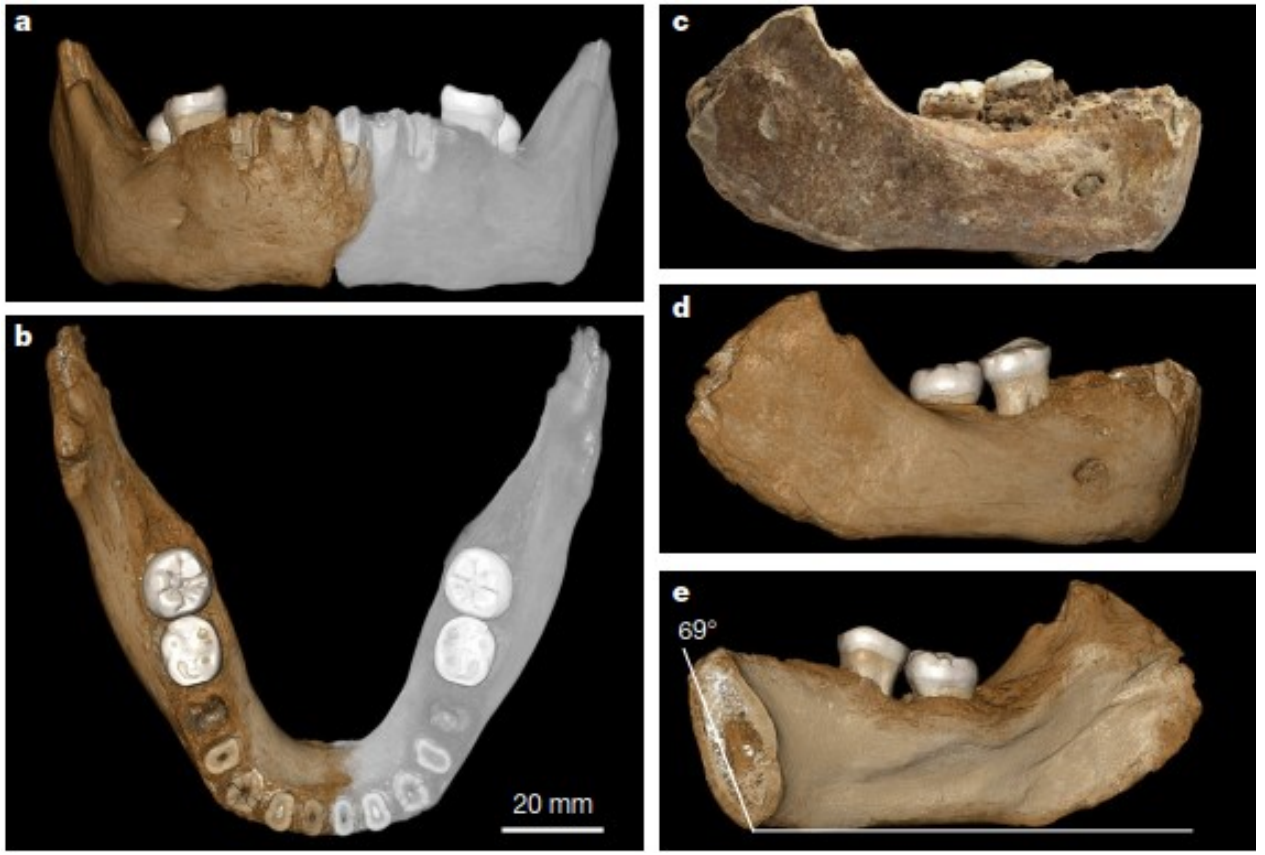
LETTER

https://doi.org/10.1038/s41586-019-1139-x

A late Middle Pleistocene Denisovan mandible from the Tibetan Plateau

Fahu Chen[1,2,15]*, Frido Welker[2,3,4,15], Chuan-Chou Shen[5,6,15], Shara E. Bailey[3,7], Inga Bergmann[3], Simon Davis[8], Huan Xia[2], Hui Wang[9,10], Roman Fischer[8], Sarah E. Freidline[3], Tsai-Luen Yu[5,6], Matthew M. Skinner[3,11], Stefanie Stelzer[3,12], Guangrong Dong[2], Qiaomei Fu[13], Guanghui Dong[2], Jian Wang[2], Dongju Zhang[2]* & Jean-Jacques Hublin[3,14]*





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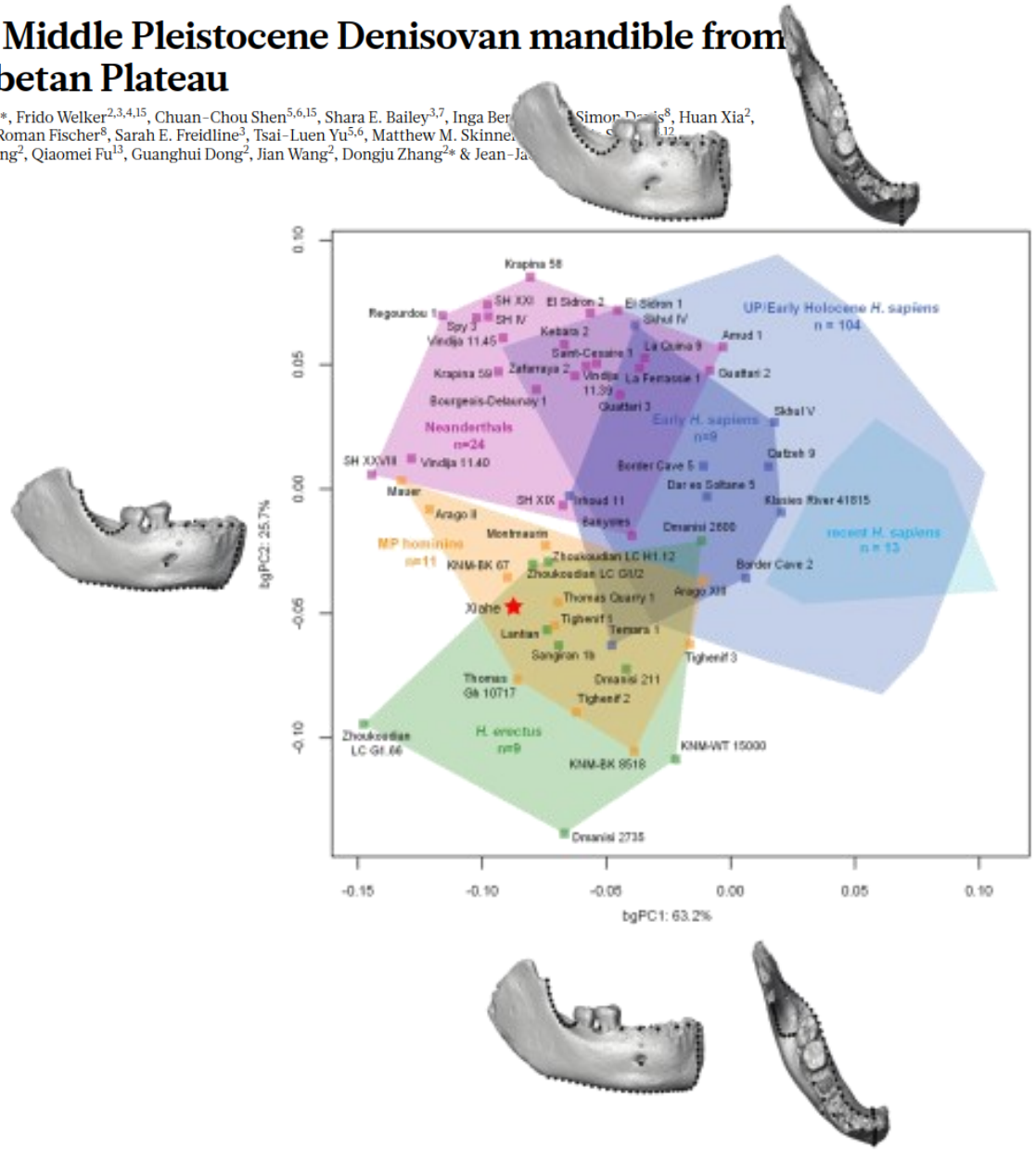


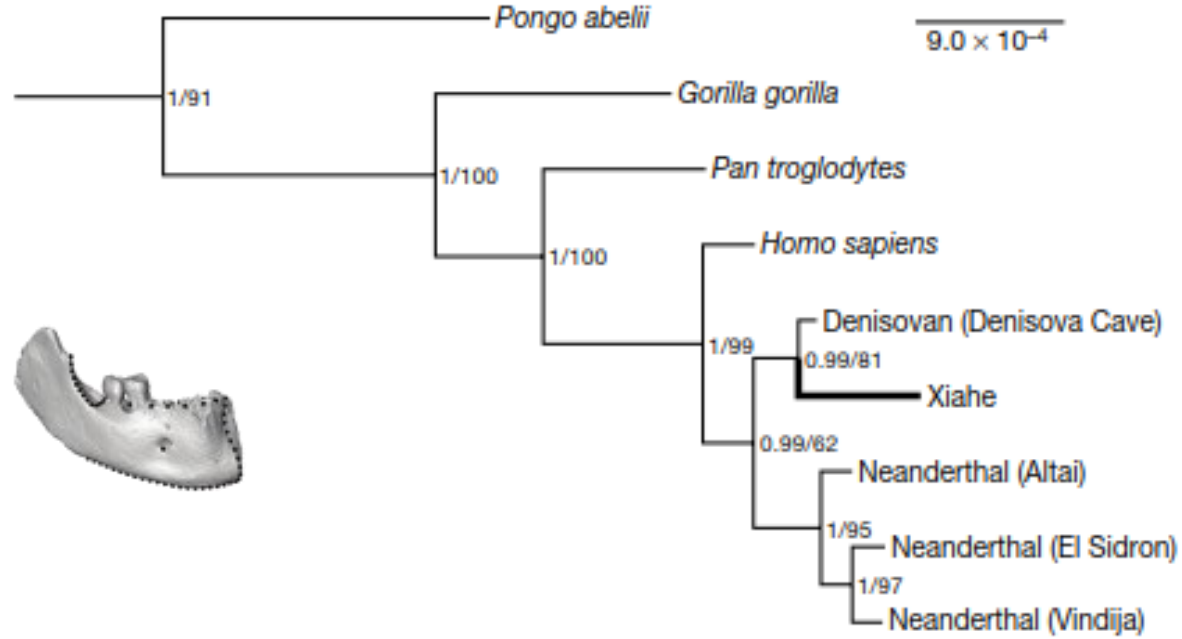


Fig. 2 | Phylogenetic position of the Xiahe proteome within Hominidae. Node values indicate Bayesian probability (0–1)/RAxML maximum likelihood (0–100%), respectively. *Macaca mulatta* and *Nomascus leucogenys* are used as outgroups (data not shown).

The Innovation

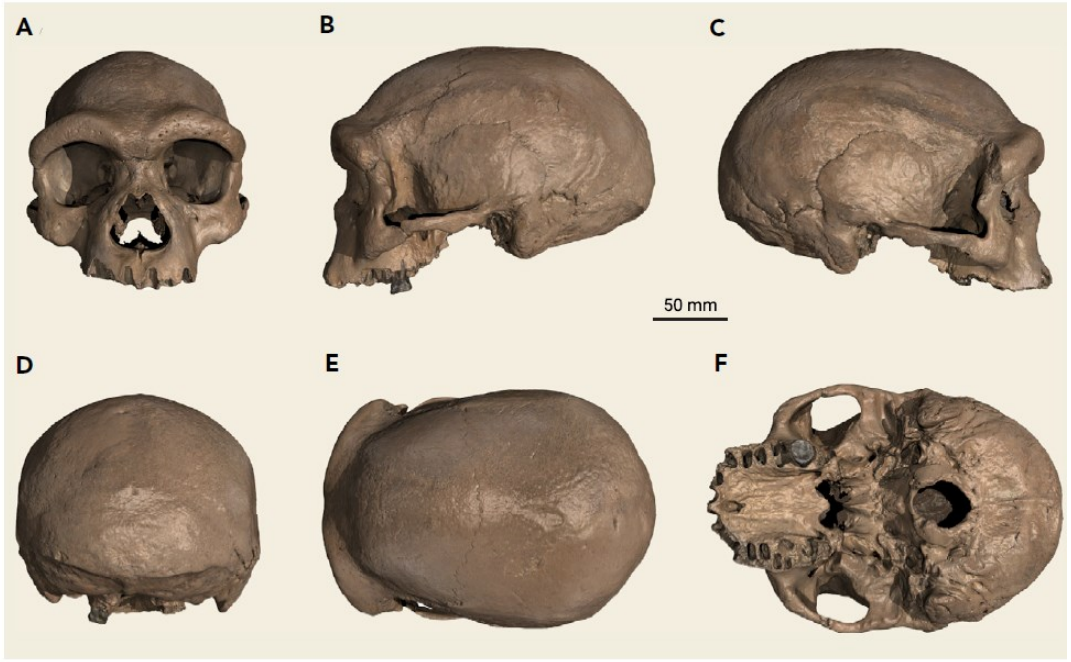
Article

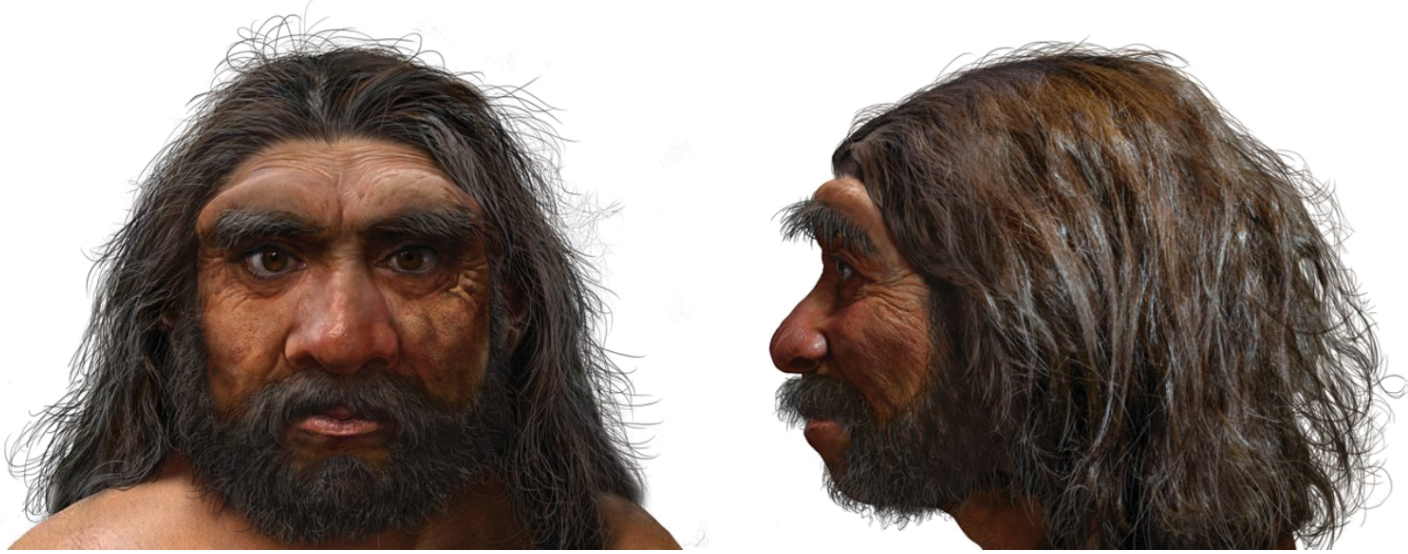
Massive cranium from Harbin in northeastern China establishes a new Middle Pleistocene human lineage

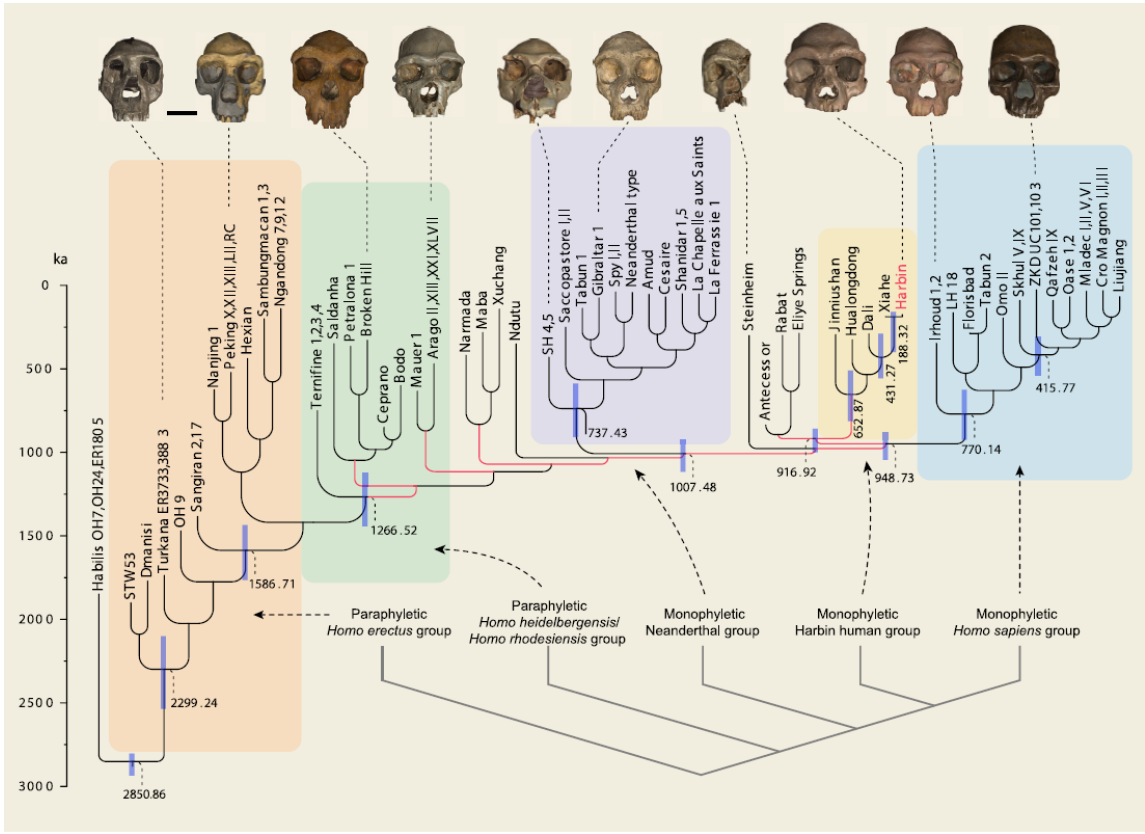
Xijun Ni,[1,2,3,4,*] Qiang Ji,[1,*] Wensheng Wu,[1] Qingfeng Shao,[5] Yannan Ji,[6] Chi Zhang,[2,4] Lei Liang,[1] Junyi Ge,[2,4] Zhen Guo,[1] Jinhua Li,[7] Qiang Li,[2,4] Rainer Grün,[8,9] and Chris Stringer[10,*]

*Correspondence: jiqiang@hgu.edu.cn (Q.J.); nixijun@hgu.edu.cn (X.N.); c.stringer@nhm.ac.uk (C.S.)

Received: May 10, 2021; Accepted: June 4, 2021; Published Online: June 25, 2021; https://doi.org/10.1016/j.xinn.2021.100130







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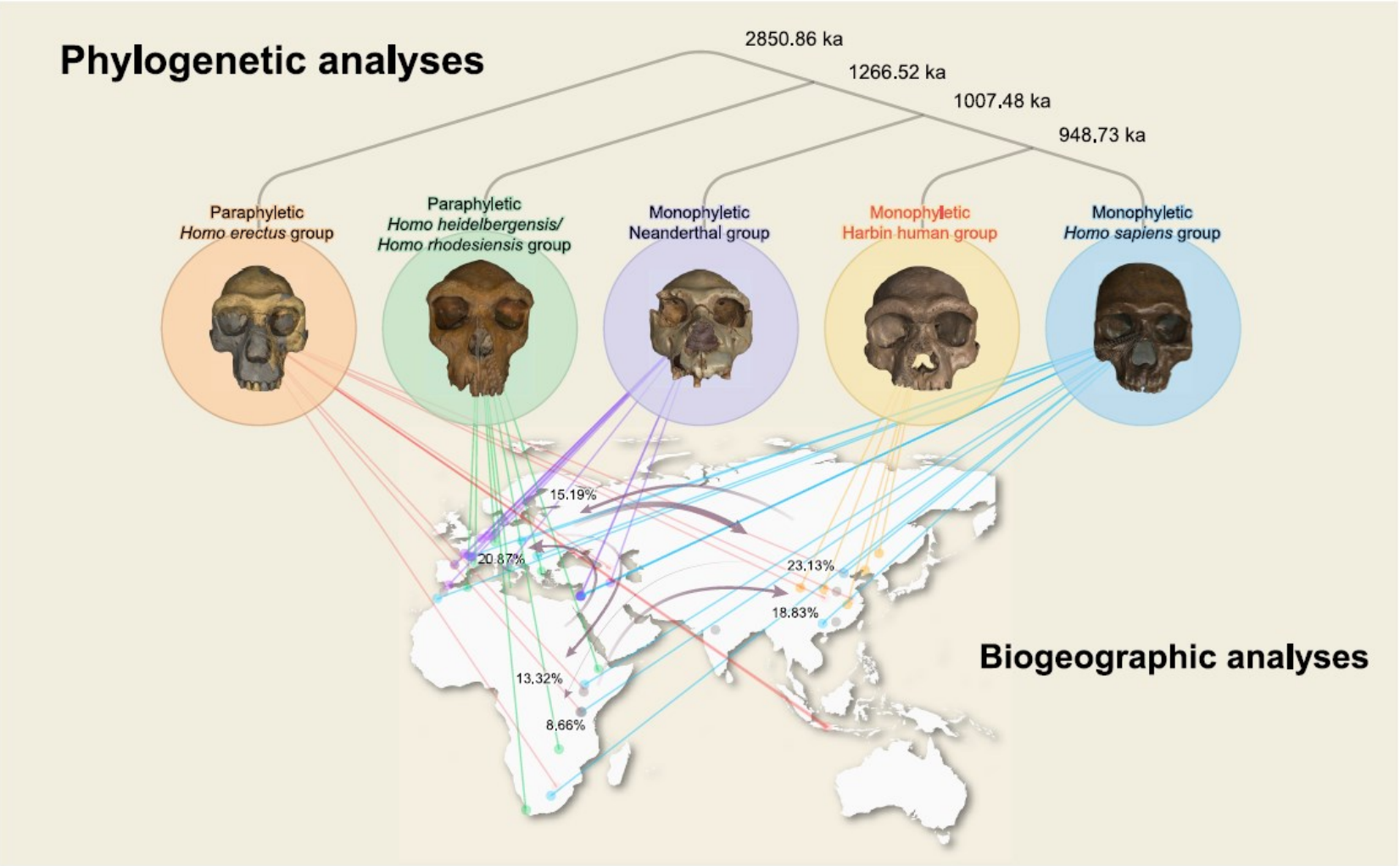
Received: May 10, 2021; Accepted: June 4, 2021; Published Online: June 25, 2021; https://doi.org/10.1016/j.xinn.2021.100130

Graphical abstract



The results of the Bayesian tip-dating analyses suggest that the Harbin and Xiahe fossils shared a common ancestor 188 ka (397–155 ka), and the clade, including the Harbin cranium and H. sapiens shared a common ancestor at 949 ka (1,041.41–875.25 ka).

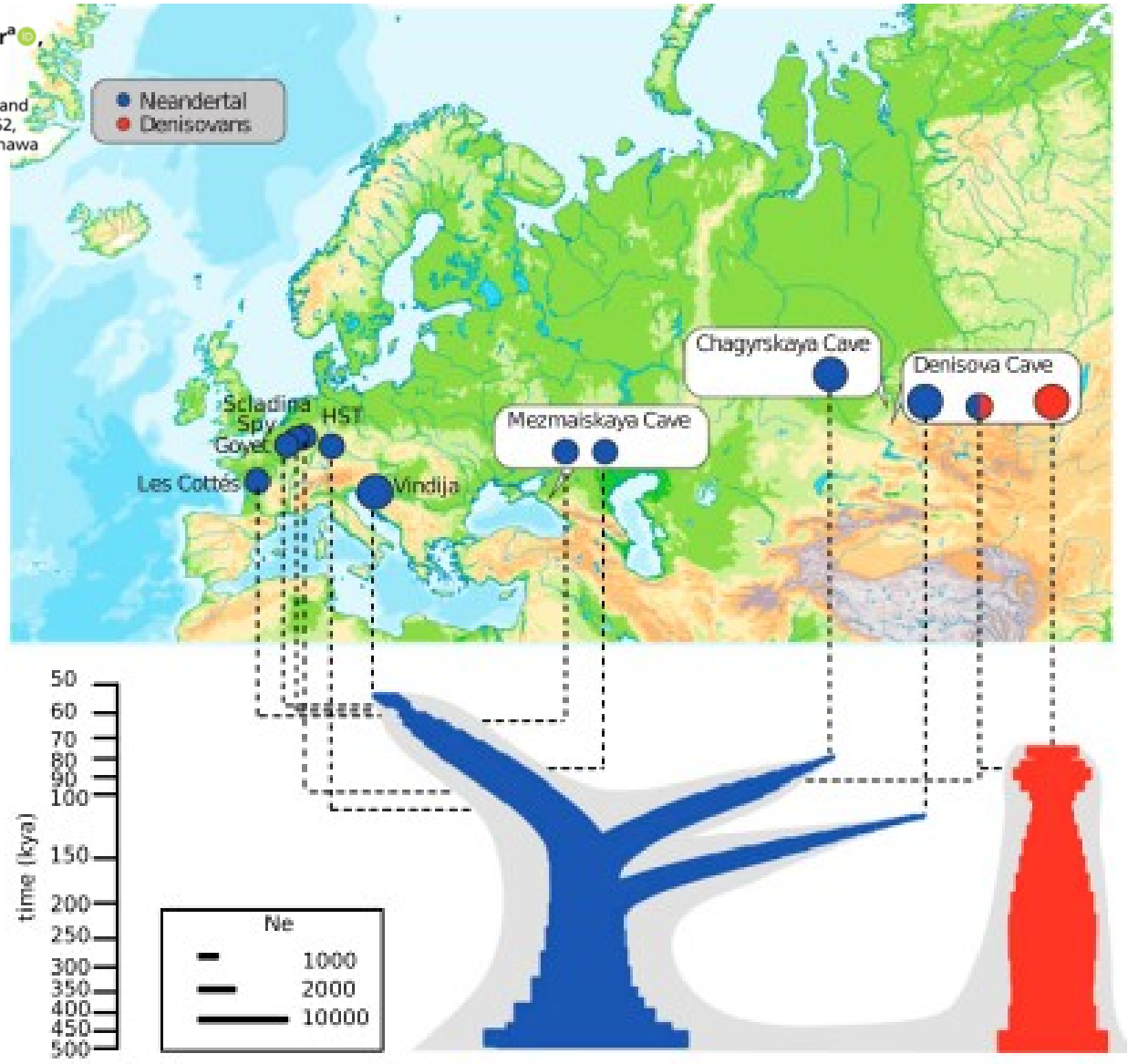
A high-coverage Neandertal genome from Chagyrskaya Cave

Fabrizio Mafessoni[a], Steffi Grote[a], Cesare de Filippo[a], Viviane Slon[a], Kseniya A. Kolobova[b], Bence Viola[c], Sergey V. Markin[b], Manjusha Chintalapati[a], Stephane Peyrégne[a], Laurits Skov[a], Pontus Skoglund[d], Andrey I. Krivoshapkin[b], Anatoly P. Derevianko[b], Matthias Meyer[a], Janet Kelso[a], Benjamin Peter[a], Kay Prüfer[a], and Svante Pääbo[a,e,1]

[a]Department of Evolutionary Genetics, Max Planck Institute for Evolutionary Anthropology, D-04103 Leipzig, Germany; [b]Institute of Archaeology and Ethnography, Russian Academy of Sciences, 630090 Novosibirsk, Russia; [c]Department of Anthropology, University of Toronto, Toronto, ON M5S 2S2, Canada; [d]Ancient Genomics Laboratory, Francis Crick Institute, NW1 1AT London, United Kingdom; and [e]Human Evolutionary Genomics Unit, Okinawa Institute of Science and Technology, Onna-son, 904-0495 Okinawa, Japan

Chagyrskaya 8 is more **closely related to Vindija 33.19** and other **late Neandertals in western Eurasia than to the Denisova 5 Neandertal who lived earlier in the Altai Mountains** (Fig. 2). Chagyrskaya 8 is thus **related to Neandertal populations that moved east sometime between 120 and 80 kya** (13).

Some of these incoming Neandertals encountered local Denisovan populations, as shown by **Denisova 11, who had a Denisovan father and a Neandertal mother related to the population in which Chagyrskaya 8 lived.**



Siti attribuiti a Neandertal

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 was considered as bears bones. Later, J.C.Fuhlrott did some study and found that they were bones from a « new » Homo.

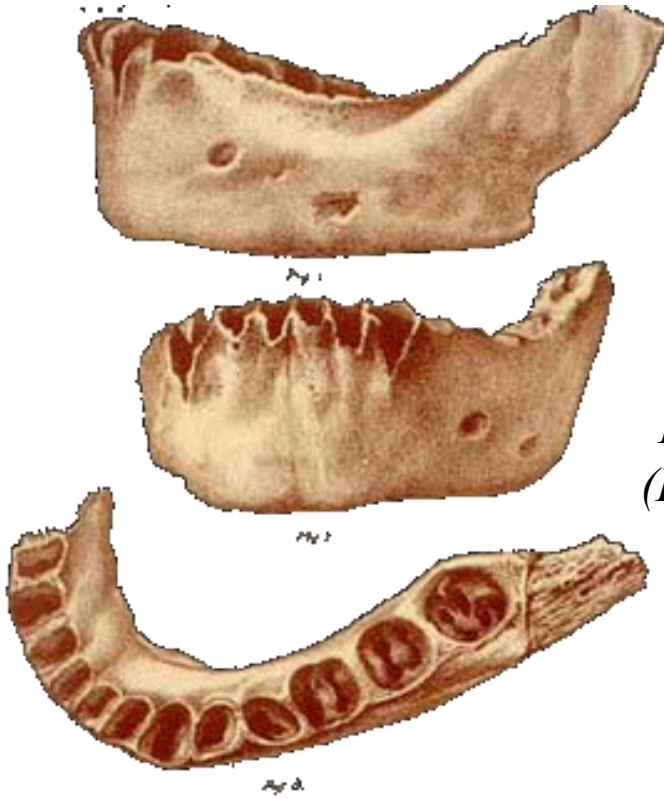
Questo fossile non fu il primo Neandertaliano portato alla luce. Altri due fossili erano già stati trovati : uno a Engis in Belgio in 1929 e uno in Spagna a Gibraltar in 1848. Ma il fossile scoperto nella valle di Neander ha confermato l'esistenza di un Uomo fossile.

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)

Biache-Saint-Vaast (Francia) 250 ka BP

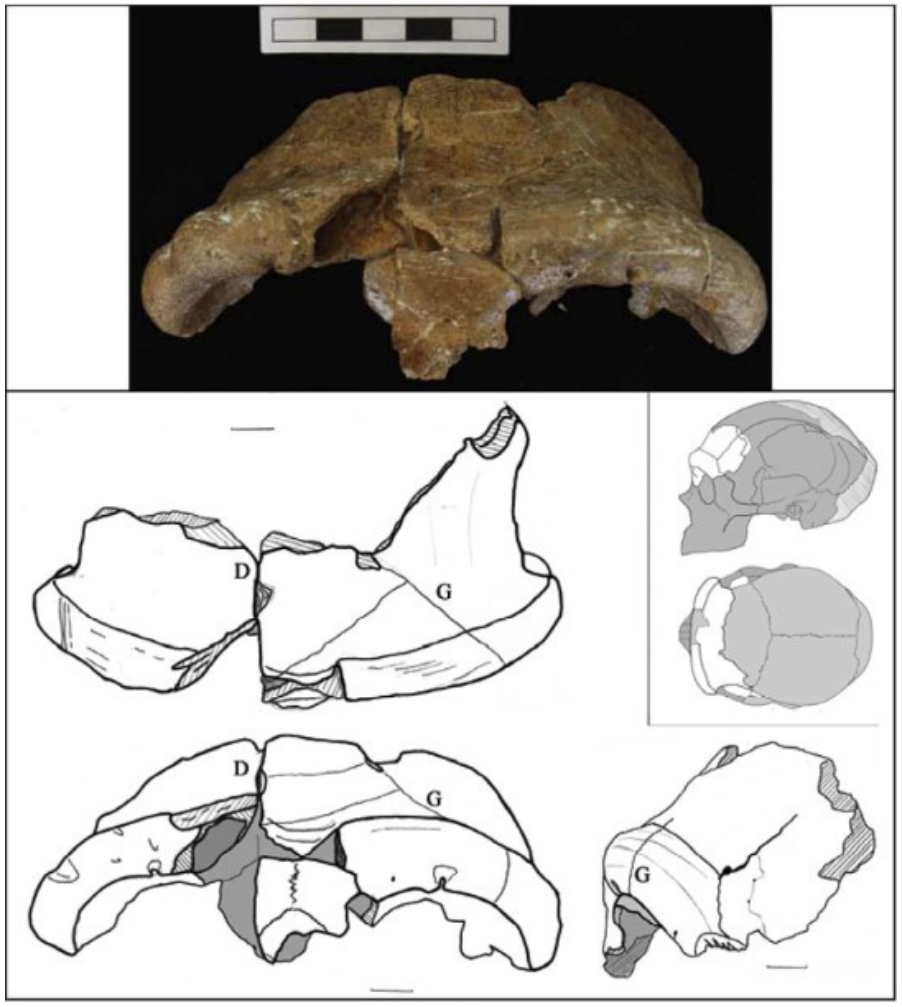


Fig. 1. Frontal bone of the Biache-Saint-Vaast 2 skull. Scale bar is 1 cm.

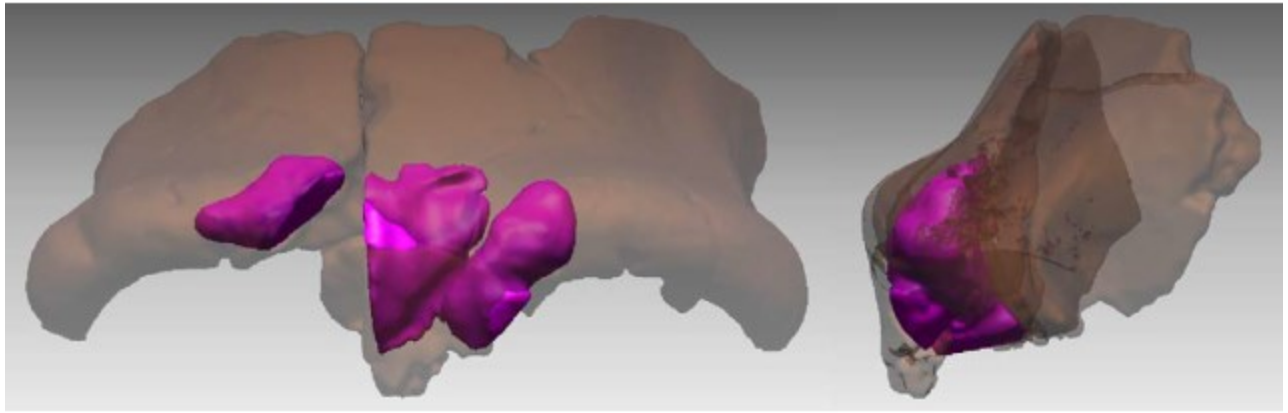
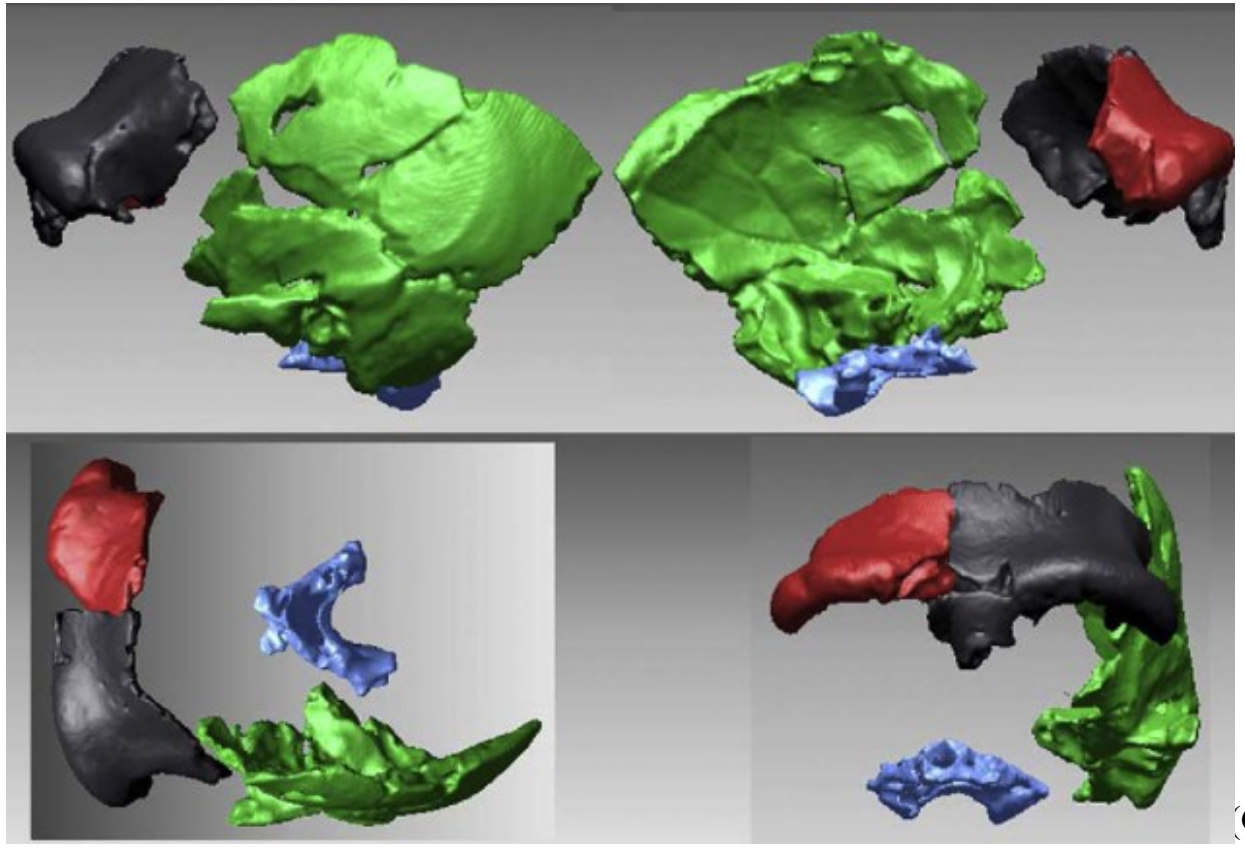


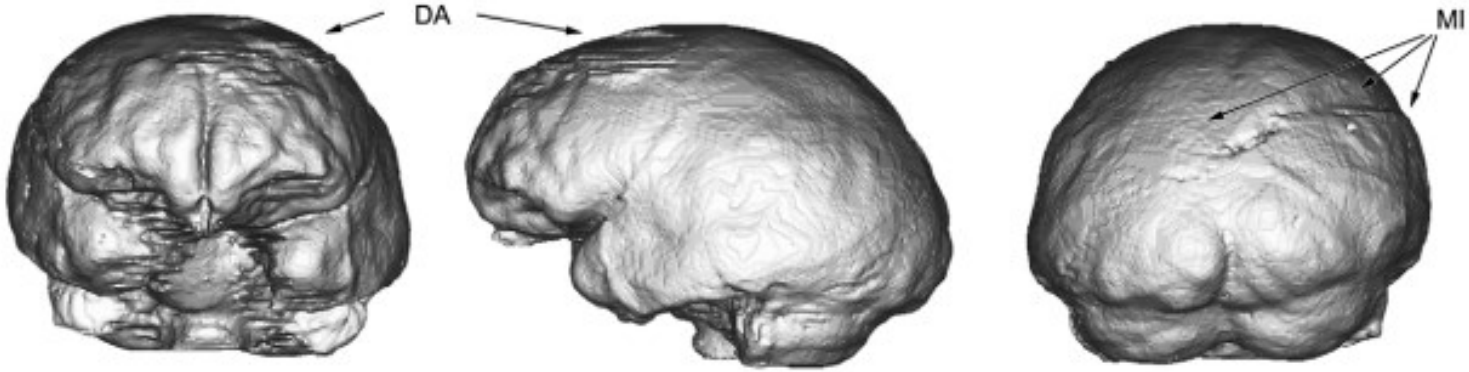
Fig. 4. Frontal sinuses of Biache-Saint-Vaast 2 after virtual reconstruction.



(Guipert et al. 2011)

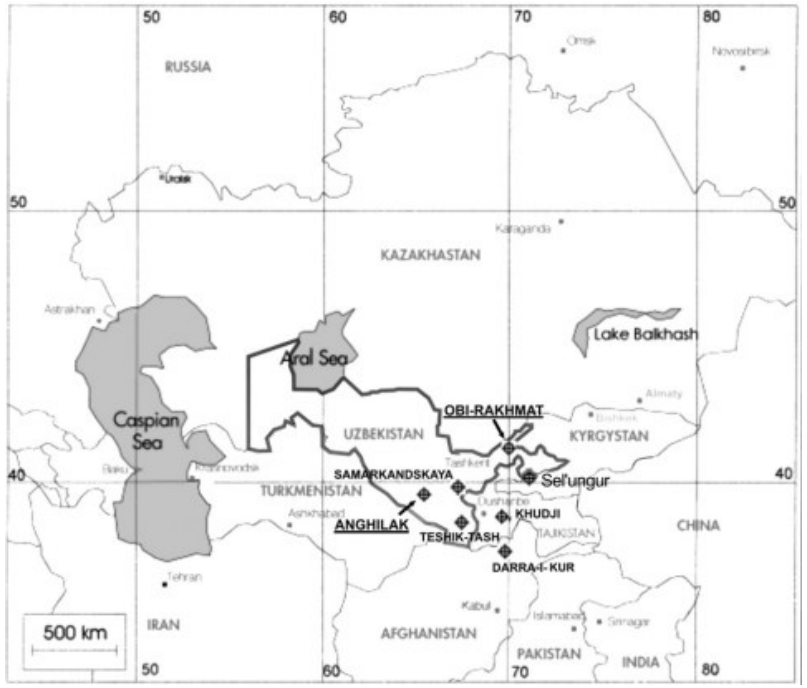
Italia : Saccopastore 250 ka BP

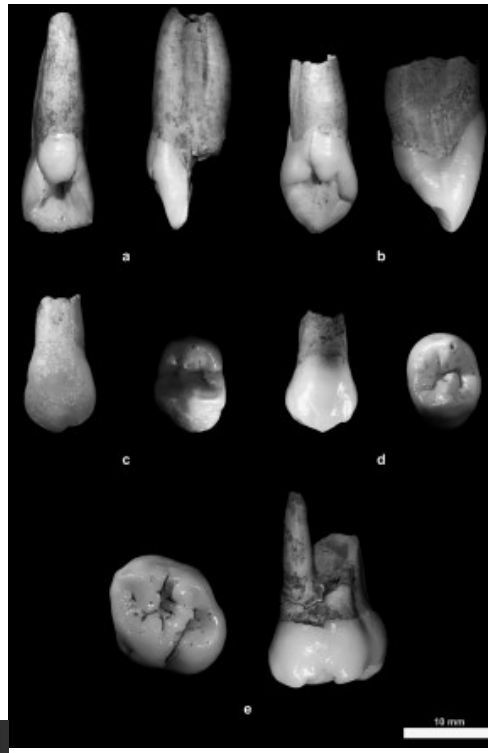
Saccopastore 1 e 2



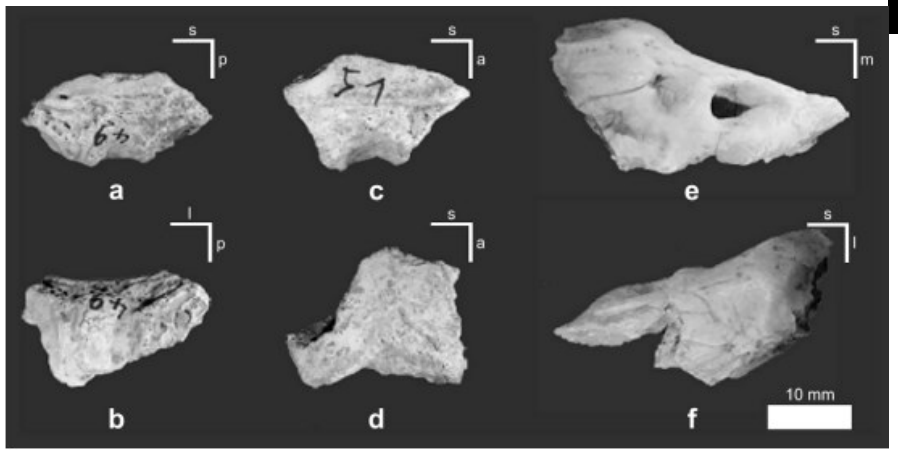
Replica digitale dell’endocranio di SCP1

Uzbekistan: Grotta Obi-Rakhmat 60-90 ka BP

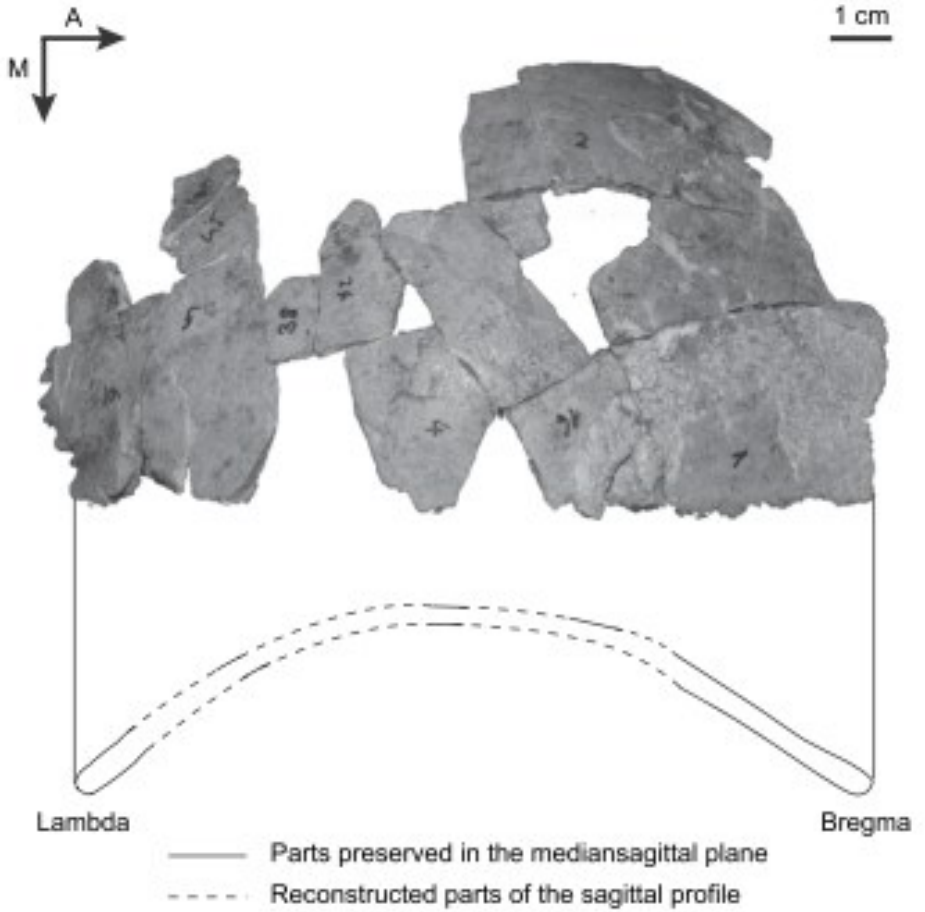




OR 1 : Denti permanenti superiori sinistri



Frammenti di temporale



Ricostruzione del parietale di OR 1.

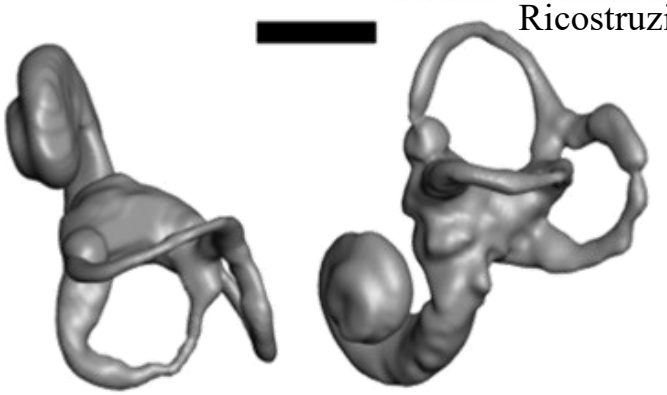
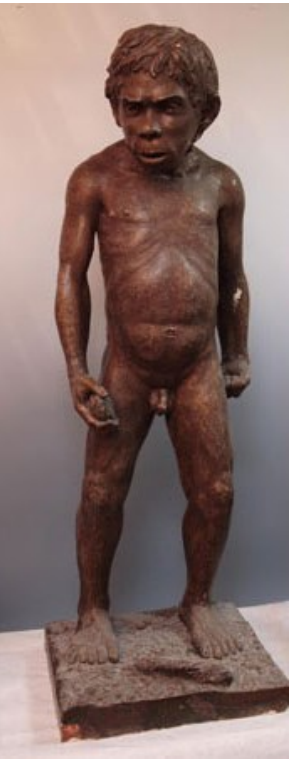
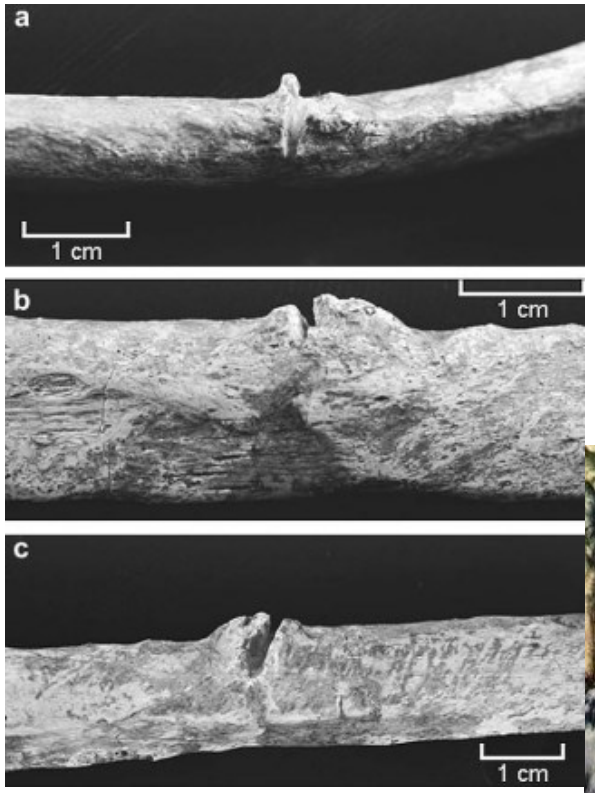


Fig. 9. Left semicircular canal of OR-1.

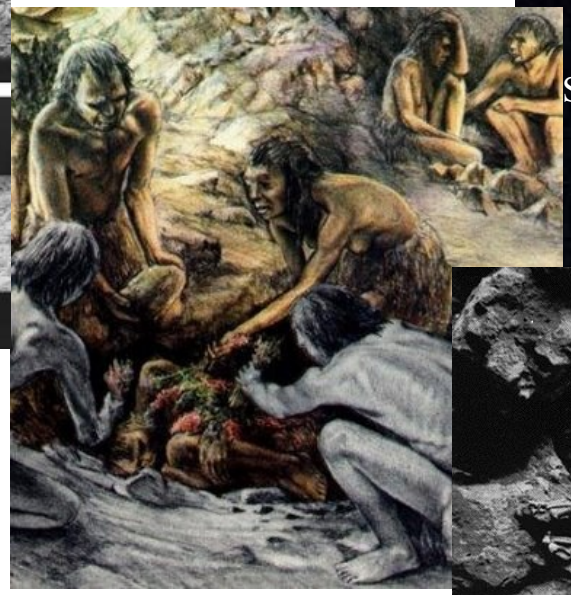
Uzbekistan: Teshik Tash 70 ka



Iraq : Shanidar 50 ka BP



Shanidar 3: Lesione sulla 9 costa.



Shanidar 1

Syria : Dederyheh 50-60 ka BP

Prima sepoltura di bambini

Ricostruzione dello scheletro immaturo di 2 anni.

Israël: Kebara 48-60 ka BP

Sepolture Kebara II *Moshe*

Ricostruzione dello
scheletro di Kebara II

Osso ioide di Kebara II

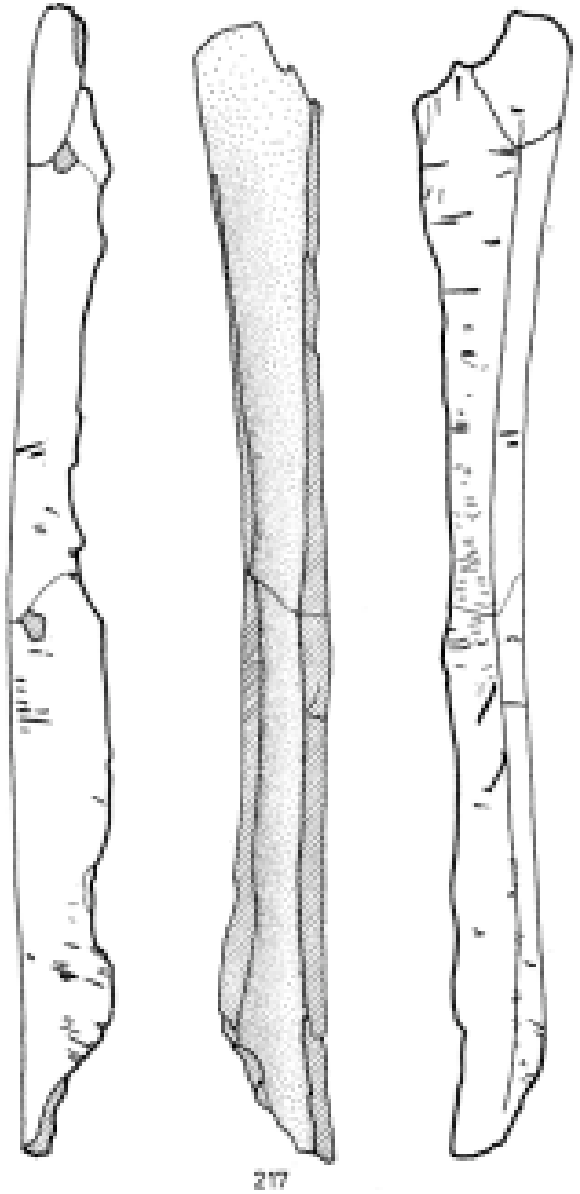
Israël: Amud 47 ka BP

Amud 1 circa 47.000 anni, il Neandertaliano più alto (174 cm) e con maggiore cc (1640 cm^3)

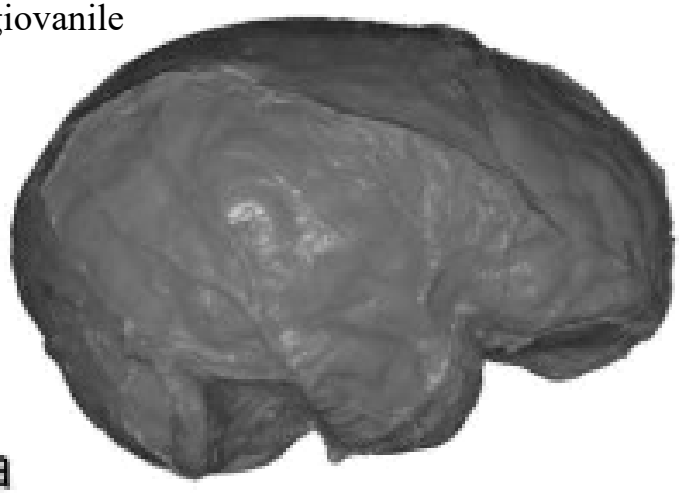
Croazia: Krapina 130 ka BP

Krapina 12 : Frammento di osso occipitale giovanile

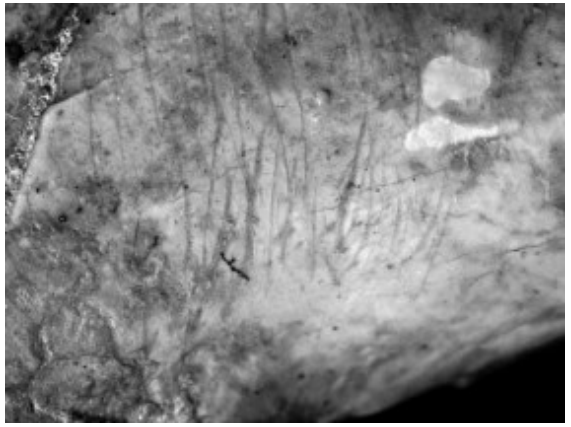
Krapina 59 : Mandibola



Tibia spaccata in 2 con tante cut marks.



emi-endocranio destro di Krapina 3

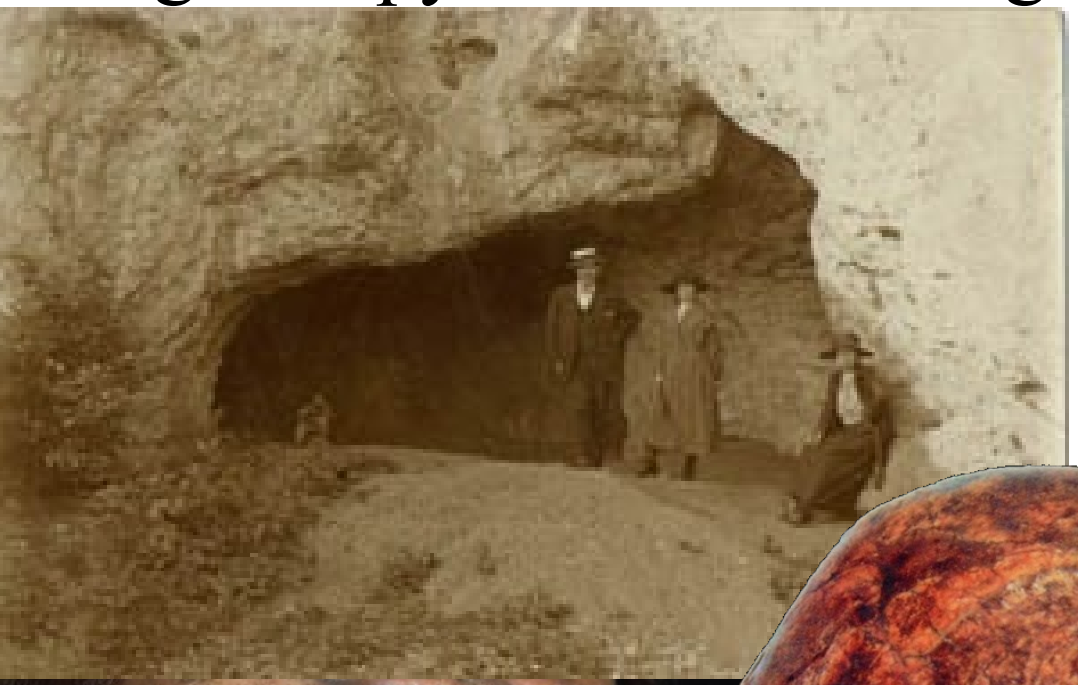


Cut marks nella sinfisi interna di K53.

Italia : Guattari 51-57 ka BP

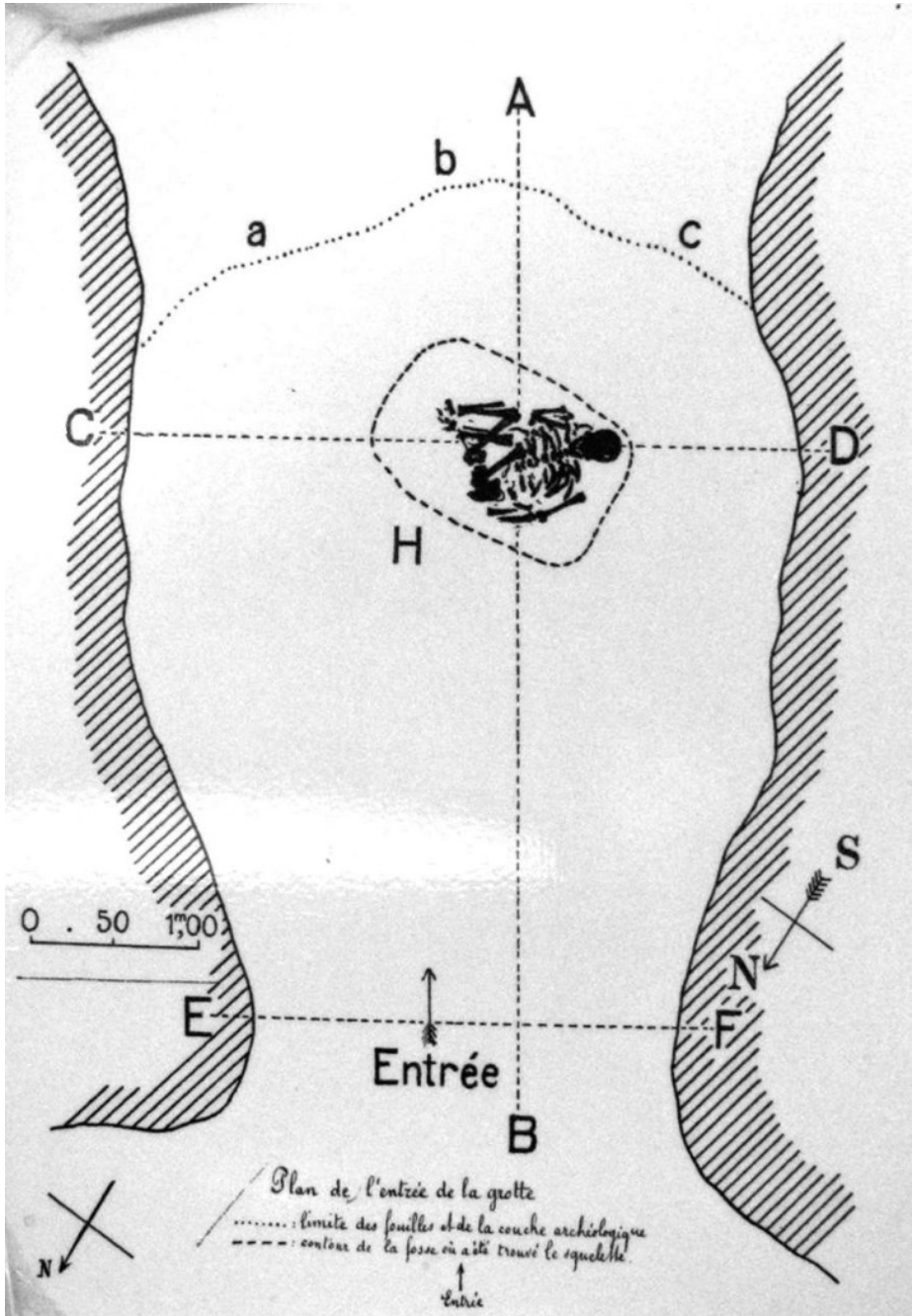
Guattari 1
(@Pigorini)

Belgio : Spy 40 ka BP Engis 70 ka BP

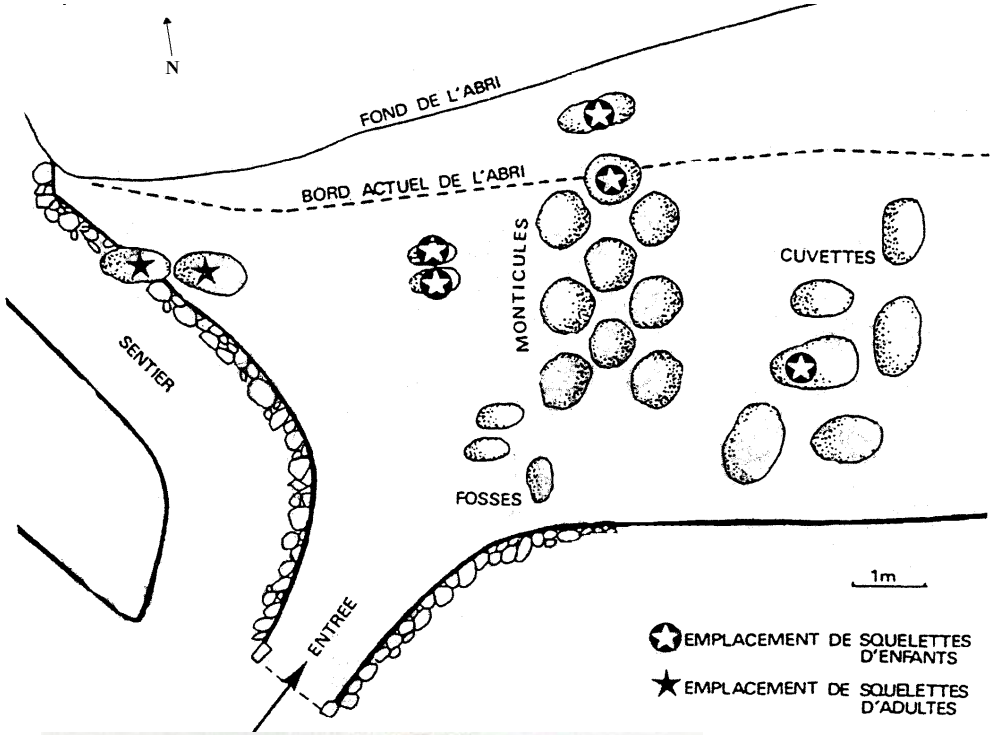


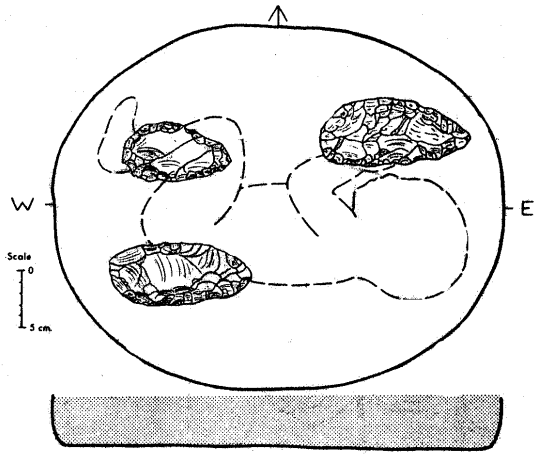
Engis 2

La Chapelle-aux-Saints (50 ka BP, Francia)

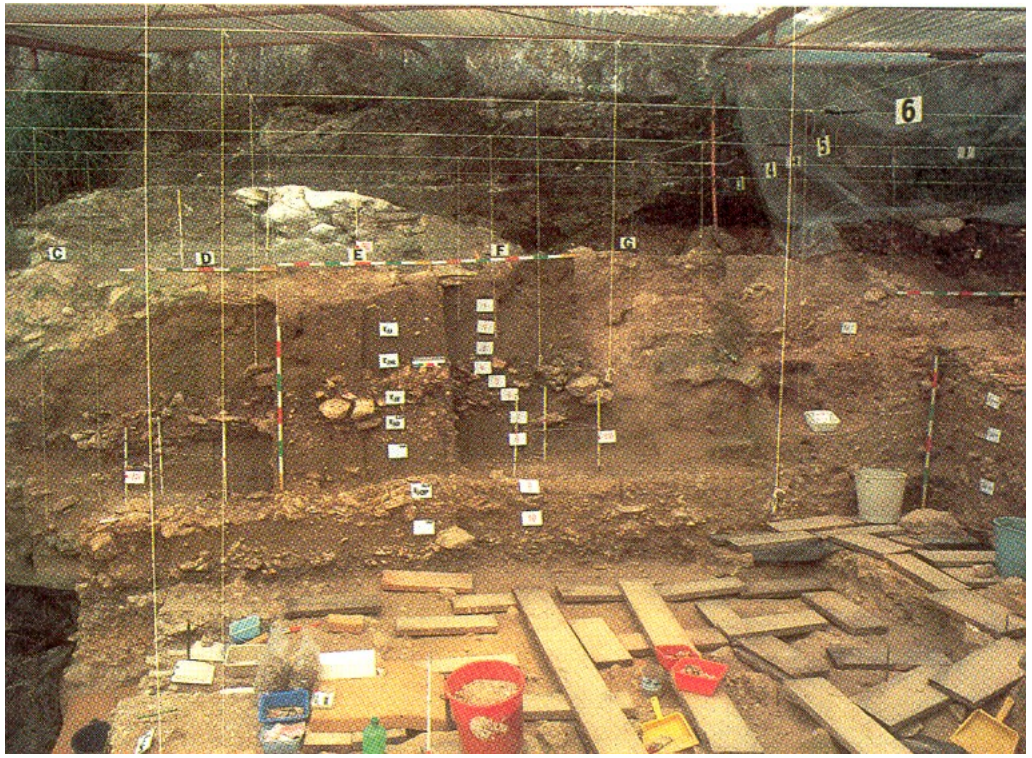


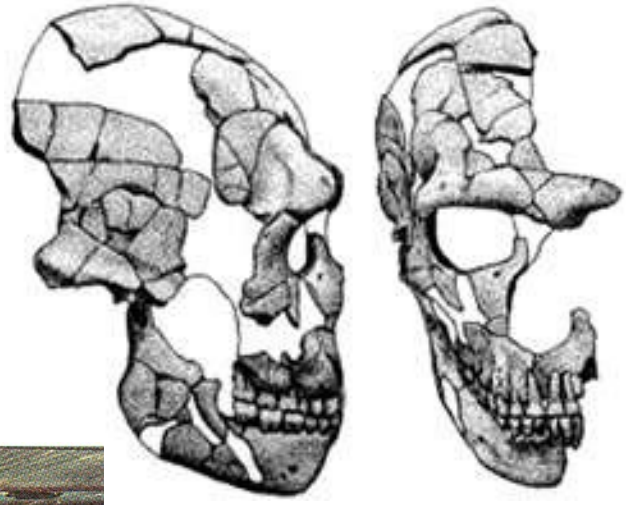
La Ferrassie (55 ka anni, Francia) – « Necropoli « di 8 schelettri





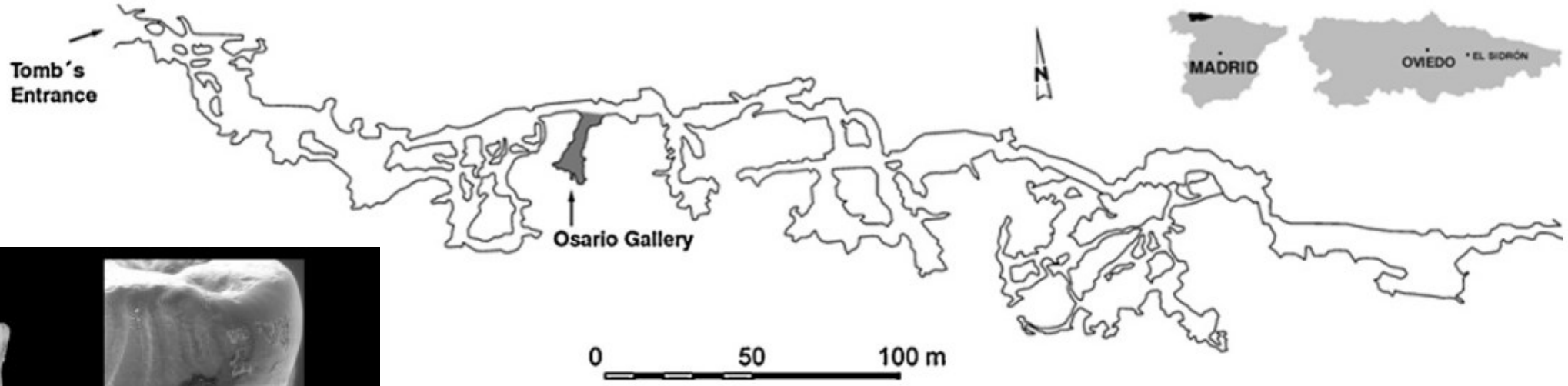
Francia : Saint-Césaire 36 ka BP

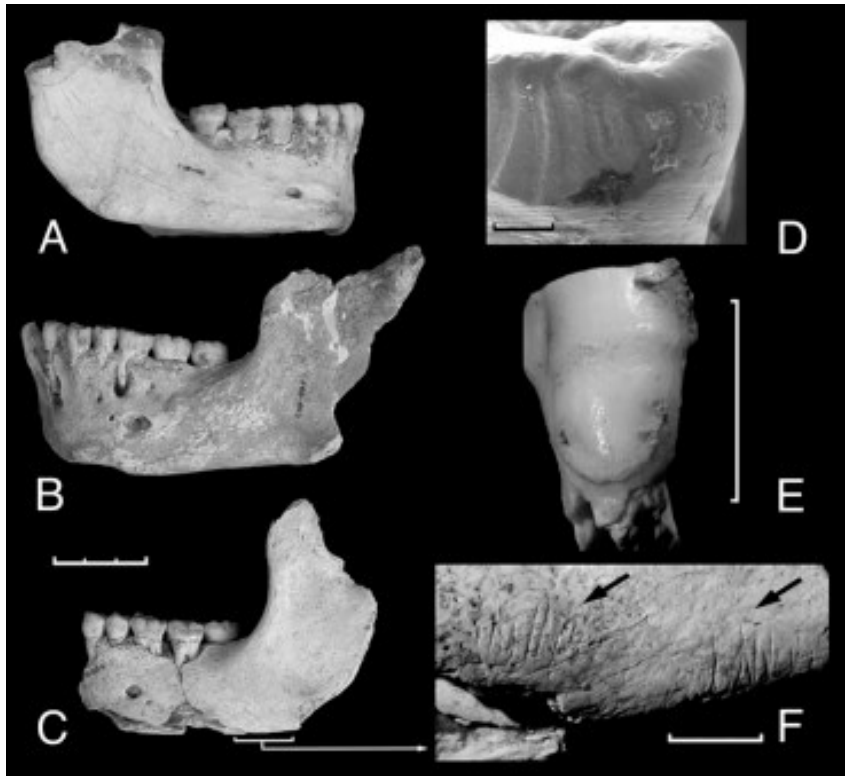




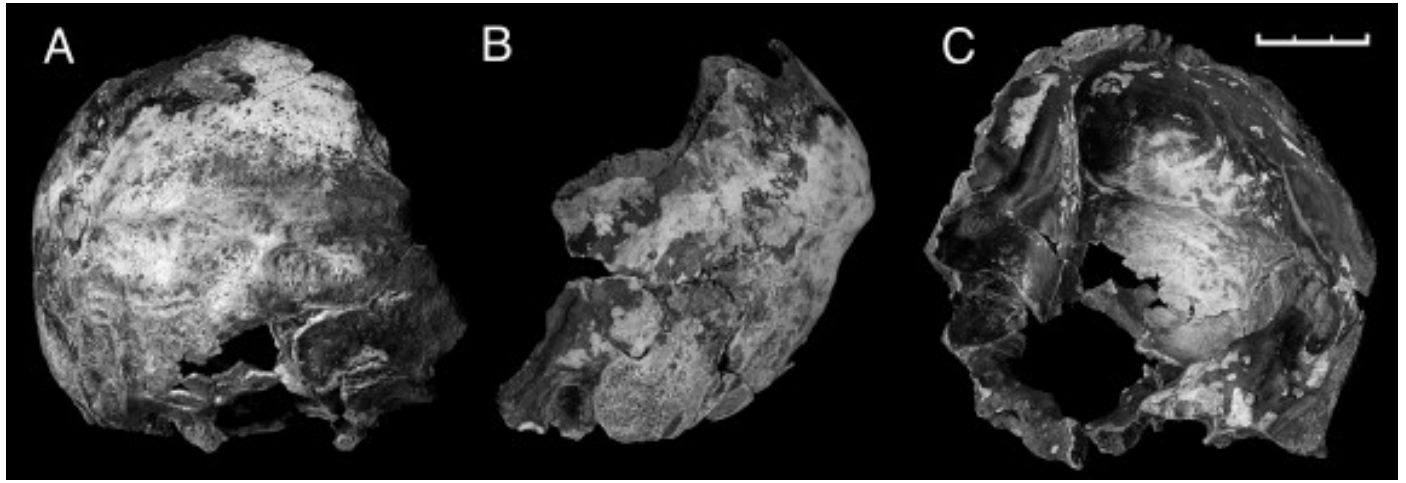
Cranio di Saint-Césaire 1

Spagna : El Sidron 43 ka BP



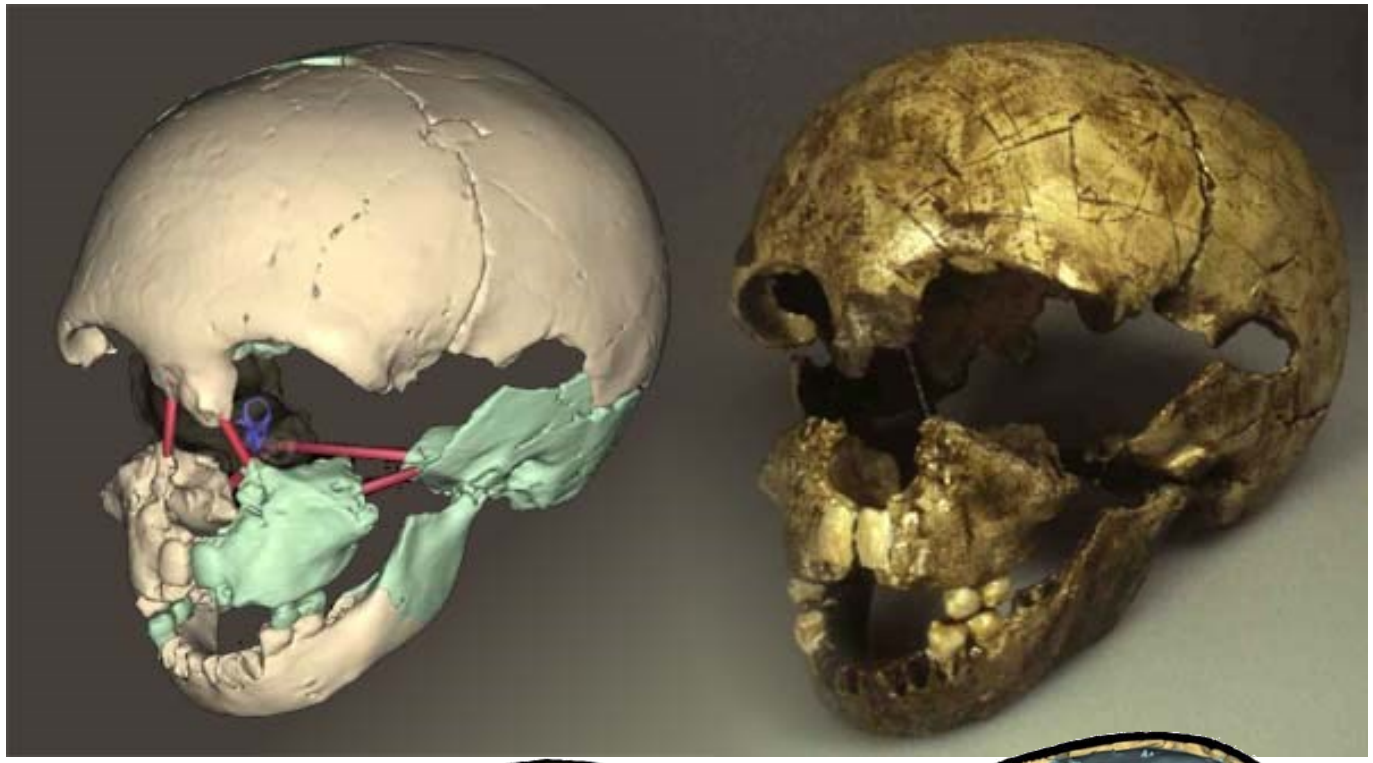


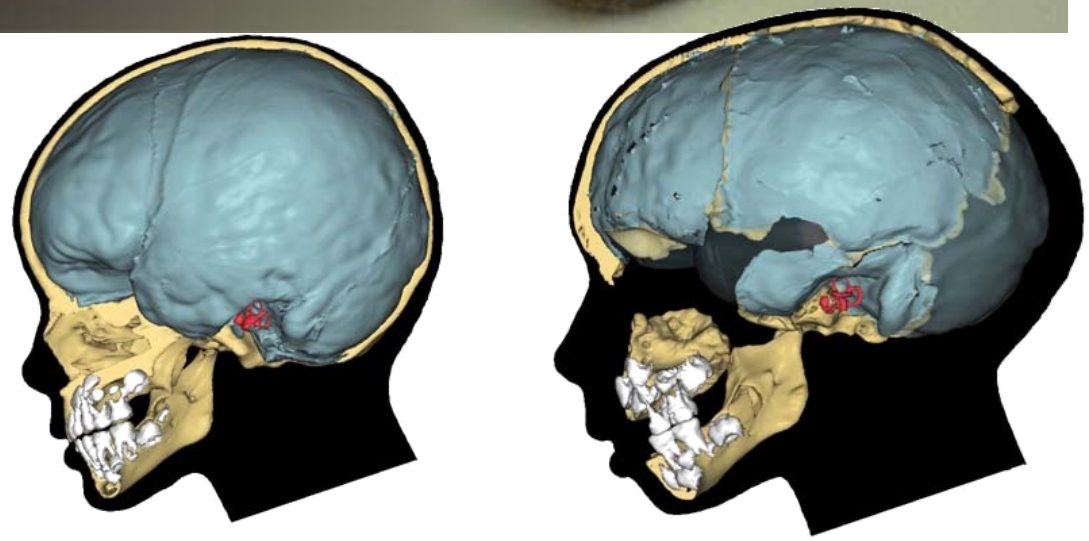
Mandibole con un'ipoplasia dello smalto e delle cut marks sul bordo basale (F)



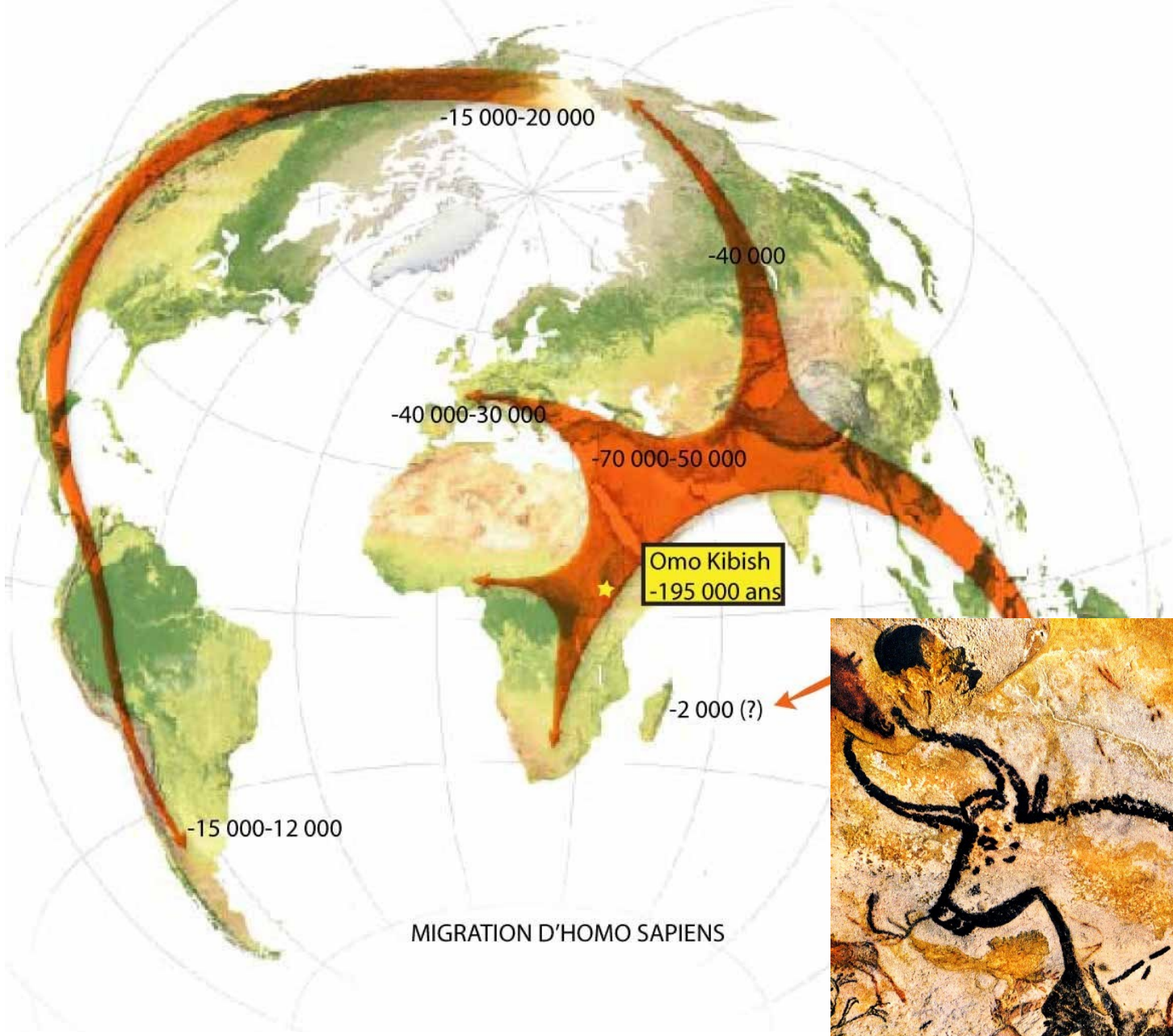
SD-1219. Regione Occipitomastoide

Spagna : Gibraltar Devil's Tower 30 ka BP





Gibraltar 2 : Cranio e ricostruzione



MIGRATION D'HOMO SAPIENS

Neandertal demise theories

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*