

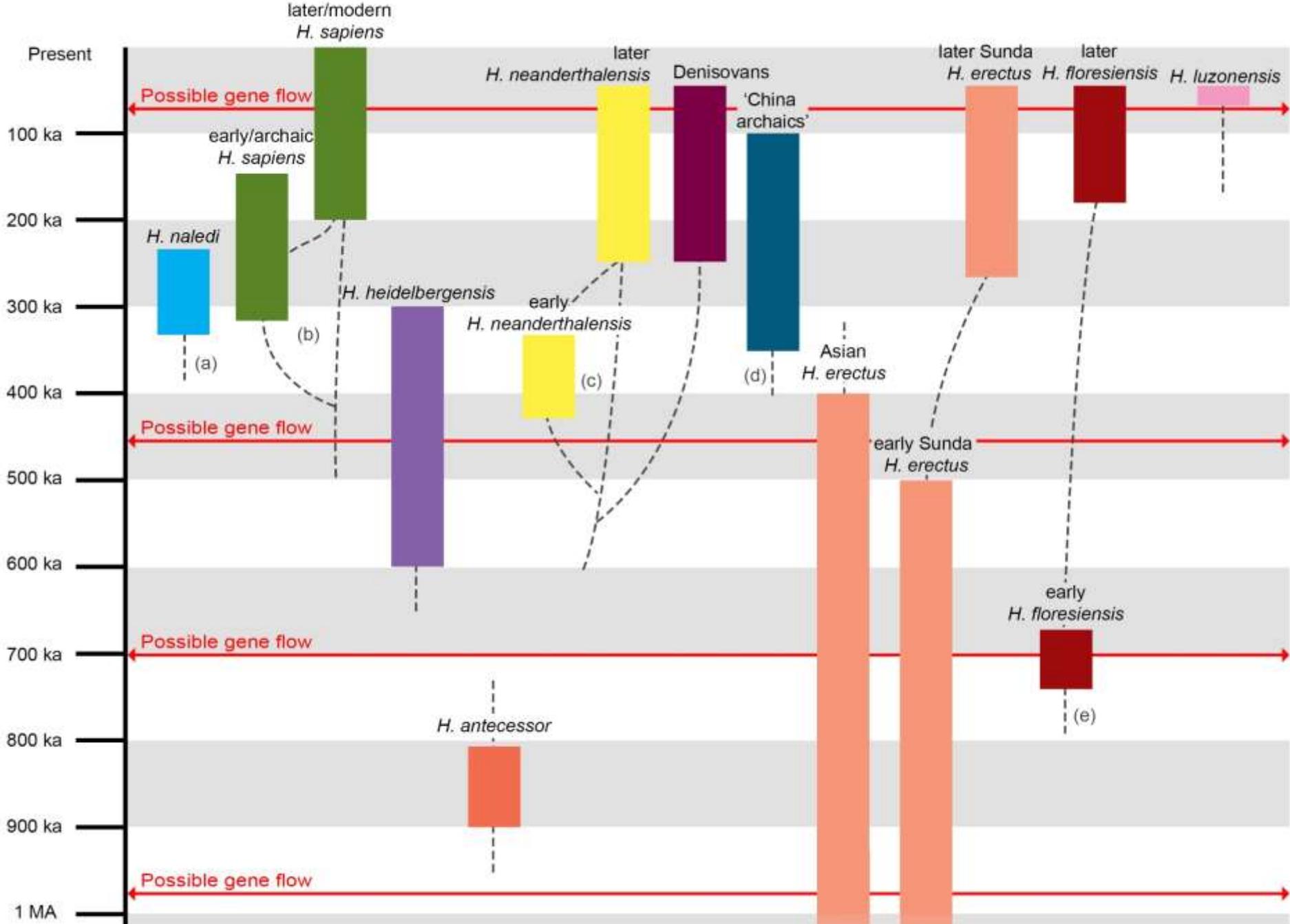
What is a '*Homo sapiens*'??

Spencer Wells: *I'd like to suggest that we re-welcome Neanderthals into our own species and tear down the wall we've built between us and them since their discovery over 150 years ago...*

Chris Stringer: *There's no 'one size fits all' for Nea vs sapiens species status. My separation on morphology has to acknowledge they could interbreed, Spencer's merging from behaviour has to acknowledge the resultant species has variation in pelvic + ear bone shape beyond any extant ape species.....*

**Today there is only one human species:
Homo sapiens - also known as 'modern humans'**





Neanderthals



Denisovans



Homo sapiens



Homo floresiensis



Homo luzonensis

There were still at least 5 kinds of humans ~70,000 years ago....

One, two, three or four *Homo sapiens* crania ?



H. sapiens
includes *heidelbergensis*, Neas?
(Bräuer)

+archaic *H. sapiens*
(Stringer)

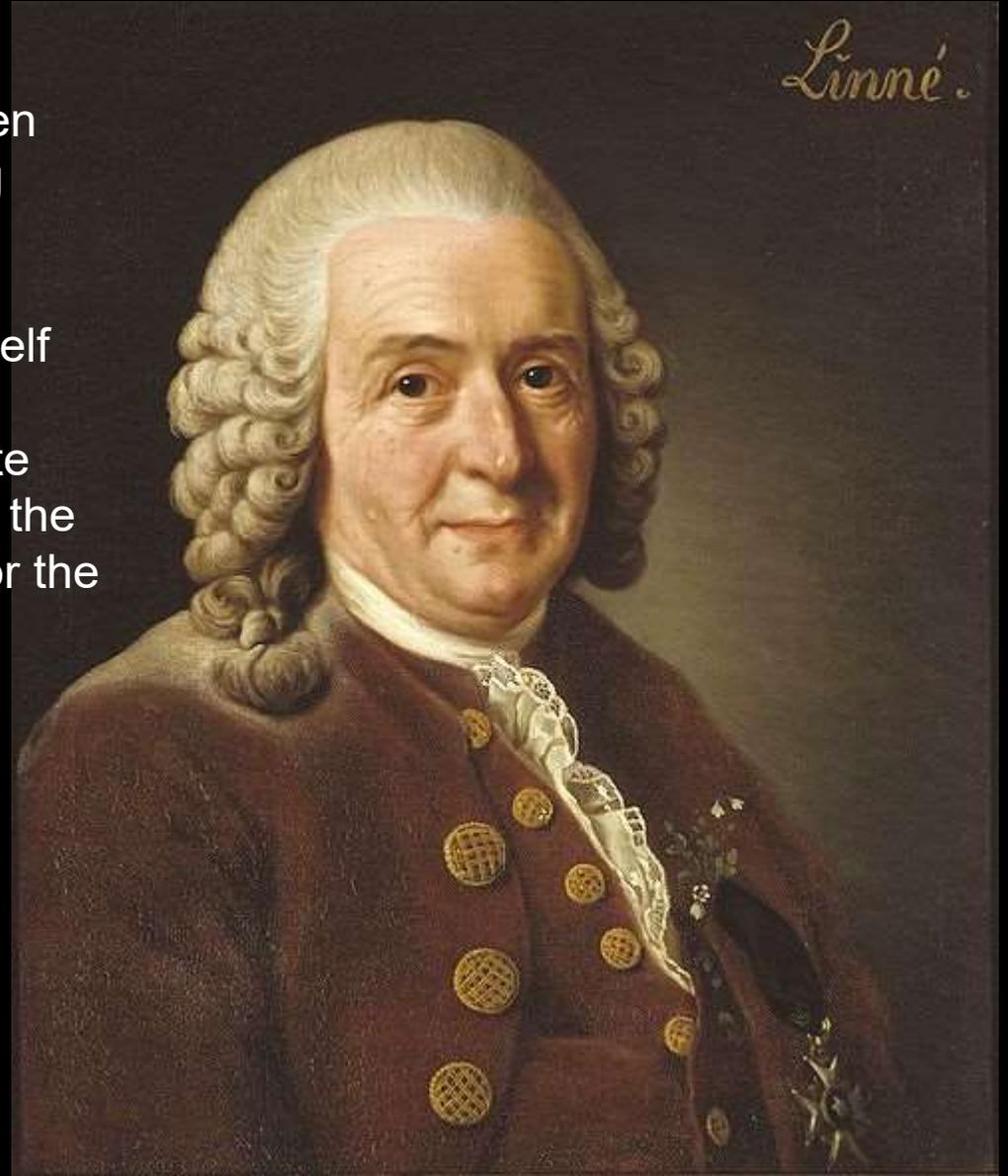
Anatomically modern
H. sapiens
(Howells)

H. sapiens
includes
erectus
(Wolpoff)

Which is the type of *Homo sapiens*?

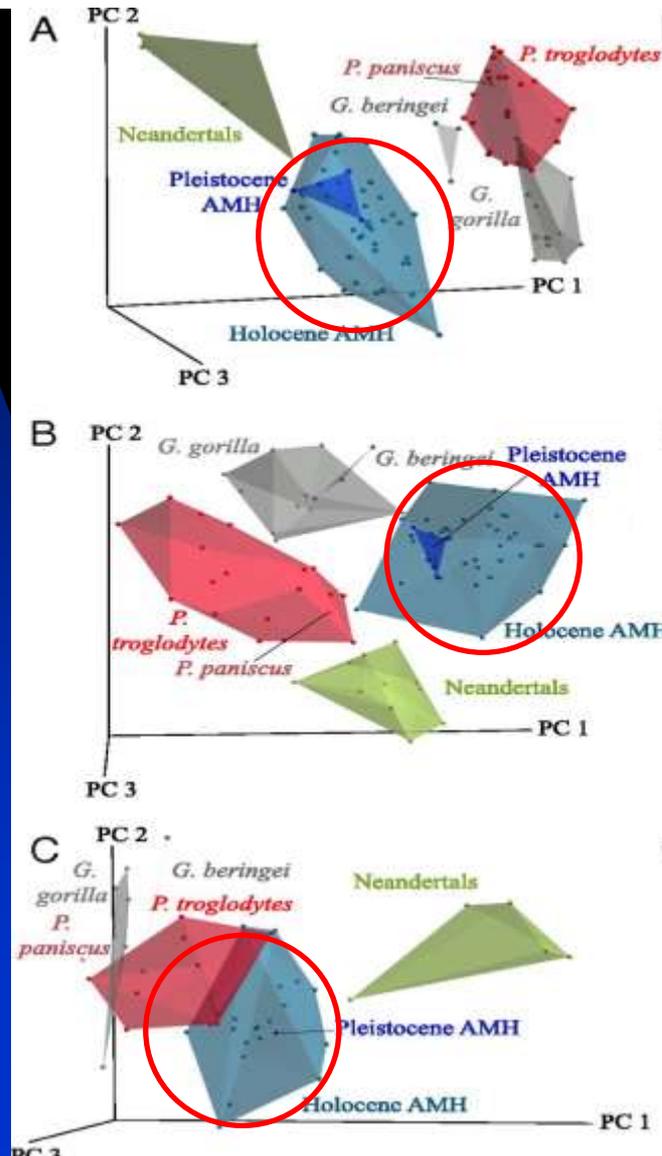
David Notton and Chris Stringer (2010)

There was, however, no single person recognised as the type until 1959, when Professor William Stearn, in a passing remark in a paper on Linnaeus' contributions to nomenclature and systematics wrote that 'Linnaeus himself must stand as the type of his *Homo sapiens*'. This was enough to designate Linnaeus as a lectotype (Article 74.5), the single name-bearing type specimen for the species *Homo sapiens*....



Morphology and function of Neandertal and modern human ear ossicles

Alexander Stoessel^{a,1}, Romain David^a, Philipp Gunz^a, Tobias Schmidt^b, Fred Spoor^{a,c}, and Jean-Jacques Hublin^a



Malleus

Incus

Stapes

Neandertal Introgression Sheds Light on Modern Human Endocranial Globularity

Philipp Gunz,^{1,20,*} Amanda K. Tilot,^{2,20} Katharina Wittfeld,^{3,4} Alexander Teumer,⁵ Chin Yang Shapland,²

~6500 modern humans

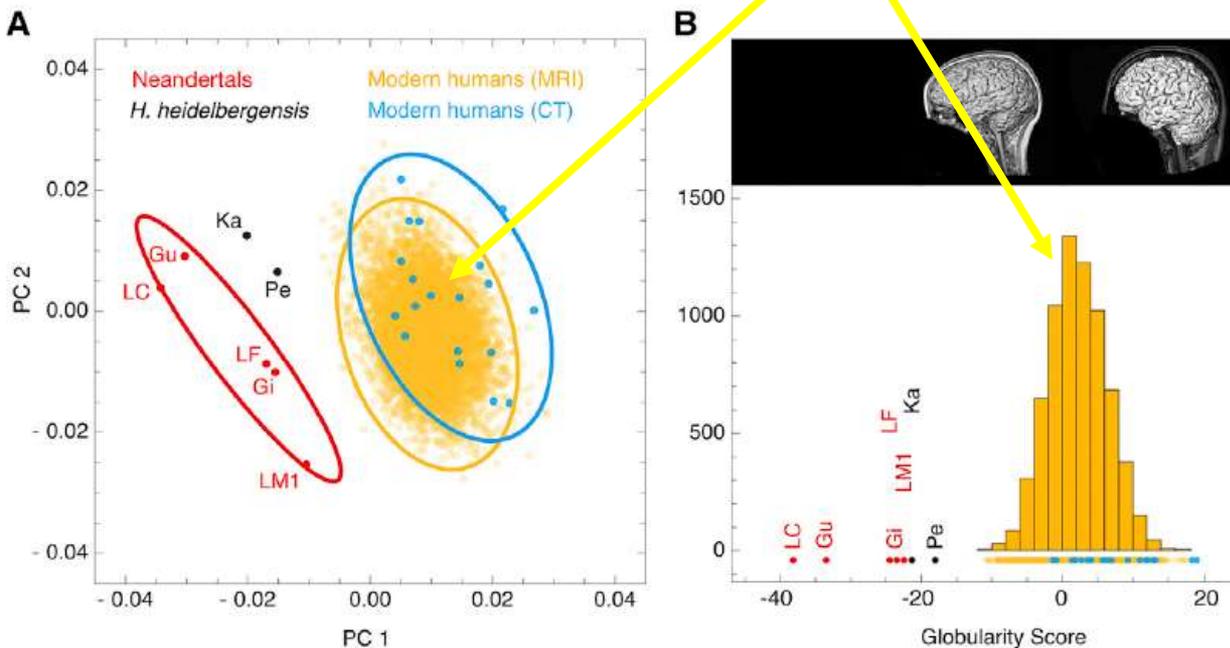


Figure 2. Globularity Scores of CT and MRI Scans

(A) Principal component analysis of endocranial shape. 99% confidence ellipses are shown for modern human CT scans from Europe (blue; $n = 19$), MRI scans of present-day humans (yellow; $n = 6,575$), and Neandertal CT scans (red; $n = 7$); two *Homo heidelbergensis* individuals are plotted in black.

(B) Frequency plot of globularity scores computed for data shown in (A). This globularity score quantifies overall endocranial shape by projecting each individual onto the vector between the elongated average shape of Neandertals and the globular average shape of present-day humans. Inset shows example MRI scans associated with low (left) and high (right) globularity scores among present-day humans.

See also [Figure S1](#).

PALEONTOLOGY

The evolution of modern human brain shape

Simon Neubauer,* Jean-Jacques Hublin, Philipp Gunz

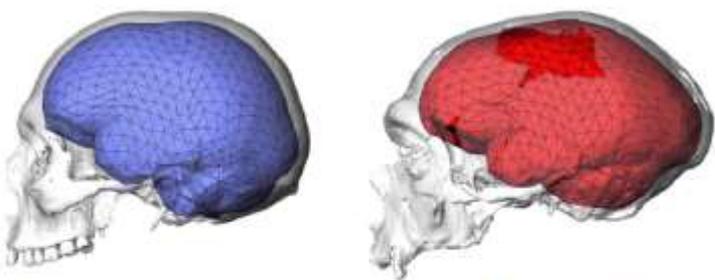
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American Association
for the Advancement

Fig. 1. Differences in brain shape between a present-day human (left, in blue) and a Neandertal from La Chapelle-aux-Saints (right, in red). Endocasts are shown together with the triangulated landmark set used in this study and CT scan renderings of the crania.

89 'diverse' modern humans

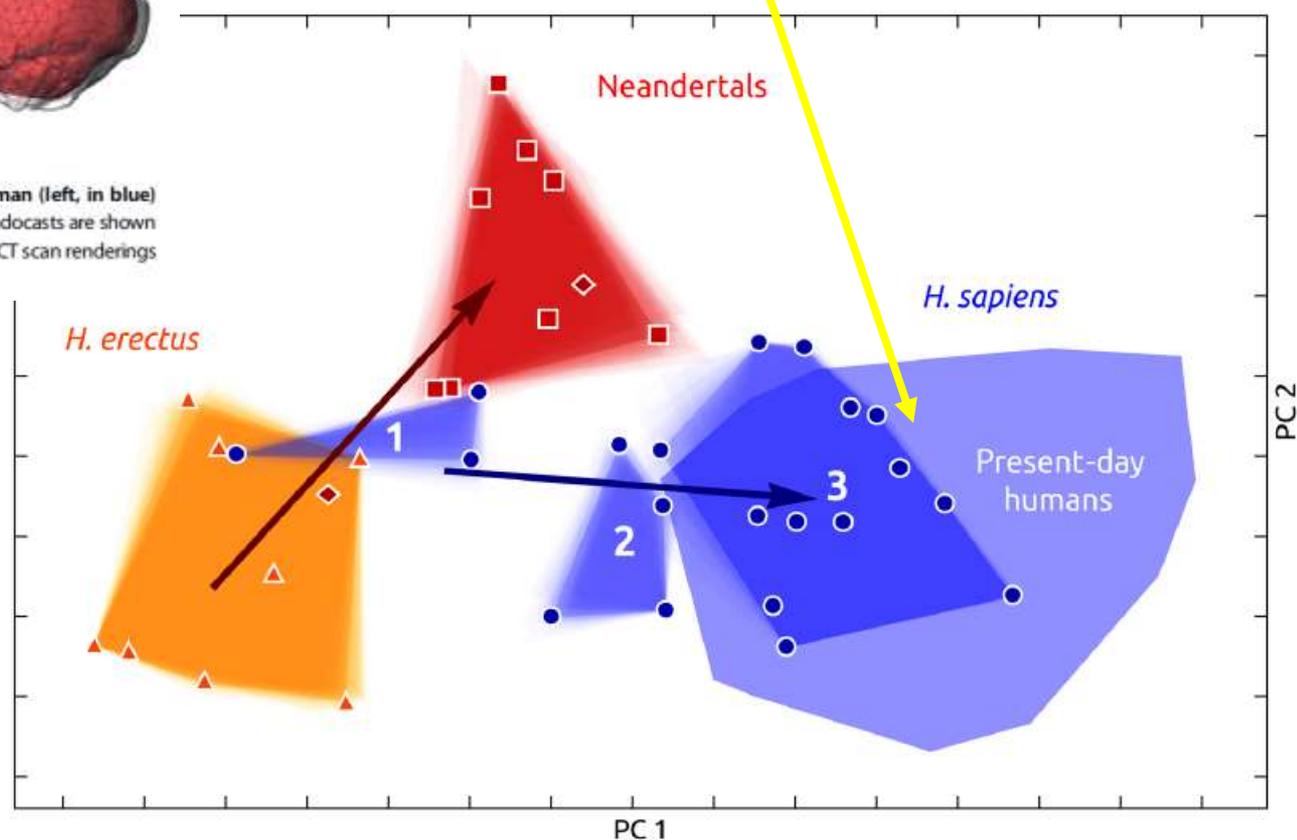
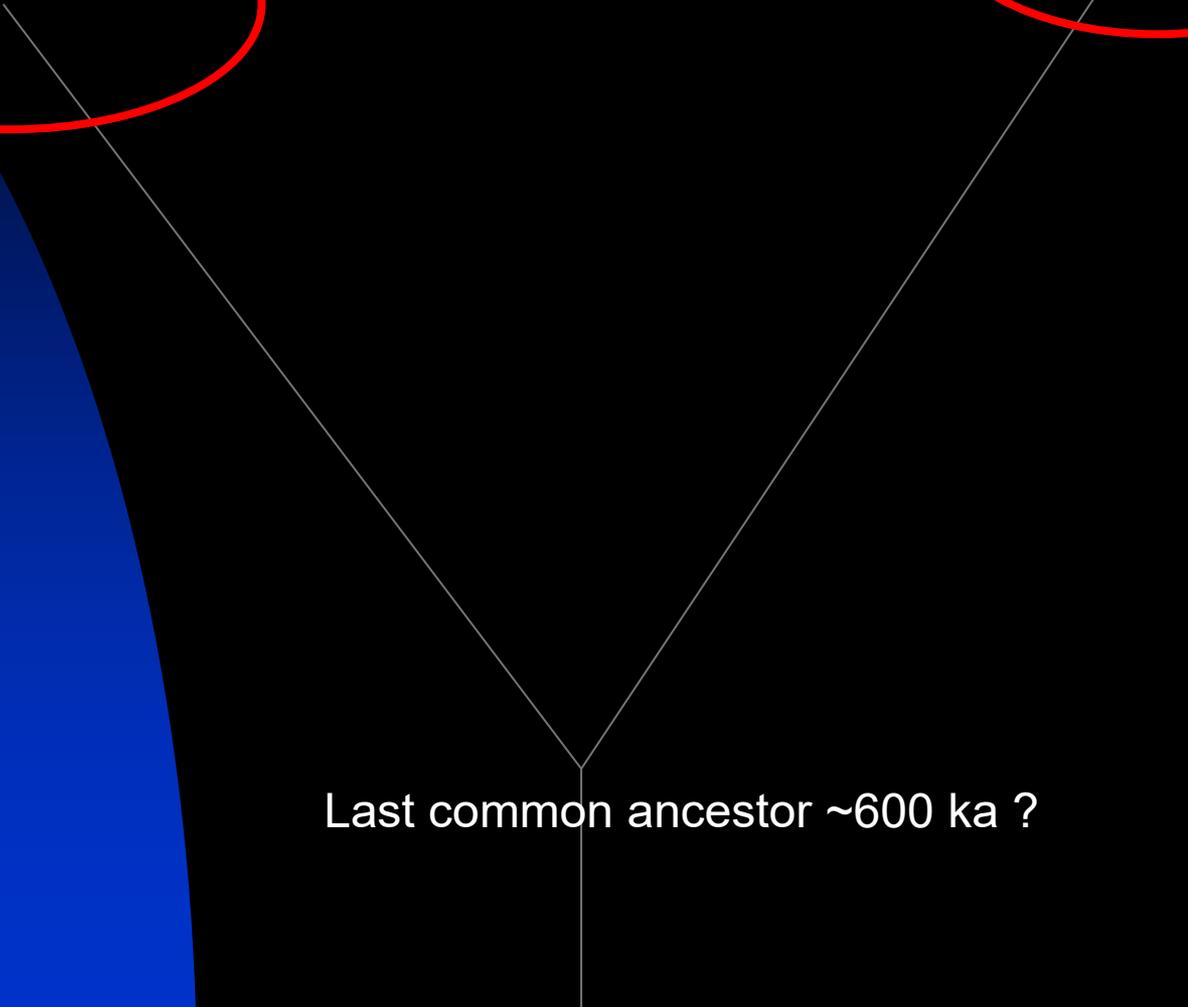
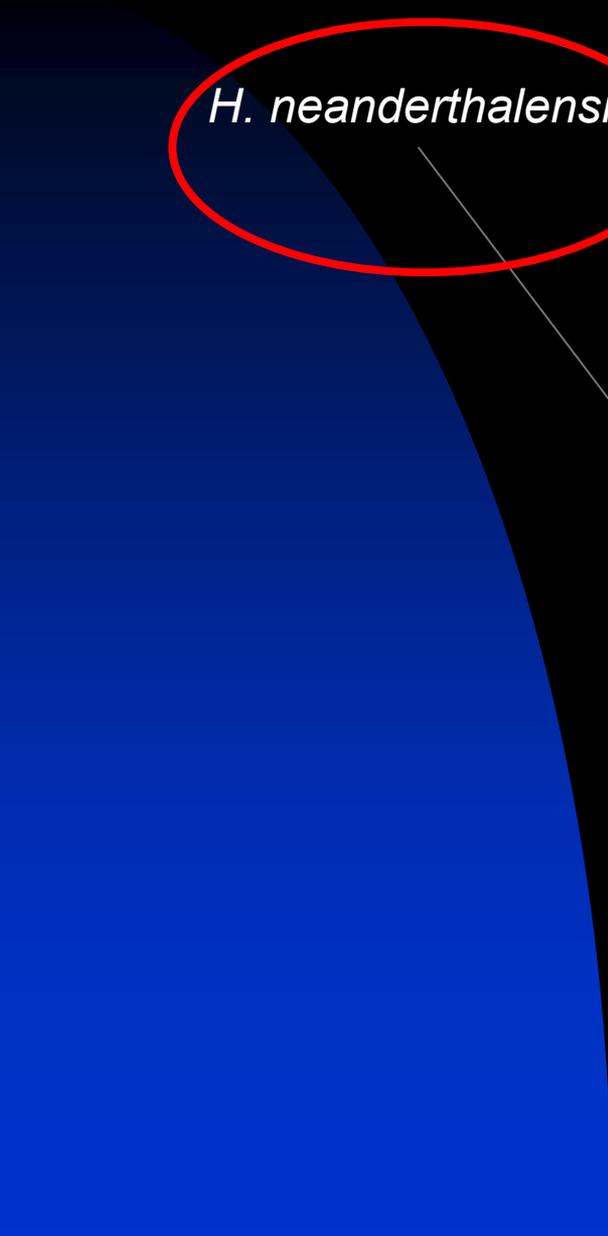


Fig. 2. **bgPCA of endocranial shape.** *H. erectus*, triangles and orange convex hull; Neandertals, squares and red convex hull; *H. heidelbergensis/rhodesiensis*, present-day humans, light blue convex hull; *H. sapiens* fossils, circles and dark blue convex hulls for geologic age groups 1 to 3. Evolutionary trends of shape in modern individuals are shown as regressions on geologic age (arrows) (see fig. S2 for labels of fossil individuals).

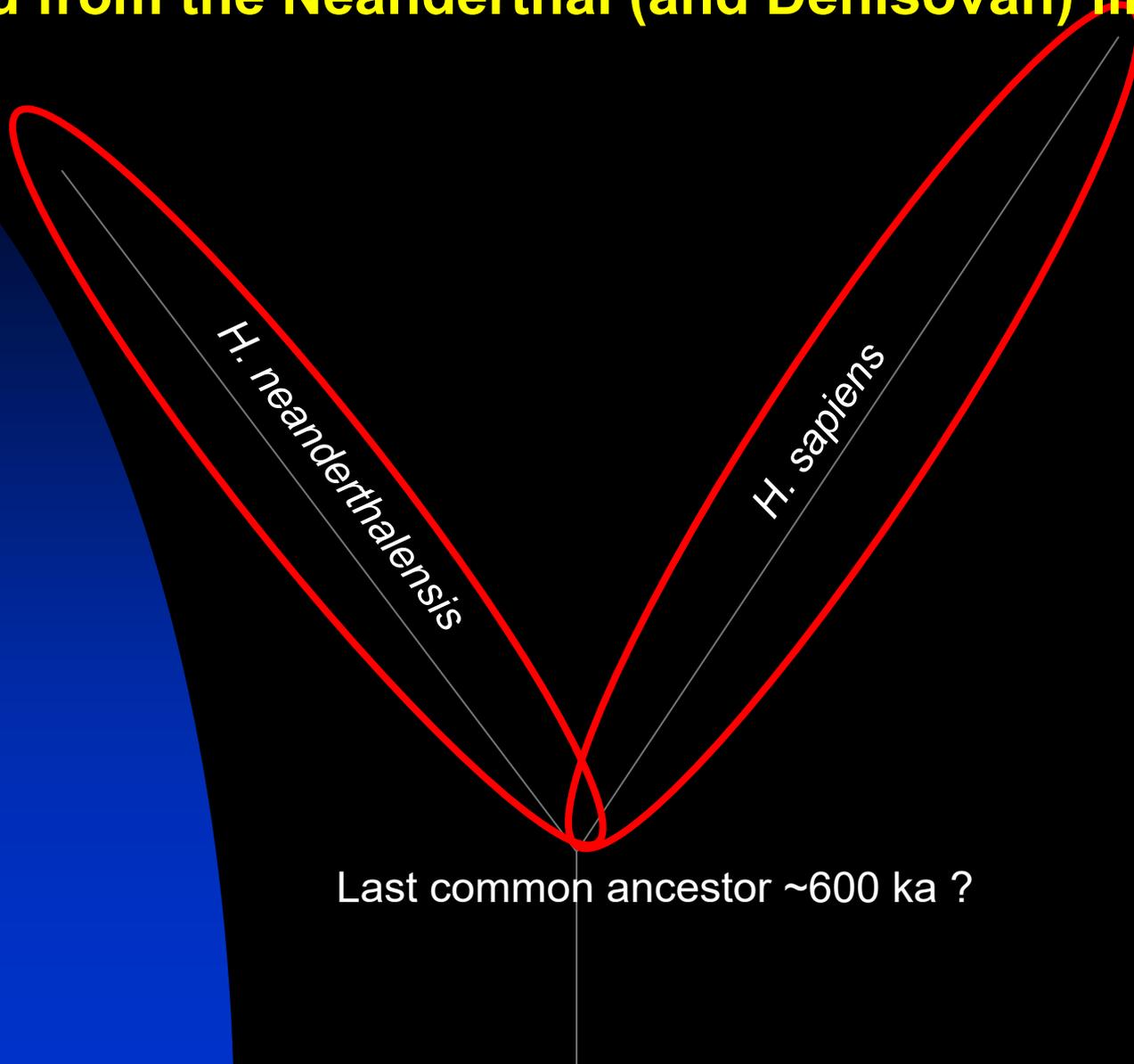
H. neanderthalensis

H. sapiens

Last common ancestor ~600 ka ?



For me, *Homo sapiens* = everything on our lineage after we diverged from the Neanderthal (and Denisovan) lineage





H. neanderthalensis



H. sapiens



Atapuerca (Sima)



Jebel Irhoud

Evolutionary
change

Last common ancestor ~600 ka ?



**'Archaic' and
'modern' *H. s.* may
have co-existed
(Iho Eleru)**

'Modern *H. s.*'

'Late *H. n.*'

'Archaic *H. s.*'



H. neanderthalensis
lineage

H. sapiens
lineage

'Archaic *H. s.*'

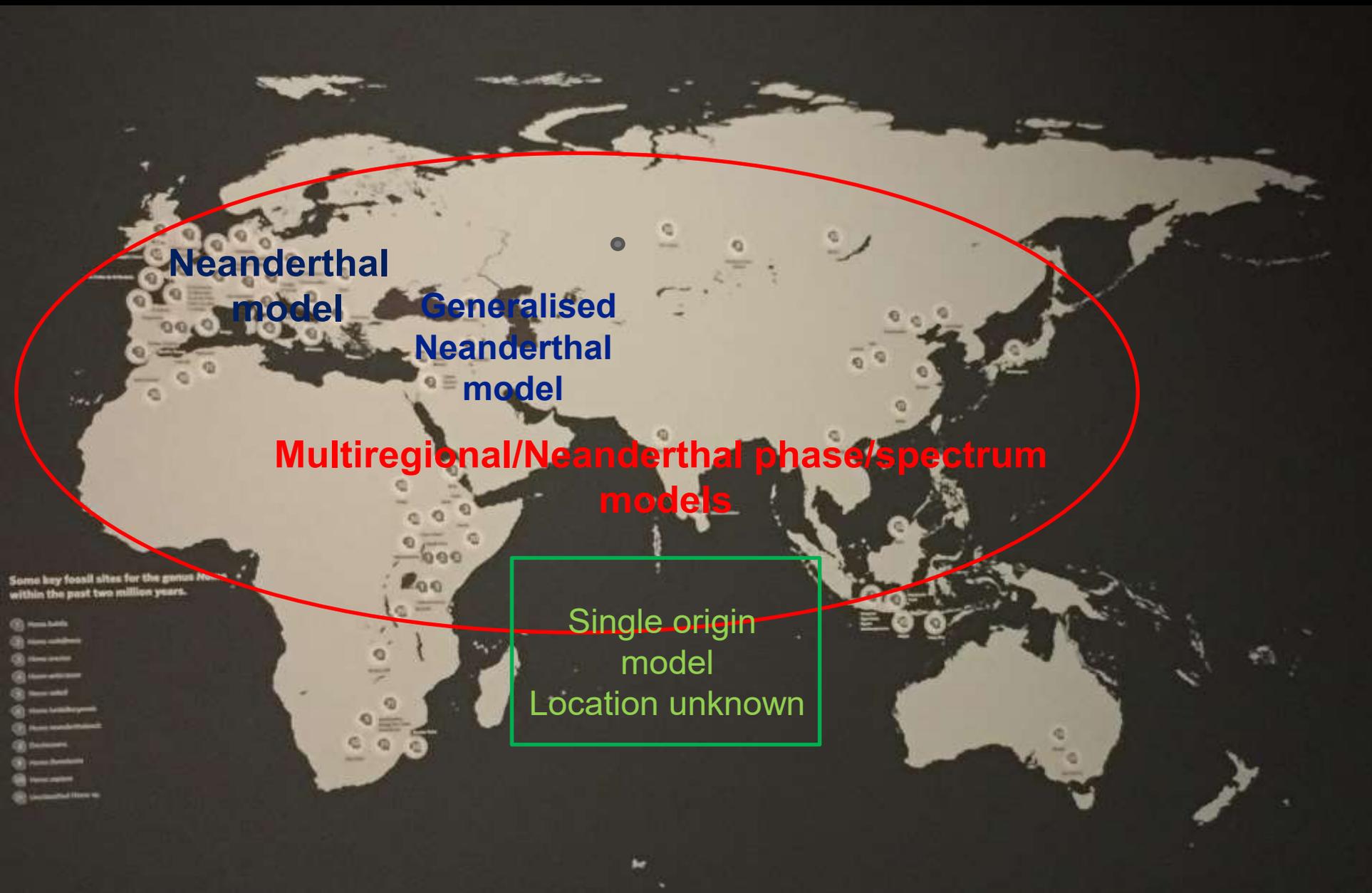


'Early *H. n.*'

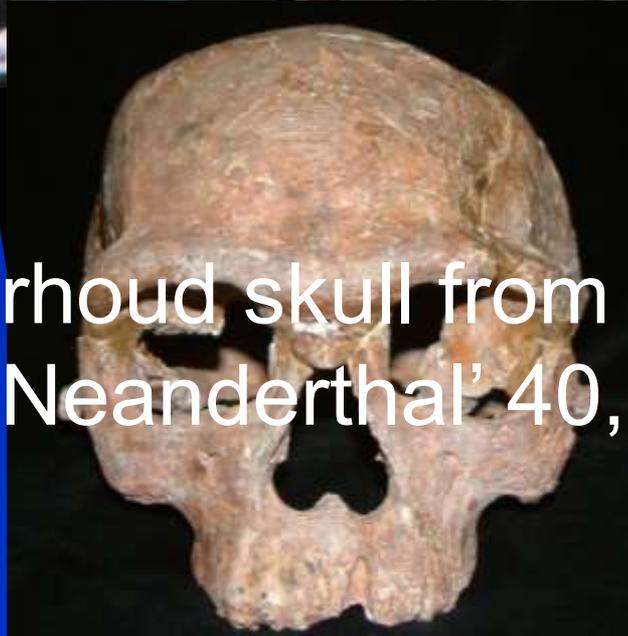


Last common ancestor ~600 ka ?

Ideas about the place of origin of *Homo sapiens* [~1970]

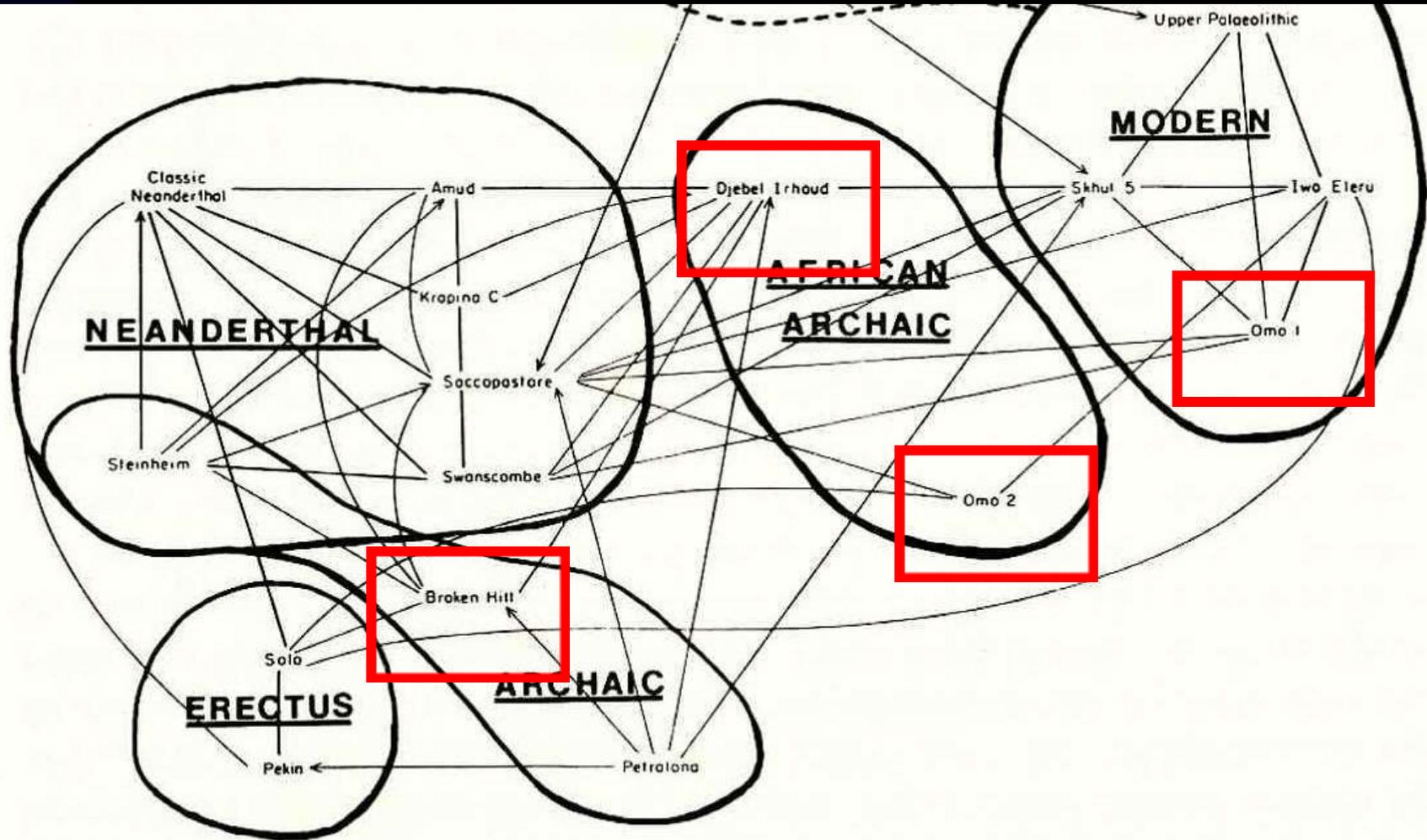


1971 : my PhD trip around Europe

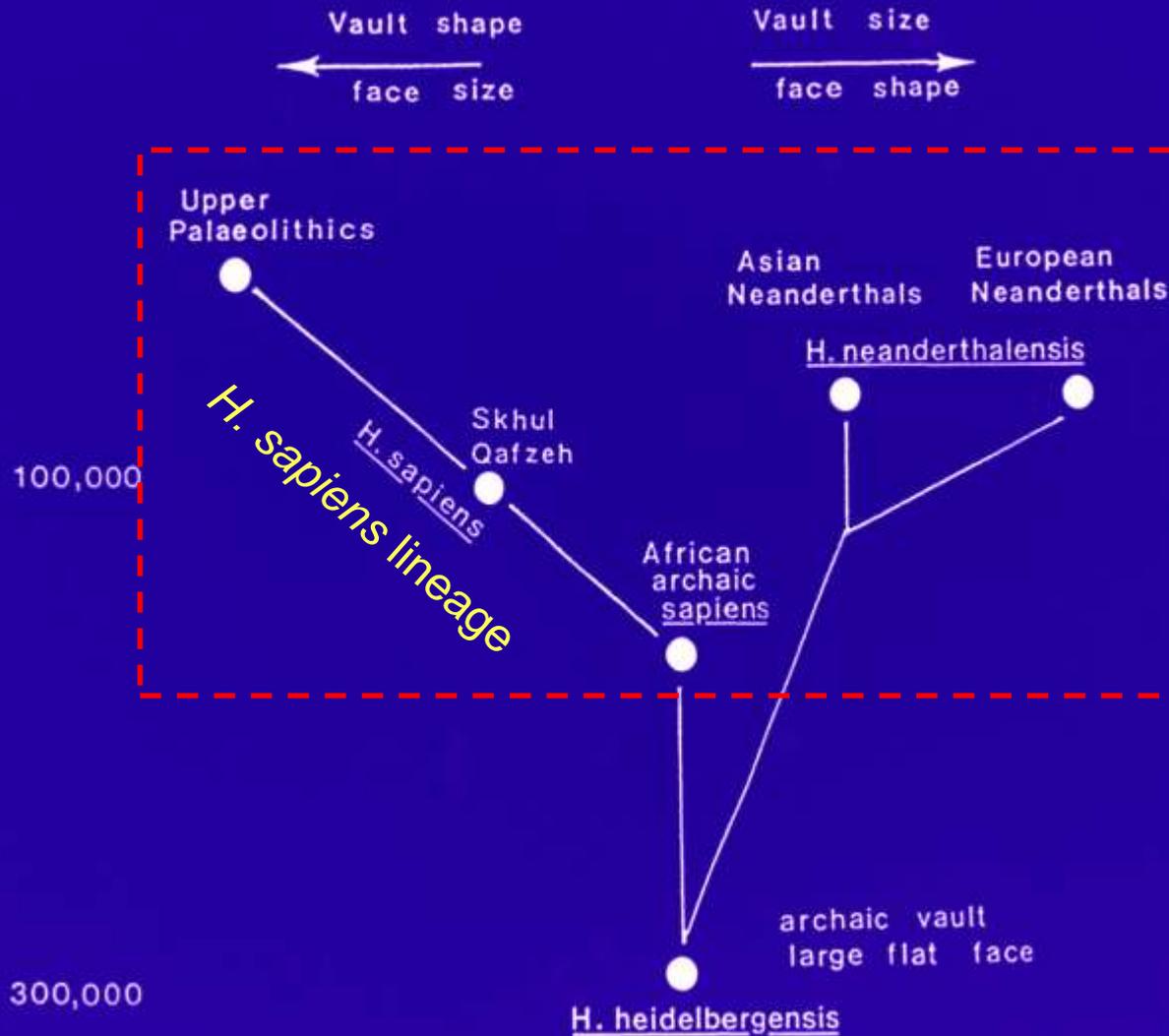


The Jebel Irhoud skull from Morocco:
an African 'Neanderthal' 40,000 years old?

Stringer 1974



Cranial changes primarily in:-



Phenogram Stringer 1978/1994

New fossils from Jebel Irhoud, Morocco and the pan-African origin of *Homo sapiens*

Jean-Jacques Hublin^{1,2}, Abdelouahed Ben-Ncer³, Shara E. Bailey⁴, Sarah E. Freidline¹, Simon Neubauer¹, Matthew M. Skinner⁵, Inga Bergmann¹, Adeline Le Cabec¹, Stefano Benazzi⁶, Katerina Harvati⁷ & Philipp Gunz¹



Luminescence + ESR dating ~315 ka...

Ancient faces from Spain and China – the ‘modern’ face is actually primitive?

nature
ecology & evolution

REVIEW ARTICLE

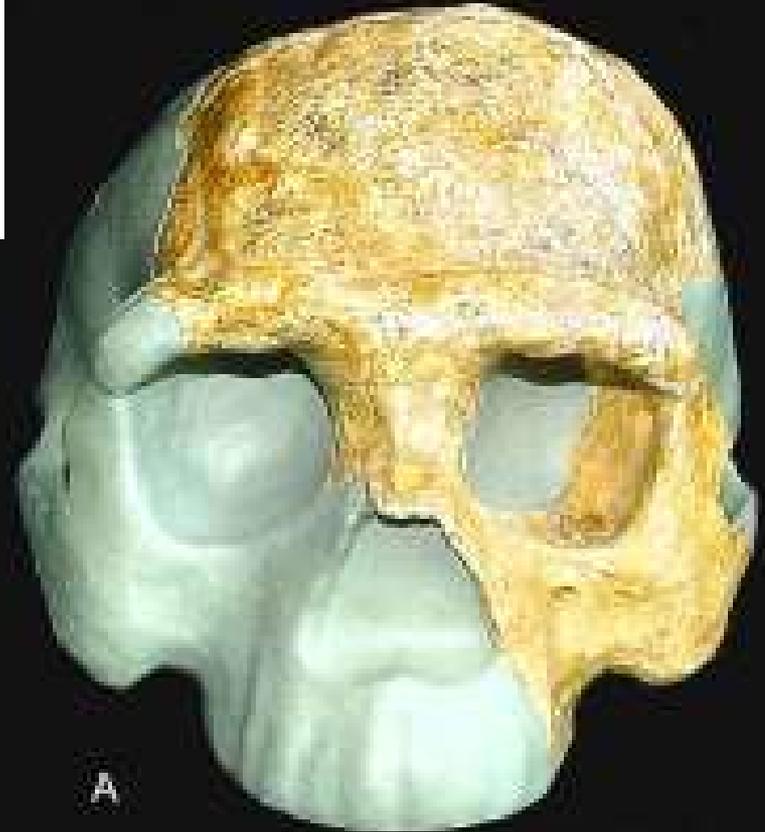
<https://doi.org/10.1038/s41467-019-0860-7>

The evolutionary history of the human face

Rodrigo S. Lacruz^{1,2*}, Chris B. Stringer³, William H. Kimbel⁴, Bernard Wood⁵, Katerina Harvati^{2,6}, Paul O’Higgins⁷, Timothy G. Bromage^{8*} and Juan-Luis Arsuaga⁹



Gran Dolina (Atapuerca)
(*H. antecessor*)
~850ka



Nanjing (Hulu Cave)
~600 ka

Homo heidelbergensis: its place in evolution in question?



nature
ecology & evolution

REVIEW ARTICLE

<https://doi.org/10.1038/s41586-020-2165-4>

Dating the skull from Broken Hill, Zambia, and its position in human evolution

The evolutionary history of the human face

Rodrigo S. Lacruz^{1,2*}, Chris B. Stringer^{3,4}, William H. Kimbel⁵, Bernard Wood^{6,7}, Katerina Harvati^{2,6}, Paul O'Higgins⁸, Timothy G. Bromage⁹ and Juan-Luis Arsuaga⁹

<https://doi.org/10.1038/s41586-020-2165-4>

Received: 30 May 2019

Accepted: 30 January 2020

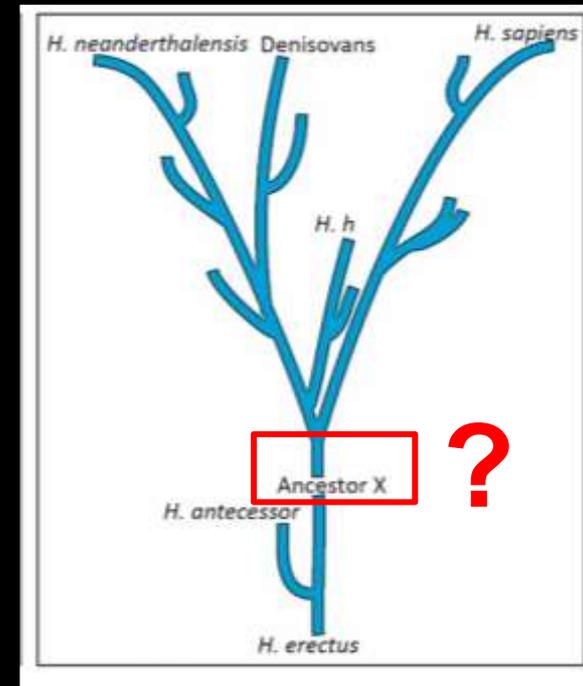
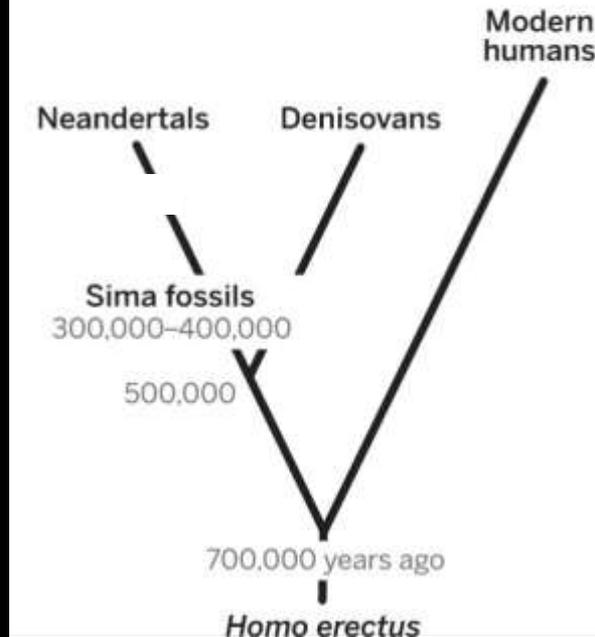
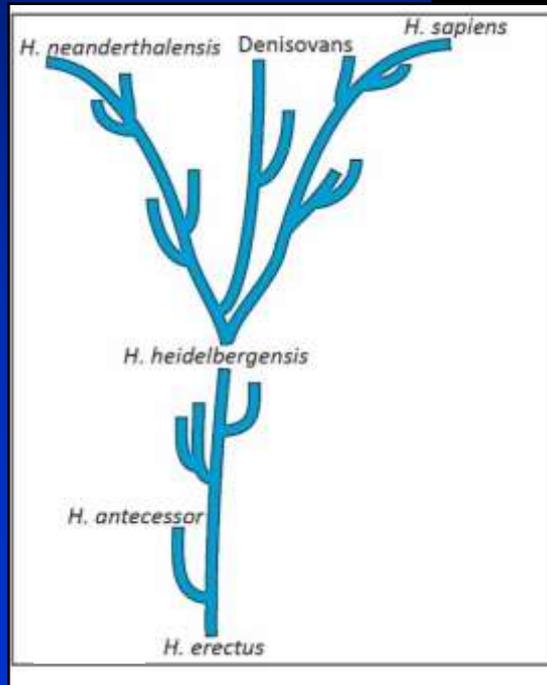
Published online: 01 April 2020

Rainer Grün^{10,11}, Alistair Pike¹², Frank McDermott⁴, Stephen Eggs⁵, Graham Mortimer¹, Maxime Aubert¹³, Lesley Kinsley¹⁴, Renaud Joannes-Boyau¹⁵, Michael Rumsey¹⁶, Christiane Denys¹⁷, James Brink^{18,19}, Tara Clark^{13,17} & Chris Stringer^{10,20}

The cranium from Broken Hill (Kabwe) was recovered from cave deposits in 1921.

Deeper branches

Putting the Sima fossils on the Neandertal lineage implies an earlier split between modern and some archaic humans.



The African story gets more complex...

**...our fossils come from less than
10% of the area of Africa**



A topographic map of the African continent is shown against a dark background. Several small, semi-transparent skull icons are placed on the map to indicate fossil locations. Two skulls are in the northwestern region (Libya/Egypt area), one is in the east (Ethiopia/Sudan area), and one is in the southern region (South Africa area).

Irhoud ?sapiens

**Africa at about 300,000 years:
*at least 3 species?***

**Broken Hill
*heidelbergensis***

H. naledi

Omo Kibish 1 (Ethiopia) is currently the oldest known fossil that can fairly confidently be assigned to 'modern' *H. sapiens*

172 ka (Brown et al., 2012). Thus, the Omo I fossils have an age of at least 172 ka and, given the depositional environment of Kibish Member 1, probably closer to 196 ka. Omo I is therefore the oldest securely dated fossil evidence of anatomically modern humans

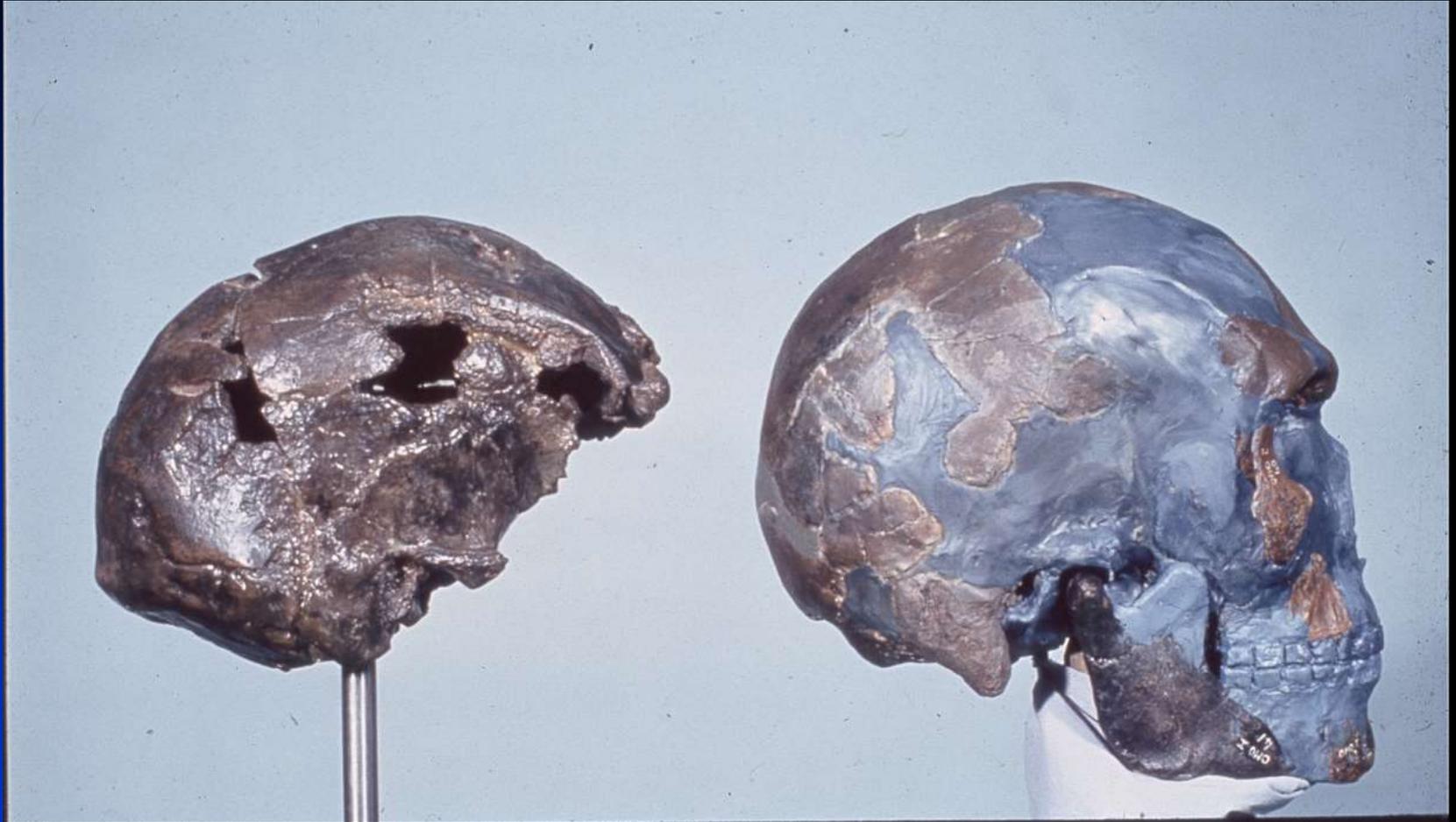


The Omo-Kibish I pelvis **(found 2001)**

Ashley S. Hammond ^{a,*}, Danielle F. Royer ^b, John G. Fleagle ^c

In conclusion, the Omo I hipbone is modern human in appearance. It has modern human apomorphies, including a reduced iliac tubercle (and therefore, reduced iliac pillar) and an ilium that does not appear as widely laterally flaring as earlier *Homo*. The hipbone is within the range of recent human variation for a number of features

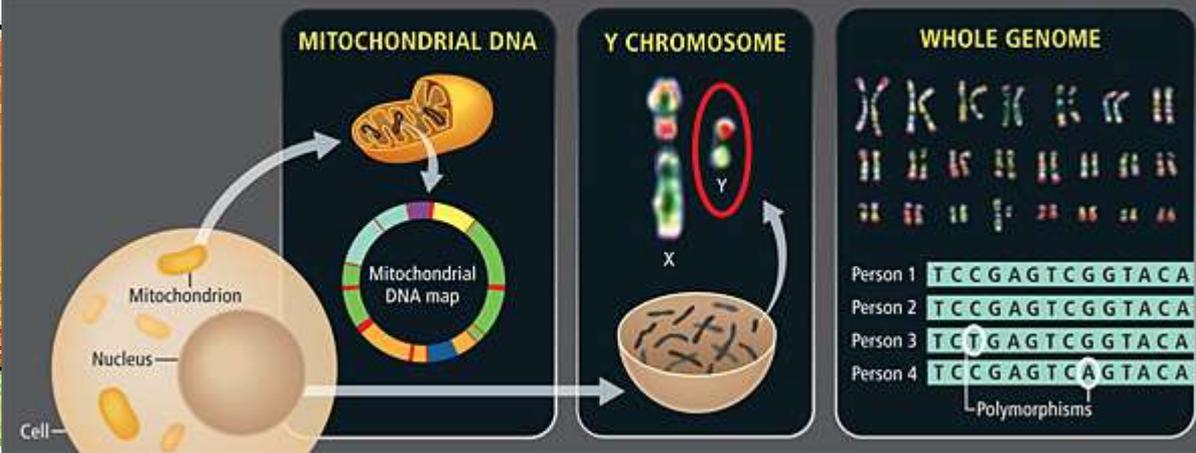
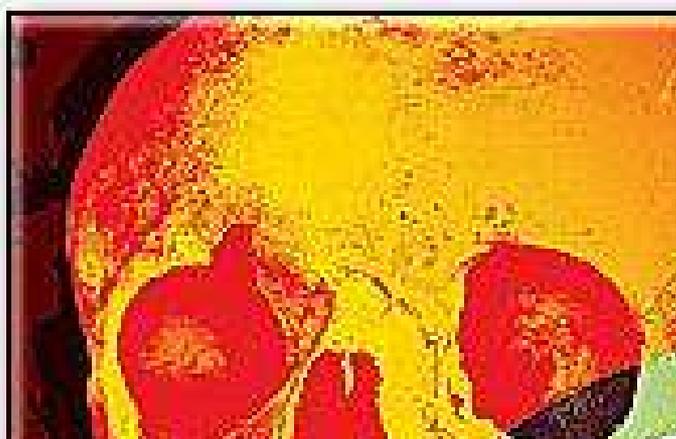
Again, evidence that “archaic” and “modern” anatomies overlapped in Africa - found only a few km apart, these crania have both been dated to ~195ka and are very different in cranial shape...



Omo Kibish
(Ethiopia)

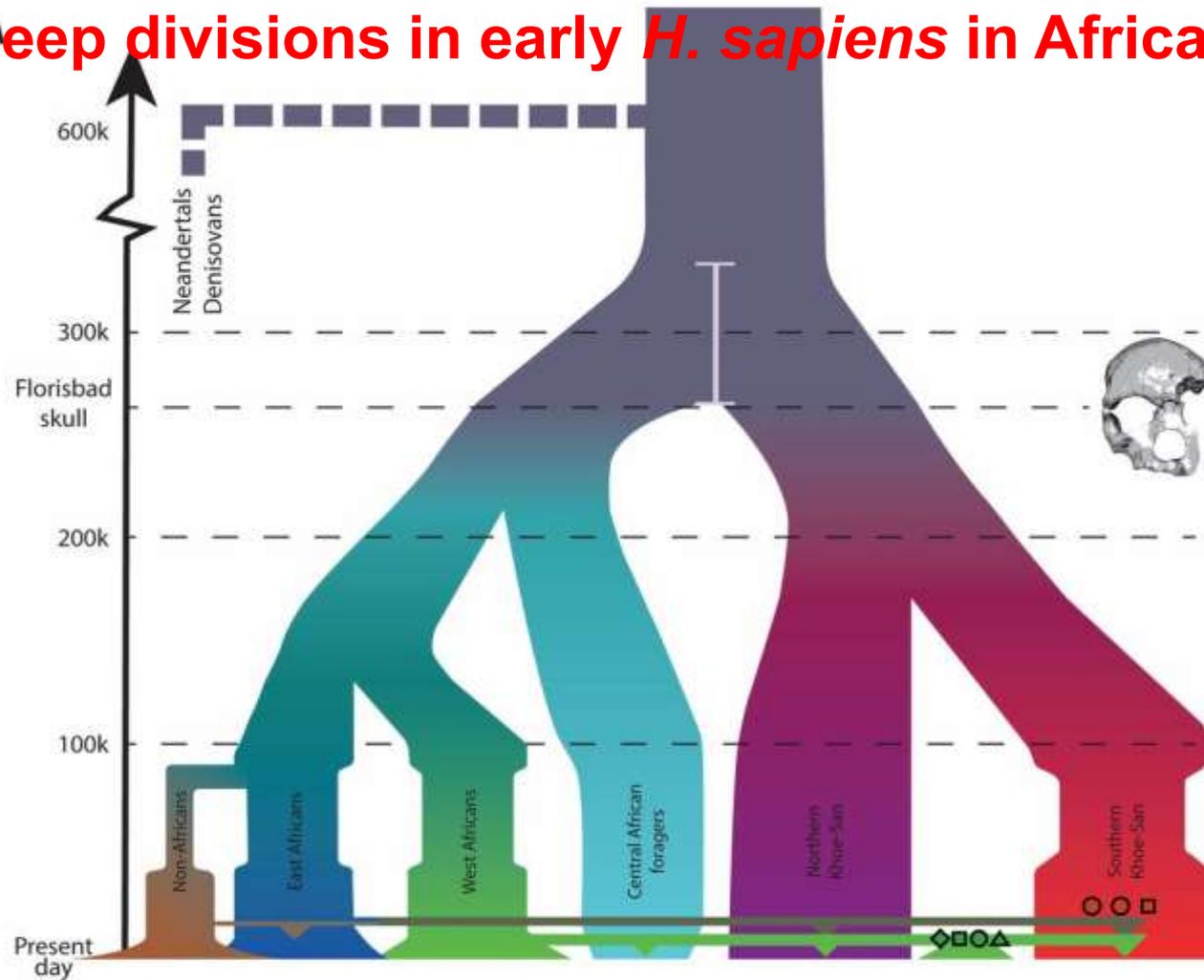
2

1



**DNA:
our
species'
history is
written in
our own
body
cells**

Deep divisions in early *H. sapiens* in Africa?



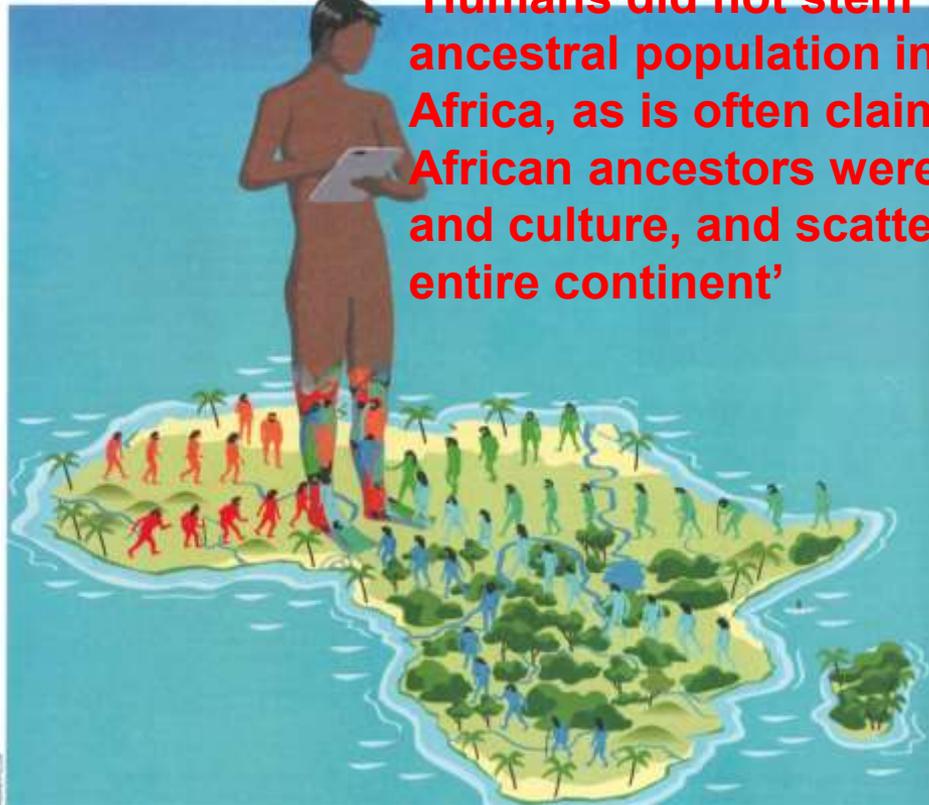
Southern African ancient genomes estimate modern human divergence to 350,000 to 260,000 years ago

Carina M. Schlebusch,^{1,2*} Helena Malmström,^{1,2*} Torsten Günther,¹ Per Sjödin,¹ Alexandra Coutinho,¹

Cite as: C. M. Schlebusch *et al.*, *Science* 10.1126/science.aaa6286 (2017).

The origin of our species

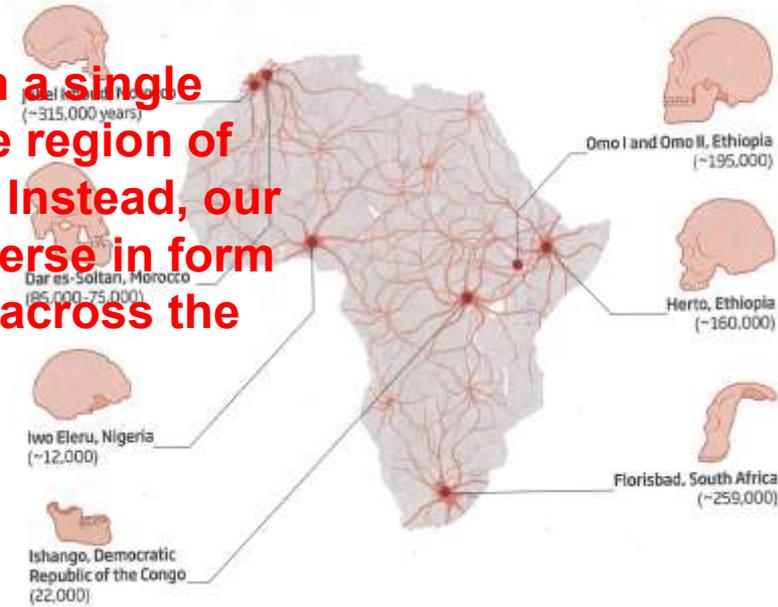
The story of humanity's beginning has far more plot twists than we ever imagined, says **Eleanor Scerri**



'Humans did not stem from a single ancestral population in one region of Africa, as is often claimed. Instead, our African ancestors were diverse in form and culture, and scattered across the entire continent'

One species, many origins

The idea that *Homo sapiens* evolved from a single population in East Africa has been undermined by discoveries of human skulls across the continent. The huge variation in their features and dates suggests that our species was born of the occasional mixing of many isolated populations



36 | NewScientist | 28 April 2018

TREE 2019 1-13

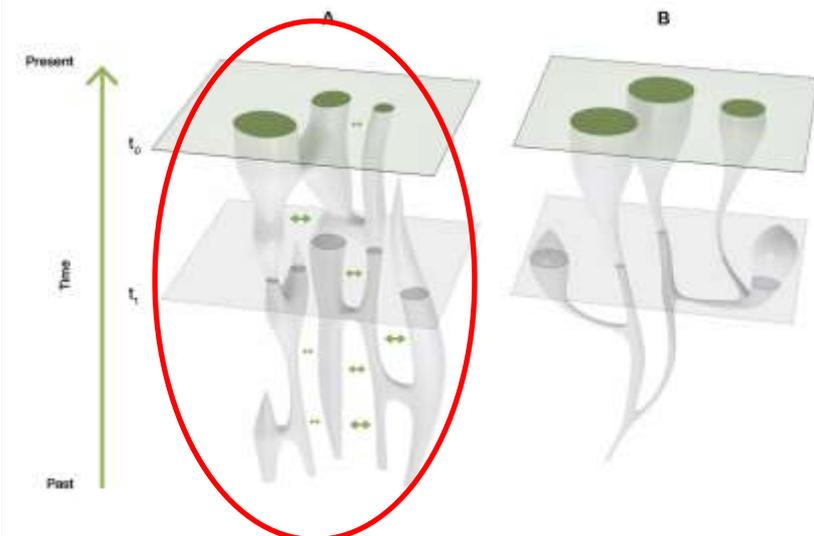
ARTICLE IN PRESS

Trends in Ecology & Evolution

CellPress
REVIEWS

Opinion

Did Our Species Evolve in Subdivided Populations across Africa, and Why Does It Matter?



One or more early exits of modern humans from Africa?

Map of sites with ages and postulated early and later pathways associated with modern humans dispersing across Asia during the Late Pleistocene.

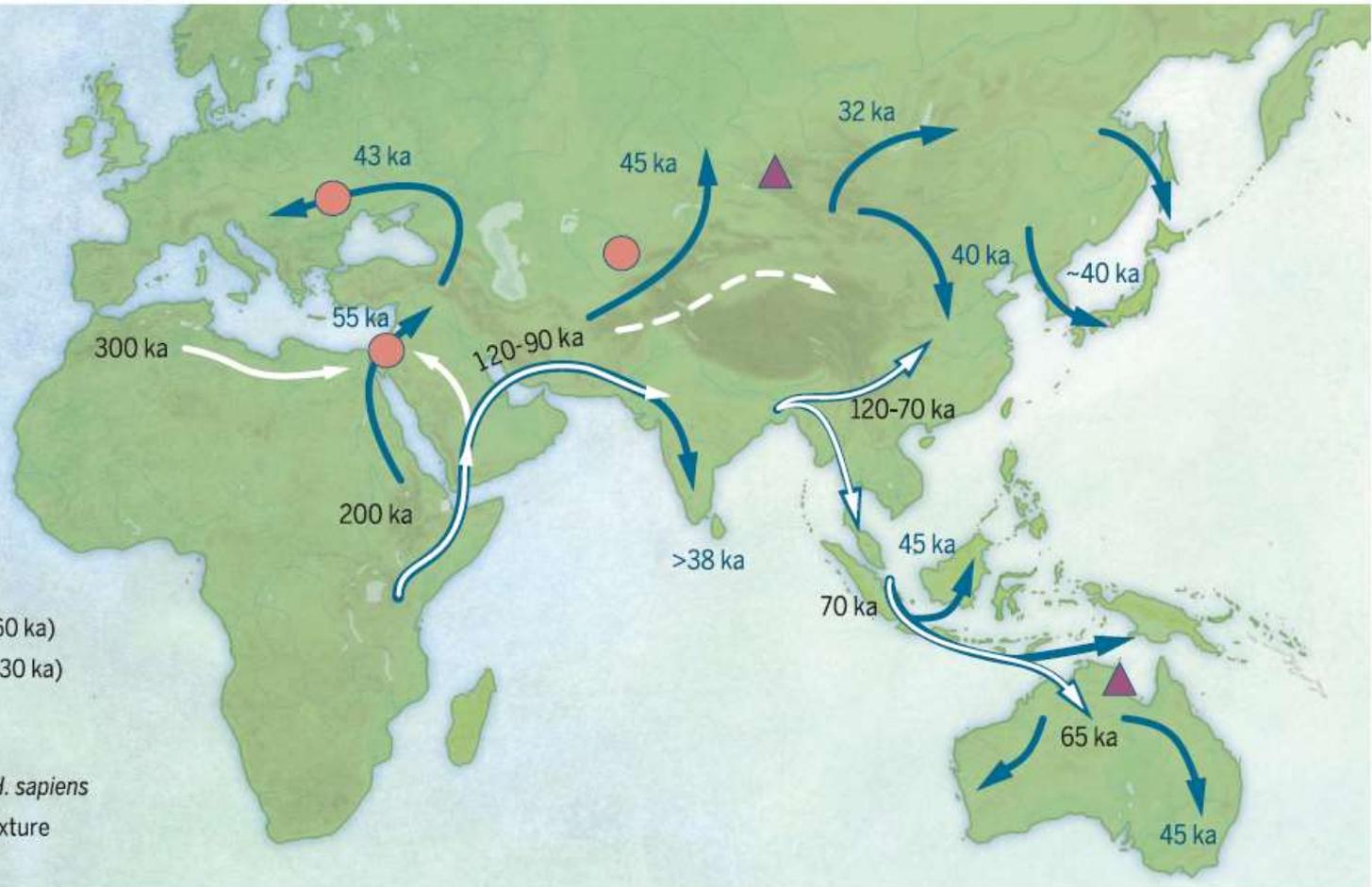
Regions of assumed genetic admixture are also shown. ka, thousand years ago.

Homo sapiens dispersal routes

- Early dispersals (120-60 ka)
- Later dispersals (<60-30 ka)

Genetic admixture

- Neandertal admixture with *H. sapiens*
- Neandertal/*H. sapiens* admixture with Denisovans



Initial Upper Palaeolithic *Homo sapiens* from Bacho Kiro Cave, Bulgaria

~45,000 years old

<https://doi.org/10.1038/s41586-020-2259-z>

Received: 30 July 2019

Accepted: 24 February 2020

Check for updates

Jean-Jacques Hublin^{1,2}, Nikolay Sirakov³, Vera Aldeias⁴, Shara Bailey^{1,5}, Edouard Bard⁶, Vincent Delvigne^{7,8}, Elena Enderova⁹, Yoann Fagault⁶, Helen Fewlass¹, Mateja Hajdinjak¹⁰, Bernd Kromer¹, Ivaylo Krumov¹¹, João Marreiros^{4,12}, Naomi L. Martisius¹³, Lindsey Paskulin¹⁴, Virginie Sinet-Mathiot¹, Matthias Meyer¹⁰, Svante Pääbo¹⁰, Vasil Popov¹⁵, Zeljko Rezek^{1,16}, Svoboda Sirakova³, Matthew M. Skinner^{1,17}, Geoff M. Smith¹, Rosen Spasov¹⁸, Sahra Talamo^{1,19}, Thibaut Tuna⁶, Lukas Wacker²⁰, Frido Welker^{1,21}, Arndt Wilcke²², Nikolay Zahariev²³, Shannon P. McPherron¹ & Tsenka Tzanova¹

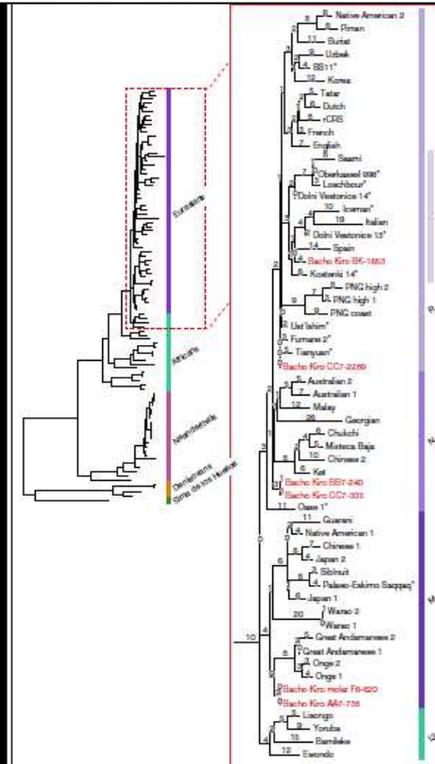


Fig. 2 | Maximum parsimony tree. Maximum parsimony tree relating Bacho Kiro Cave mtDNAs to 54 present-day humans, 12 ancient *H. sapiens*, 12 Neanderthals, 12 Denisovans and 12 individuals from the 120,000-year-old



Fig. 3 | Bone tools and personal ornaments from Bacho Kiro Cave layers I and J (Niche I and Main sectors). a–j, Pendants made from perforated and grooved teeth (a, ungulate; b–j, cave bear). k, l, o, Awls. m, Anthropogenically modified piece. n, p, Lissoirs. q, Ivory bead. Further details are provided in Supplementary Table 15. Scale bars, 1 cm (a–o, q), 3 cm (p).

In southwest Asia (Extended Data Fig. 2). For instance, the Bacho Kiro Cave IUP is similar to the IUP from layers I–F at Üçağızlı Cave (Turkey) in terms of lithic technology, typology, and the presence of shaped bone tools and pendants, as well as with respect to ages^{32,33}.

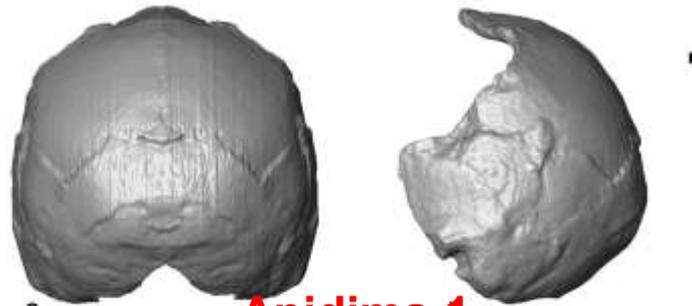
The Bacho Kiro Cave site clearly demonstrates that the IUP in this region was made by *H. sapiens*, and is consistent with models that attrib-

Apidima Cave fossils provide earliest evidence of *Homo sapiens* in Eurasia

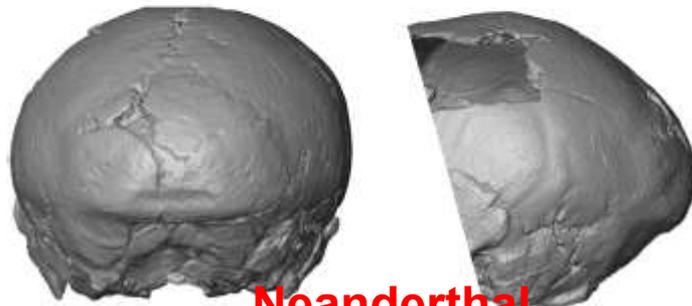
Katerina Harvati^{1,2,3*}, Carolin Röding¹, Abel M. Bosman^{1,2}, Fotios A. Karakostis¹, Rainer Grün⁴, Chris Stringer⁵, Panagiotis Karkanas⁶, Nicholas C. Thompson^{1,3}, Vassilis Koutoulidis⁷, Lia A. Mouloupoulos⁷, Vassilis G. Gorgoulis^{8,9,10*} & Mirsini Kouloukoussa^{3,8}

>200,000 years old ?

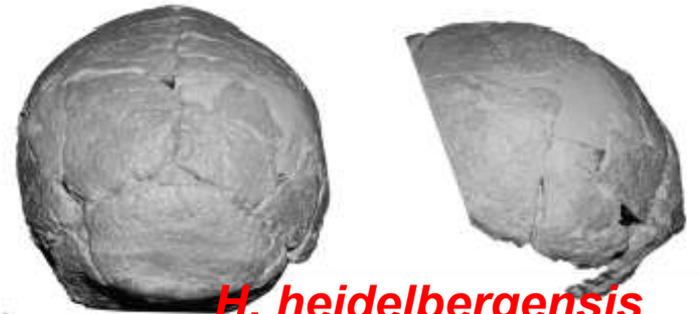
Two fossilized human crania (Apidima 1 and Apidima 2) from Apidima Cave, southern Greece, were discovered in the late 1970s but have remained enigmatic owing to their incomplete nature, taphonomic distortion and lack of archaeological context and chronology. Here we virtually reconstruct both crania, provide detailed comparative descriptions and analyses, and date them using U-series radiometric methods. Apidima 2 dates to more than 170 thousand years ago and has a Neanderthal-like morphological pattern. By contrast, Apidima 1 dates to more than 210 thousand years ago and presents a mixture of modern human and primitive features. These results suggest that two late Middle Pleistocene human groups were present at this site—an early *Homo sapiens* population, followed by a Neanderthal population. Our findings support multiple dispersals of early modern humans out of Africa, and highlight the complex demographic processes that characterized Pleistocene human evolution and modern human presence in southeast Europe.



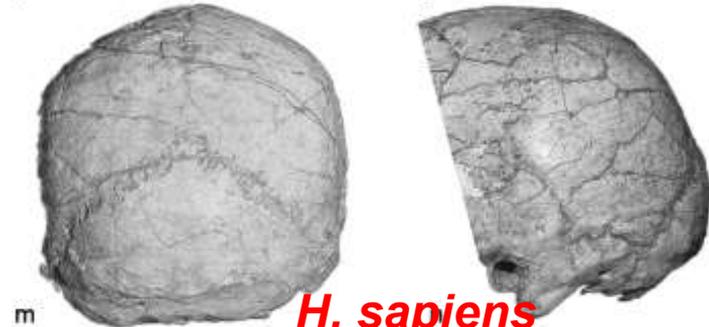
Apidima 1



Neanderthal



H. heidelbergensis



H. sapiens

The evolutionary history of Neanderthal and Denisovan Y chromosomes

Martin Petr^{1*}, Mateja Hajdinjak^{1,2}, Qiaomei Fu^{3,4,5}, Elena Essel¹, H el ene Rougier⁶, Isabelle Crevecoeur⁷, Patrick Semal⁸, Liubov V. Golovanova⁹, Vladimir B. Doronichev⁹, Carles Lalueza-Fox¹⁰, Marco de la Rasilla¹¹, Antonio Rosas¹², Michael V. Shunkov¹³, Maxim B. Kozlikin¹³, Anatoli P. Derevianko¹³, Benjamin Vernot¹, Matthias Meyer¹, Janet Kelso^{1*}

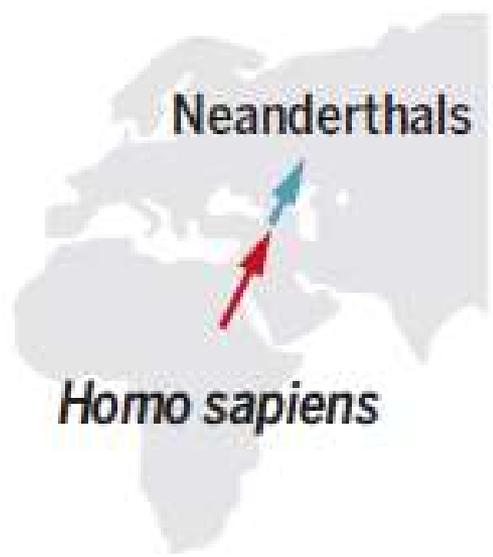
The last pieces of a puzzling early meeting

Y chromosomes transferred from *Homo sapiens* to Neanderthals between 350,000 to 150,000 years ago

By Mikkel Heide Schierup

● People transfer ● Gene transfer

Gene flow from *Homo sapiens* to Neanderthals (200 to 300 ka ago)



GENOME COMPONENT	REPLACEMENT (%)
Mitochondrial DNA	100
Y chromosome	100
X chromosome	4–8
Autosomes	3–6



Will Asia Rewrite Human History?

The earliest unequivocally modern humans in southern China

Wu Liu^{1*}, Marka Marković^{1,2,3,4}, Yao-jun Cai¹, Song Kang¹, Han-wei Song¹, Shao-wen Fu¹, Marko Šunjević^{1,2,3,4}, Xiao-ting Wang¹, & Lawrence H. Keeley^{1,2,3,4}, Xiaoyan Li^{1,2}, Xiang-yu Yang¹, José María Bermúdez de Castro^{1,2,3,4} & Wei Jie Wu^{1,2}

Figure 1 | Geographical location and stratigraphy of the Daoxian site. Location of the Daoxian site. Late Middle Pleistocene and Late Pleistocene.

Daoxian (Fuyan) Cave 80 ka+ ?

Figure 1 | Daoxian hand axes (red circles). See Extended Data Fig. 1 for detailed information about each tool. © Research and Innovation, 2018. All rights reserved. C. C. BY-NC-ND 4.0 International.

An early modern human presence in Sumatra 73,000–63,000 years ago

R. E. Wostear¹, J. Louys¹, R. Das An¹, M. J. Morwood², G. I. Price³, J.-A. Zhai⁴, M. Aubert⁵, R. Soejarto⁶, T. M. Smith⁷, M. M. Shimoza^{8,9}, T. Crompton¹⁰, R. M. Bailey¹¹, G. D. van den Brugg¹², I. de Vos¹³, A. W. G. Pflü¹⁴, C. Stringer¹⁵, E. W. Scahmer¹⁶, Y. Bai¹⁷, I. Zaini¹⁸, W. D. Swales¹⁹, A. Triandafyllou²⁰, I. S. Kuehn²¹ & R. S. Barlow²²

Lida Ajer Cave, Sumatra

Evidence	Chronology	Modelled
1 (11472)	11 ± 2 kyr	Becca 68 ± 5 kyr
2 (11471)	71 ± 7 kyr	
	86 ± 25 kyr	
	82 ± 5 kyr	
	76 ± 1 kyr	
	86 ± 13 kyr	
	66–70 kyr	
	54 ± 1 kyr	
	203 ± 17 kyr	

Figure 1 | A summary of the results from the Lida Ajer cave analysis. Dating techniques used: thermoluminescence (TL), U-series (thermal ionization mass spectrometry) (U-series), optically stimulated luminescence (OSL), and radiocarbon (14C).

Human occupation of northern Australia by 65,000 years ago

Chris Clarkson¹, Zenobia Jacobs^{2,3}, Ben Marwick^{3,4}, Richard Fullagar³, Lynley Wallis⁵, Mike Smith⁶, Richard G. Roberts^{2,3},



Madjedbebe rockshelter

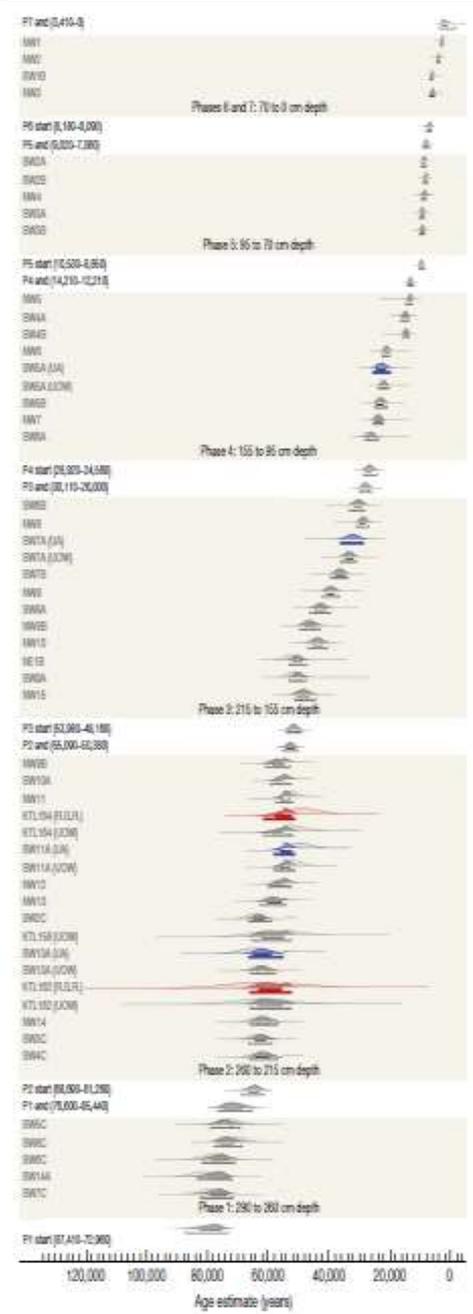


Figure 3 | Bayesian model of the single-grain OSL ages. Ages have been



Dennell 2015

[Or could the genetic calibrations of events be wrong (too young)?]

The complete genome sequence of a Neanderthal from the Altai Mountains

Kay Prüfer¹, Fernando Racimo², Nick Patterson³, Flora Jay², Sriram Sankararaman^{3,4}, Susanna Sawyer¹, Anja Heinze¹,

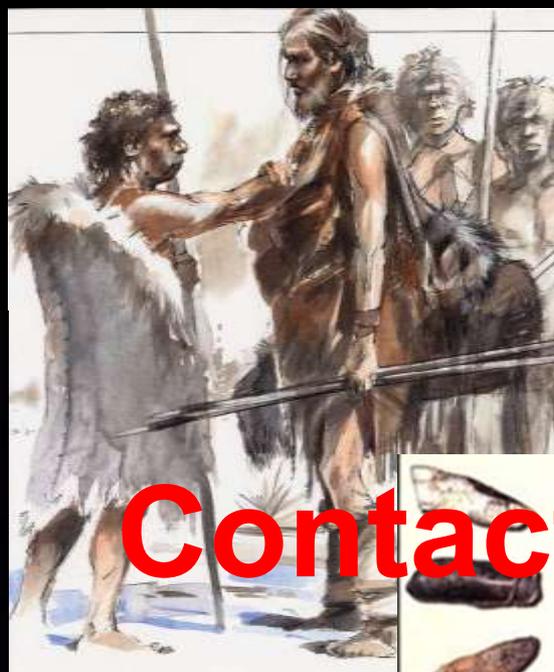
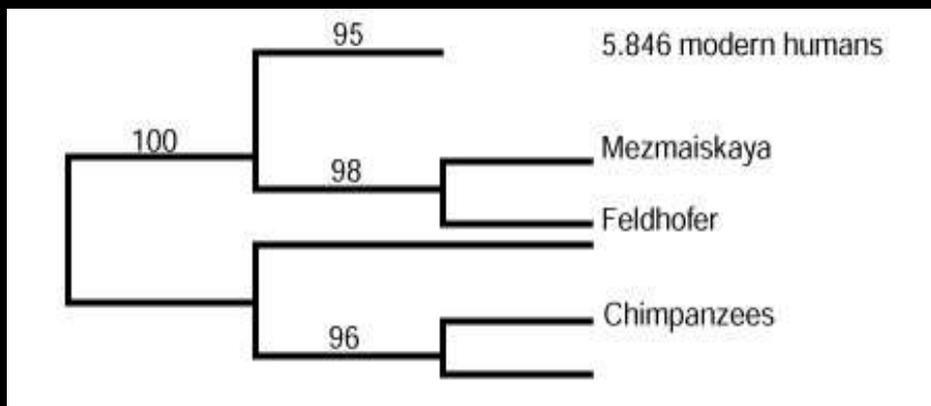
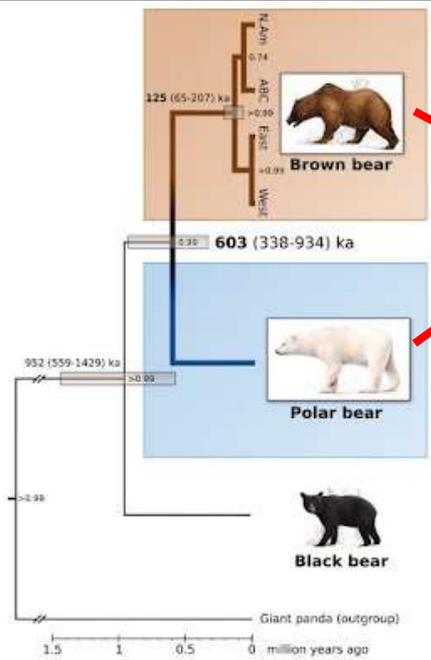
The genomic landscape of Neanderthal ancestry in present-day humans

Sriram Sankararaman^{1,2}, Swapan Mallick^{1,2}, Michael Dannemann³, Kay Prüfer³, Janet Kelso³, Svante Pääbo³, Nick Patterson^{1,2} & David Reich^{1,2,4}

Patterns of coding variation in the complete exomes of three Neandertals

Sergi Castellano^{a,1}, Genís Parra^{a,2}, Federico A. Sánchez-Quinto^{b,2}, Fernando Racimo^{a,c,2}, Martin Kuhlwilm^{a,2},

Interbreeding?



Contact?



If there was any interbreeding it was thought that it was on such a small scale we would find no trace of it today.

Close Encounters 2010 Of the Prehistoric Kind

As a result, **most** people living outside Africa have inherited a small but significant amount of DNA from these extinct humans.

The long-awaited sequence of the Neandertal genome suggests that modern humans and Neandertals interbred tens of thousands of years ago, perhaps in the Middle East



SEPARATING THEM FROM US

Some genes that differ between modern humans and Neandertals

Gene	Significance
<i>RPTN</i>	Encodes the protein repertin, expressed in skin, sweat glands, hair roots, and tongue papillae
<i>TRPM1</i>	Encodes melastatin, a protein that helps maintain skin pigmentation
<i>TNMD4</i>	Associated with type 2 diabetes in humans; evolutionary changes may have affected energy metabolism
<i>DIK1A</i>	Found in an area critical for causing Down syndrome
<i>NRG3</i>	Mutations associated with schizophrenia
<i>CADPS2/AUTS2</i>	Mutations implicated in autism
<i>RUNX2 (CBRA1)</i>	Causes cleidocranial dysplasia, characterized by delayed closure of cranial sutures, malformed clavicles, bell-shaped rib cage, and dental abnormalities
<i>SPAG17</i>	Protein important for the beating of the sperm flagellum

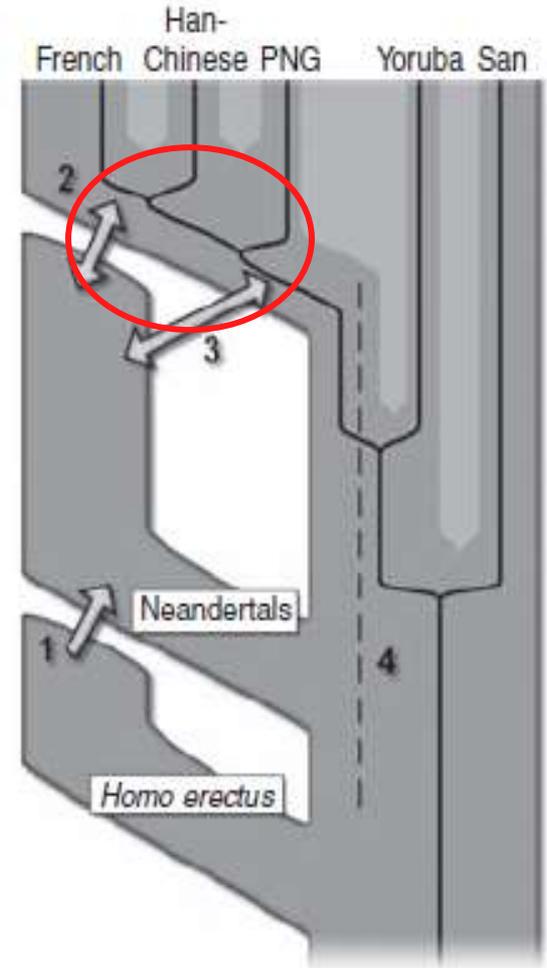


Fig. 6. Four possible scenarios of genetic mixture

The owner of the Oase 1 mandible (~40 ka Romania) had a very recent Neanderthal ancestor....

Genetic Analysis Detects Neanderthal Ancestor

[+ Share](#)

Wednesday, May 13, 2015



(Erik Trinkaus)

BOSTON, MASSACHUSETTS—Genetic testing of a 40,000-year-old mandible with modern human and Neanderthal traits has revealed that the Oase man's genome was between five and 11 percent Neanderthal, including large chunks of several chromosomes. Palaeogenomicist Qiaomei Fu of Harvard Medical School and her colleagues analyzed how lengths of DNA inherited from an ancestor shorten with each generation. They estimate that this individual's Neanderthal ancestor was introduced in the previous four to six

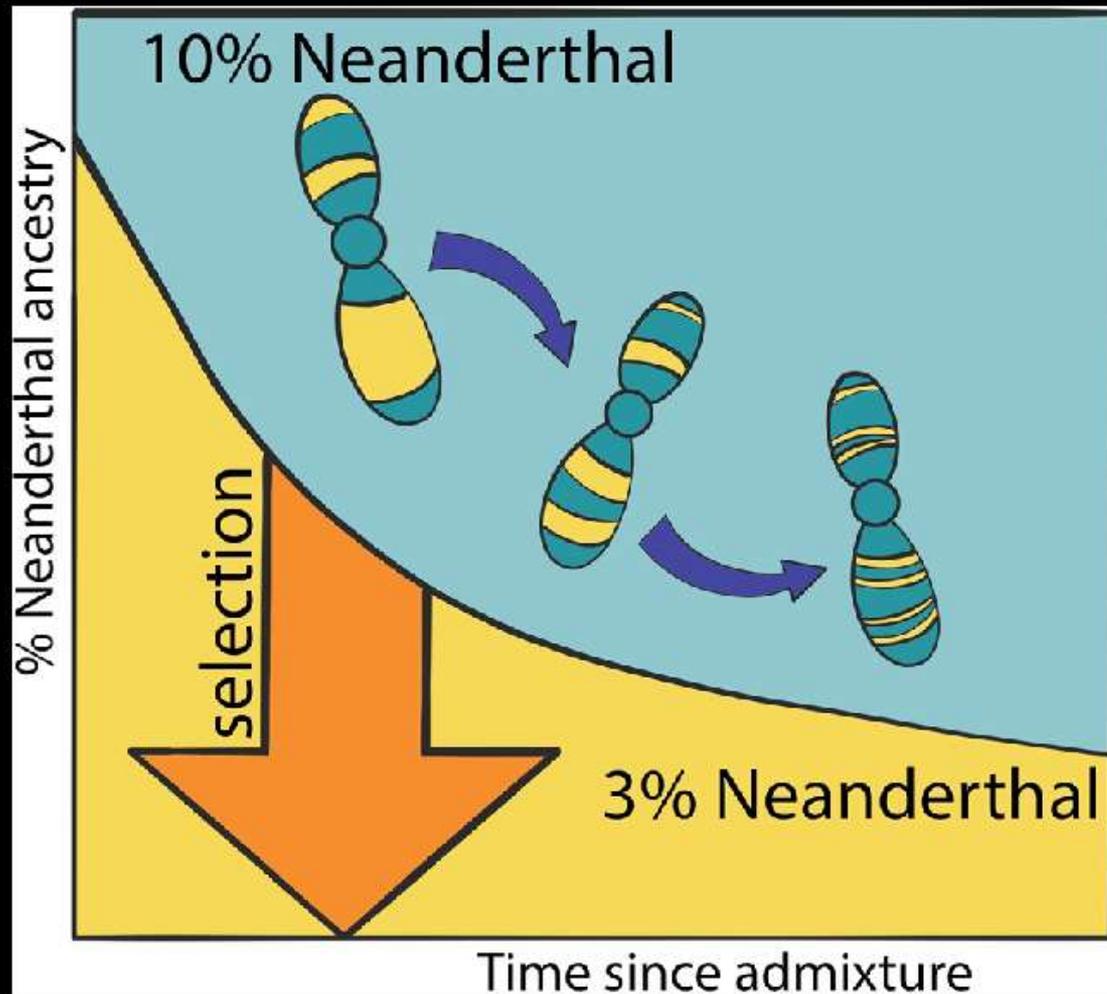
generations. The jawbone and one other human bone were discovered among bear remains in a Romanian

Neanderthal DNA is selected away...

Q&A: Where did the Neanderthals go?

Kelley Harris^{1*} and Rasmus Nielsen^{2,3*}

Fig. 1. The decline of Neanderthal DNA in humans due to selection. The curve shows the expected decline in the proportion of Neanderthal DNA in modern humans due to natural selection based on the simulations in Harris and Nielsen [6]. The chromosomes depicted also illustrate the fact that not only is the Neanderthal DNA proportion decreasing through time, it is also distributed in smaller and smaller segments due to the effect of recombination



The introgressed variants remaining in modern Europeans are depleted of heritability for most traits.

However, we discover that they are enriched for heritability of several traits with potential relevance to human adaptation to non-African environments, including hair and skin traits, autoimmunity, chronotype, bone density, lung capacity, and menopause age.

Quantifying the contribution of Neanderthal introgression to the heritability of complex traits

Evonne McArthur, David Rinker, John A. Capra

COMMENT

NATURAL HISTORY Edward Lear's forgotten work on ornithology p.28

EARTH SCIENCE How rocks and life evolved together on our planet p.38

MUSIC Philip Glass on Einstein and the unpredictability of opera composition p.48

EMPLOYMENT The skills gained in PhD training make it worth the money p.48



What makes a modern human

We probably all carry genes from archaic species such as Neanderthals. Chris Stringer explains why the DNA we have in common is more important than any differences.

So we (*Homo sapiens*) are not more or less 100% Recent African Origin, as I would have said 15 years ago....

Our DNA shows that we are >90% Recent African Origin

So we are 'Mostly Out of Africa'

3 MAY 2012 | VOL 485 | NATURE

PATCHWORK PLANET

Most people's genomes contain remnants of archaic DNA from ancient interbreeding³⁻⁶.



Sub-Saharan Africa



Eurasia and Americas



Australia and New Guinea

Genes*

- African
- Unknown archaic African source
- Neanderthal
- Denisovan

*Figures are approximate, and for Africa, based on limited data⁶.

Neanderthals



Denisovans



Homo sapiens



Homo floresiensis



Homo luzonensis

Why were we the only kind of human left by ~30,000 years ago?

End of Neanderthals linked to flip of Earth's magnetic poles, study suggests

Event 42,000 years ago combined with fall in solar activity potentially cataclysmic, researchers say

Nicola Davis *Science correspondent*

🐦 @NicolaKSDavis

Thu 18 Feb 2021 19:00 GMT



3,739



▲ When the poles switch, Earth's magnetic field weakens dramatically, exposing the planet to cosmic radiation. Photograph: Elen11/Getty Images/iStockphoto

The flipping of the Earth's magnetic poles together with a drop in solar activity 42,000 years ago could have generated an apocalyptic environment that may have played a role in a major events ranging from the extinction of megafauna to the end of the **Neanderthals**, researchers say.

The secret(s) of our success?

Homo sapiens WERE to blame for Neanderthal extinction because they were better hunters and out-competed them for food, computer model shows

- Experts have long been divided on the reason for the extinction of Neanderthals
- They lived in Eurasia for 300,000 years and went extinct 40,000 years ago
- This coincided with the introduction of Homo sapiens into their territory
- Supercomputer has found the most likely cause of Neanderthal extinction is that Homo sapiens were better hunters and out-competed them for food

SHARP EXIT Humans replaced Neanderthals because we had bows and arrows and they didn't, study suggests

Sun Reporter
2 Oct 2019, 224 | Updated: 2 Oct 2019, 231



3 COMMENTS

PRIMITIVE cavemen may have been wiped out by man's early ancestors armed with bows and arrows, a study suggests.

Scientists in Italy have found evidence that early homo sapiens were using spears, arrows and darts at least 40,000 years ago – 20,000 years earlier than previously thought.

A new theory claims Homo sapiens beat out Neanderthals because of art

By [Liam B. Reilly](#)



When considering what humans need to survive, art doesn't seem high on the list. A hunter-gatherer will pick a wolfpack over a painting, so. But there was a time when our ancestors worried over something linked with their ability to create images. Prehistoric cave art depicts modern human hunters who the latest technology can

Science News

from research organizations

Homo sapiens developed a new ecological niche that separated it from other hominins

Date: July 30, 2018

Source: Max Planck Institute for the Science of Human History

Summary: A new study argues that the greatest defining feature of our species is not 'symbolism' or dramatic cognitive change but rather its unique ecological position as a global 'generalist specialist'.

Humans owe our evolutionary success to friendship

Cooperation is the key to long-term survival.

Brian Hare and Vanessa Woods | July 21, 2020



Our ability to share each other's emotions could be the quality that has kept humans alive for so long. Photo by Chaitin Lopez on Unsplash

Excerpted from ***SURVIVAL OF THE FRIENDLIEST*** by Brian Hare and Vanessa Woods

As humans became friendlier, we were able to make the shift from living in small bands of ten to fifteen individuals to living in larger groups of a hundred or more. Even without larger brains, our larger, better-coordinated groups easily outcompeted other groups of humans. Our sensitivity to others allowed us to cooperate and communicate in increasingly complex ways that put our cultural abilities on a new trajectory. We could innovate and share those innovations more rapidly than anyone else.

Our success was down to a combination of factors?

In summary, we succeeded in colonising all parts of Asia and eliminating rival species such as Neandertals because we were more numerous, had a more diverse diet that increased the survival rates of mothers and infants, and combined a longer period of childhood development with a re-organised brain that was cognitively more powerful in inventive, imaginative and ingenious at colonising new environments.

Robin Dennell

JQS

Journal of Quaternary Science

QRA
Quaternary Research Association

State of the Science

Aspects of human physical and behavioural evolution during the last 1 million years

JULIA GALWAY-WITHAM,¹ JAMES COLE² and CHRIS STRINGER¹

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Review

Origins of modern human ancestry

<https://doi.org/10.1038/s41586-021-03244-5>

Received: 8 July 2020

Accepted: 14 December 2020

Published online: 10 February 2021

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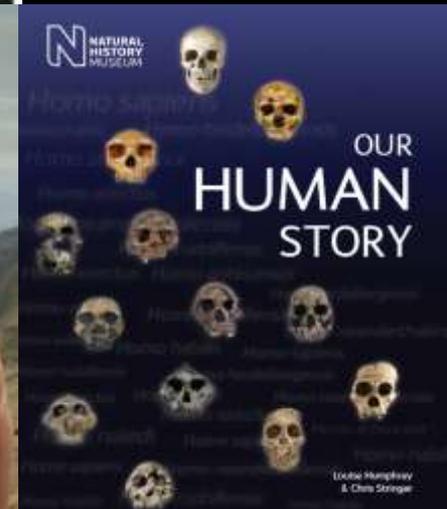
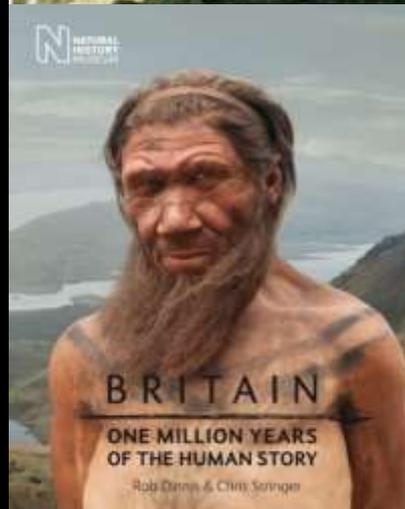
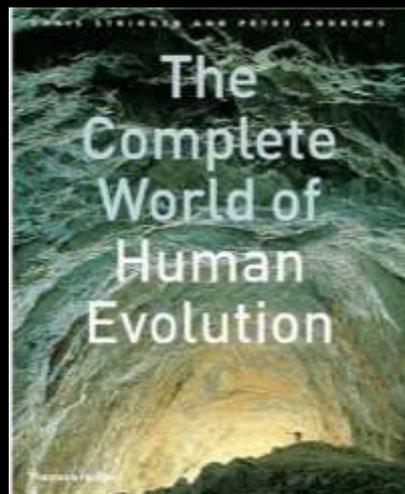
New finds in the palaeoanthropological and genomic records have changed our view of the origins of modern human ancestry. Here we review our current understanding

Thanks for listening and
thanks to the Natural History Museum London
The Calleva Foundation and Human Origins Research Fund
and all my sources of data and illustrations..

Centre for
Human
Evolution
Research
(NHM)



@ChrisStringer65



Adapted from P. Gunz, using about 1000 cranial landmarks and semi-landmarks

