



Genetic comparison of Human and Neanderthal mtDNA

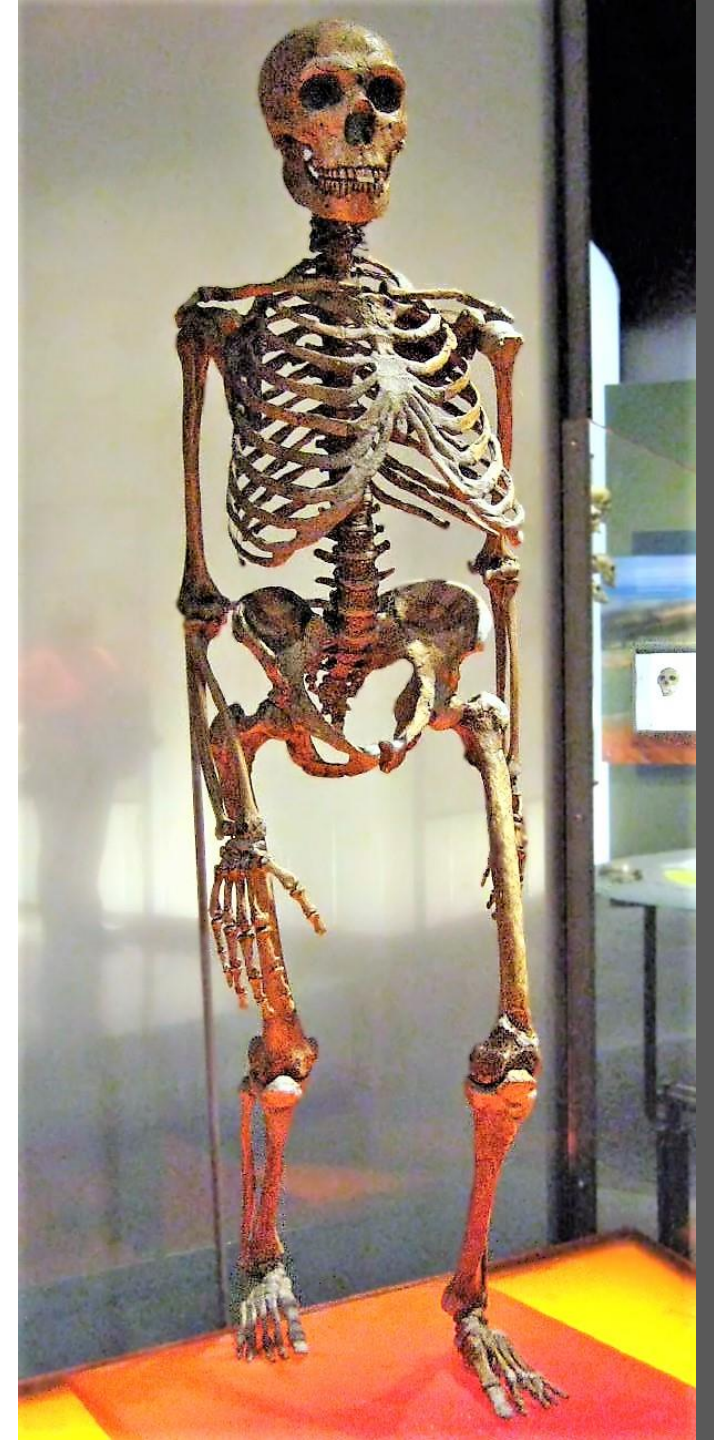
Stephan, Max, Laksan, Sebastian

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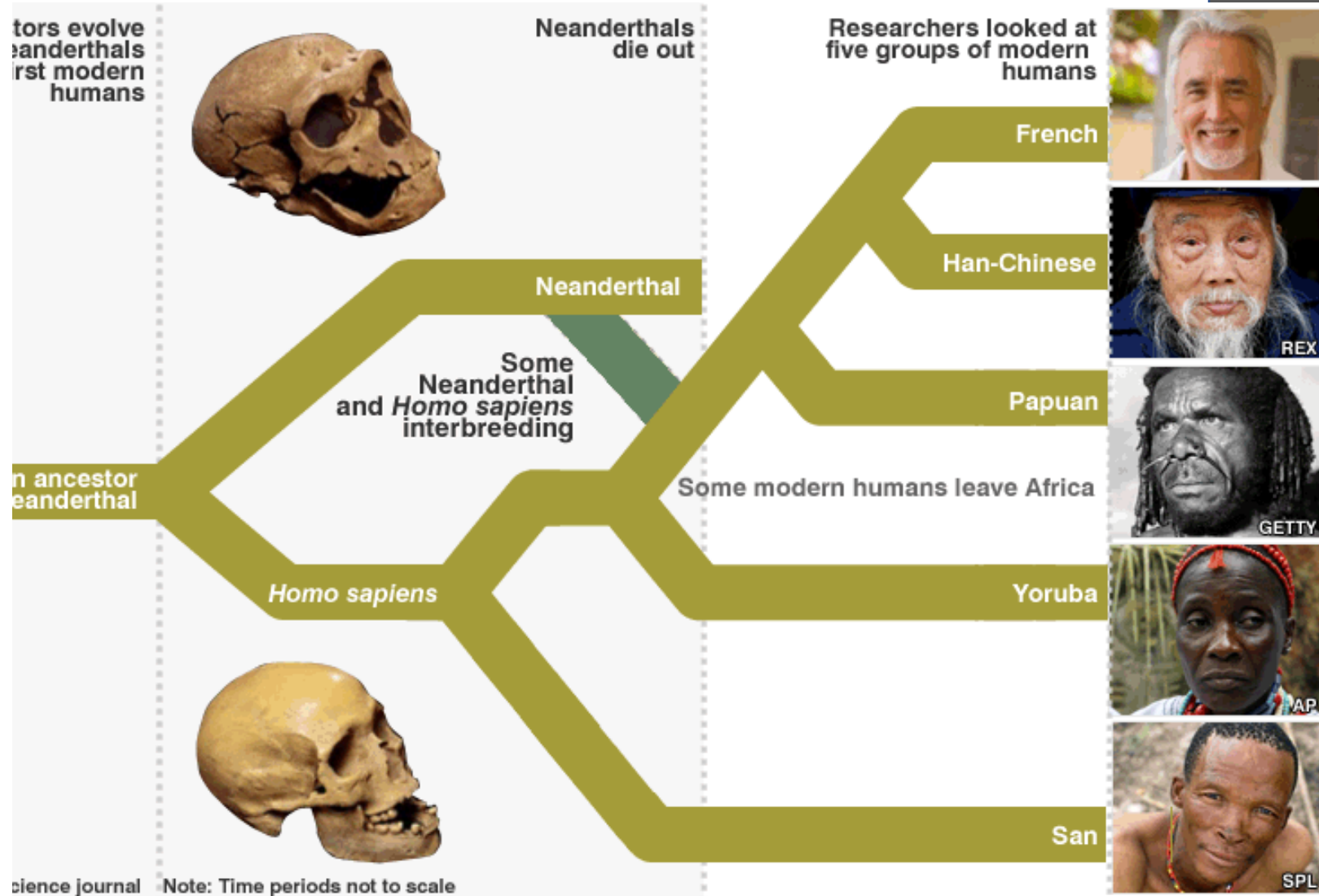
Neanderthals

- Lived side by side with *H. sapiens* (that's us)
- Latest common ancestor: *Homo erectus*
- Evolved in Eurasia about 600.000 years ago
- Extinction: 30.000 years ago
- Related to Humans?

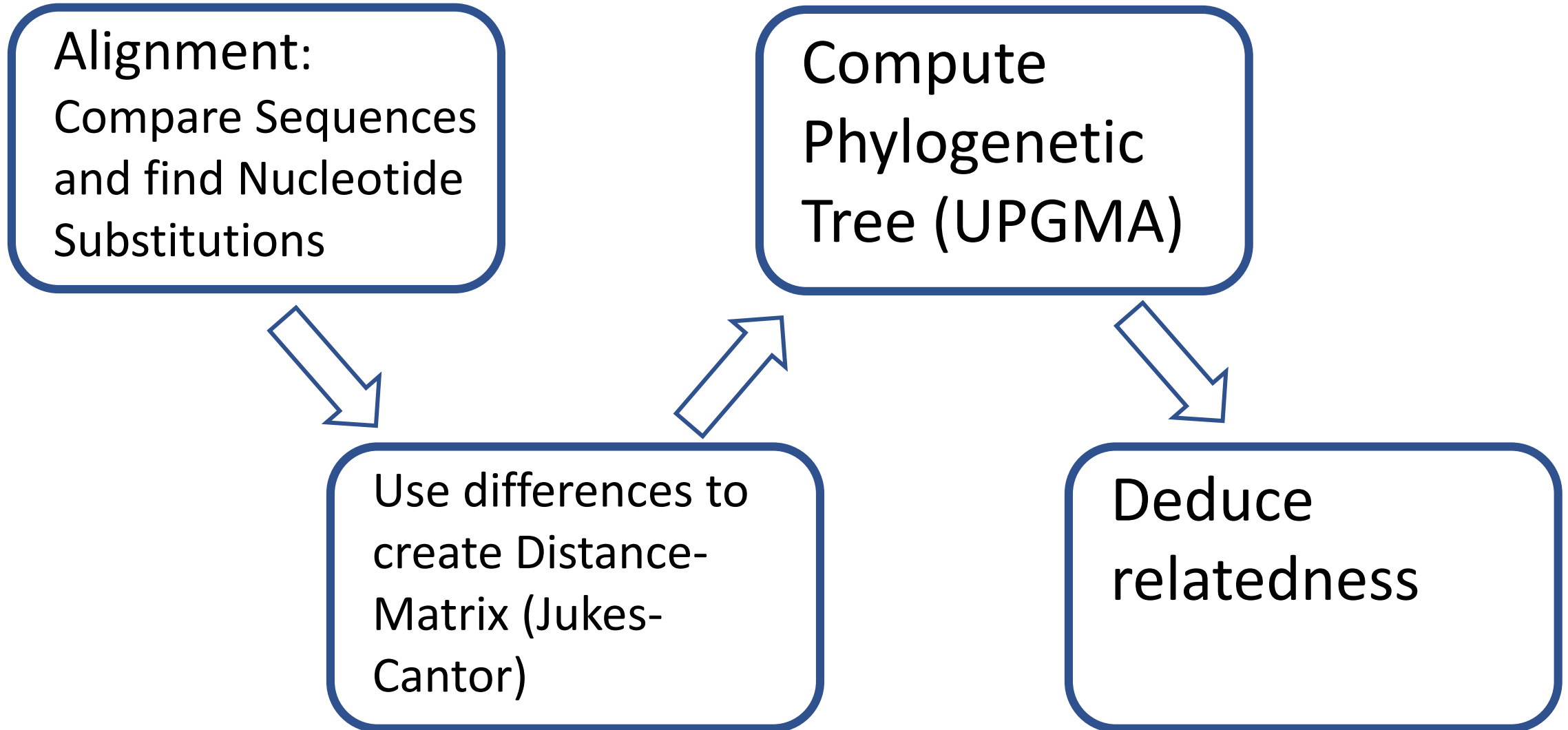


Neanderthals and Humans

- About 202 differences in mtDNA compared to humans
- Geneflow from Neanderthals to Humans
- Gene mixing estimated at 1.15% to 1.3% in autosomes



Genealogical DNA-Testing



Genetic Distances

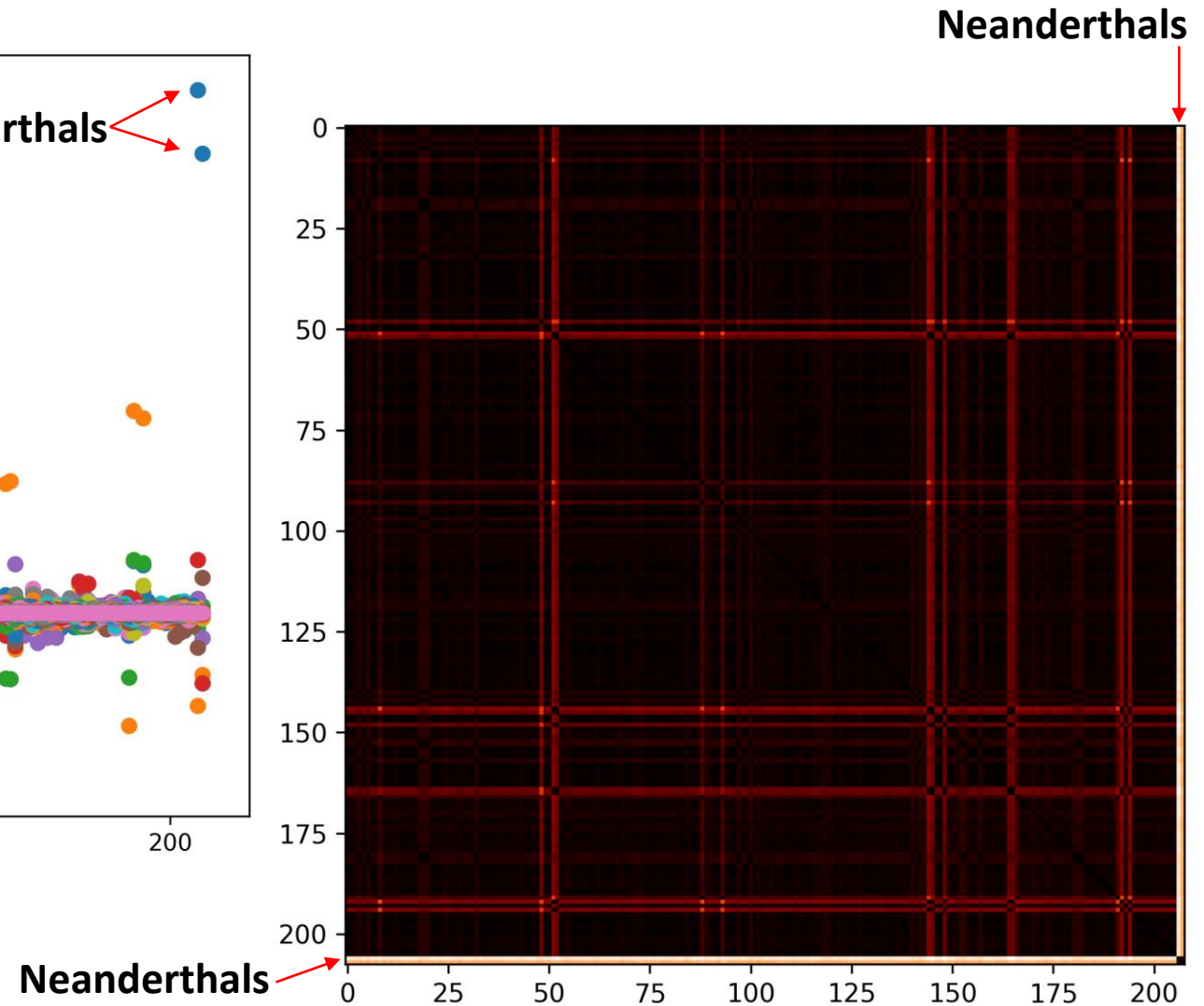
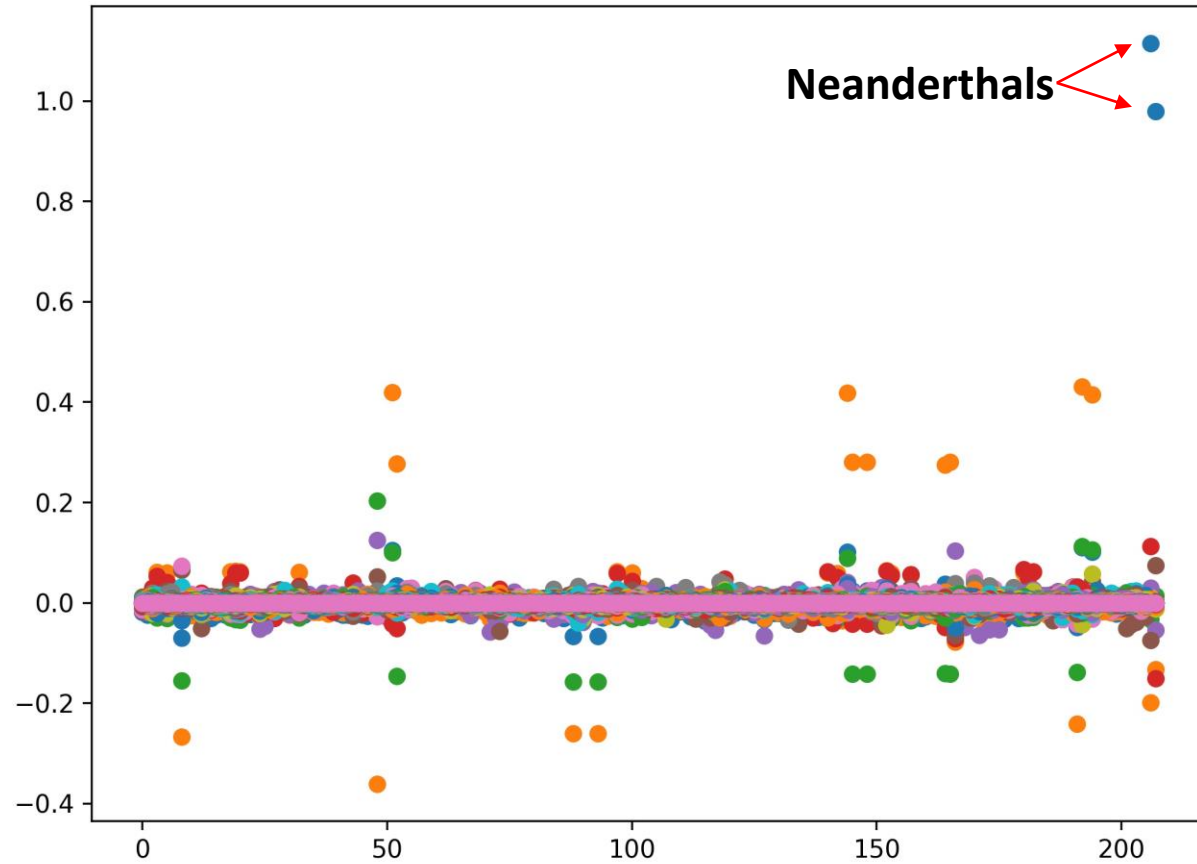
Calculated mean distances...

- among any two *H. sapiens*: **0.0890**
- between Neanderthal and any modern human: **1.0739**

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 [0.02601417 0.          0.07266085 ... 0.03478884 1.15120154 1.01045433]
 [0.06961516 0.07266085 0.          ... 0.07266085 1.12598908 0.99861976]
 ...
 [0.04374418 0.03478884 0.07266085 ... 0.          1.12598908 0.99861976]
 [1.15120154 1.15120154 1.12598908 ... 1.12598908 0.          0.13260893]
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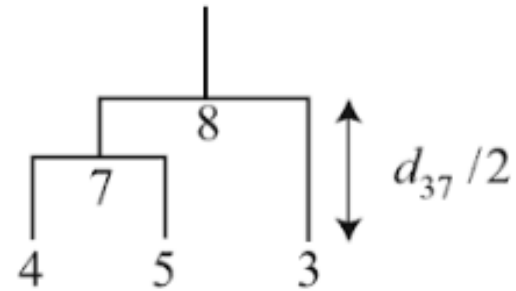
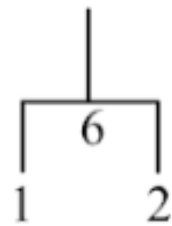
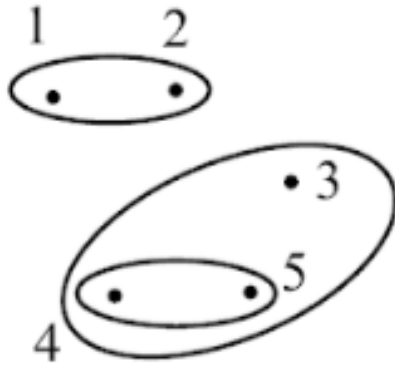
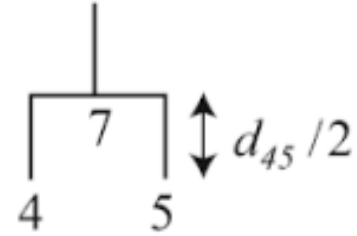
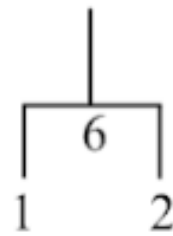
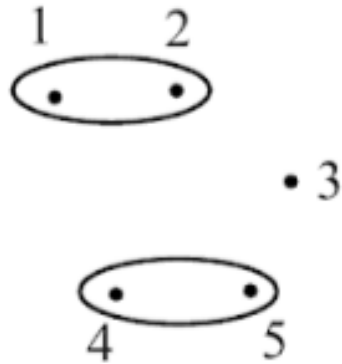
Experimental procedure

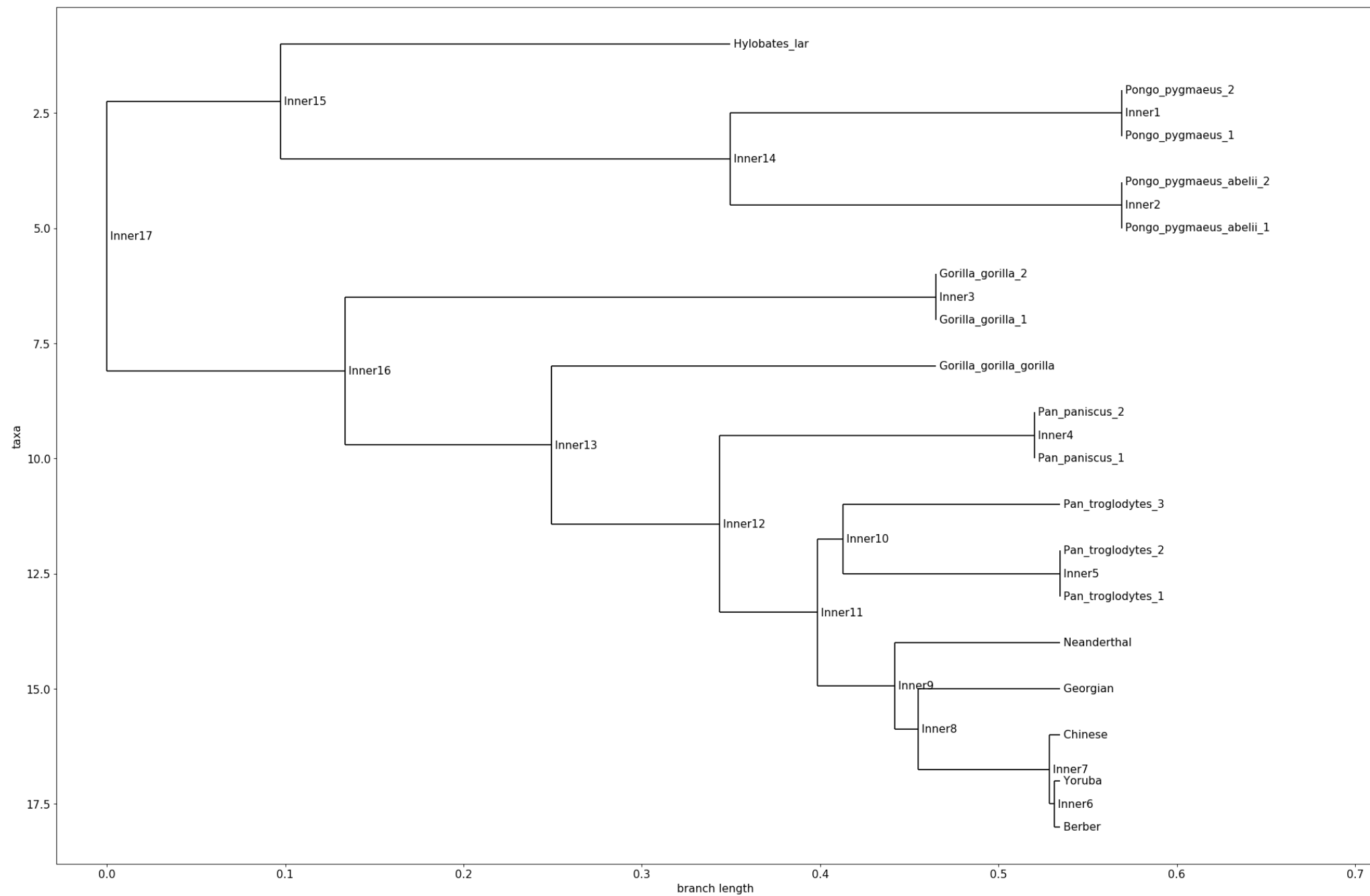
Genetic Distances

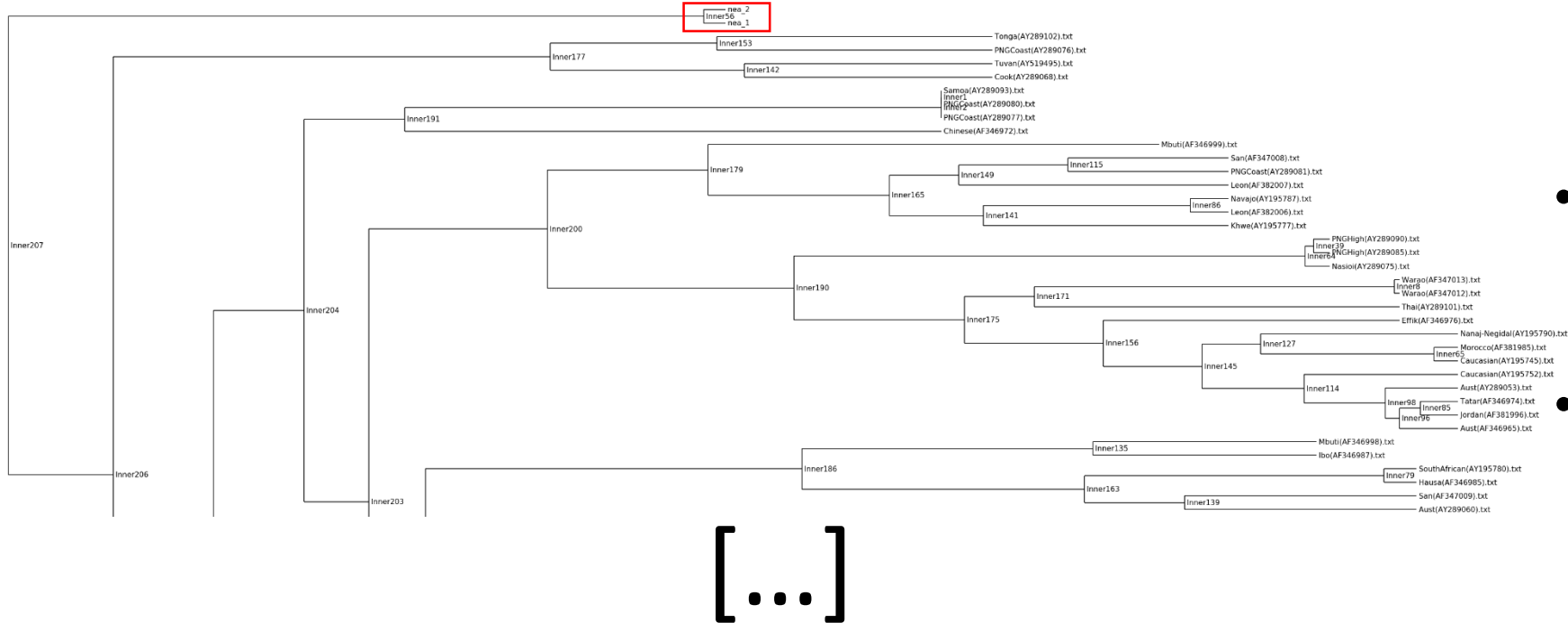


Experimental procedure

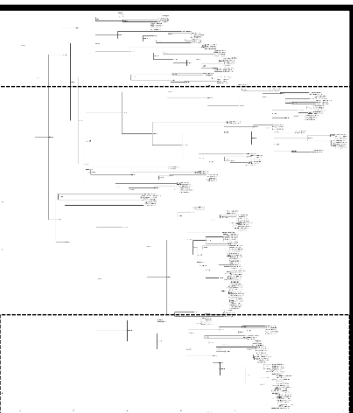
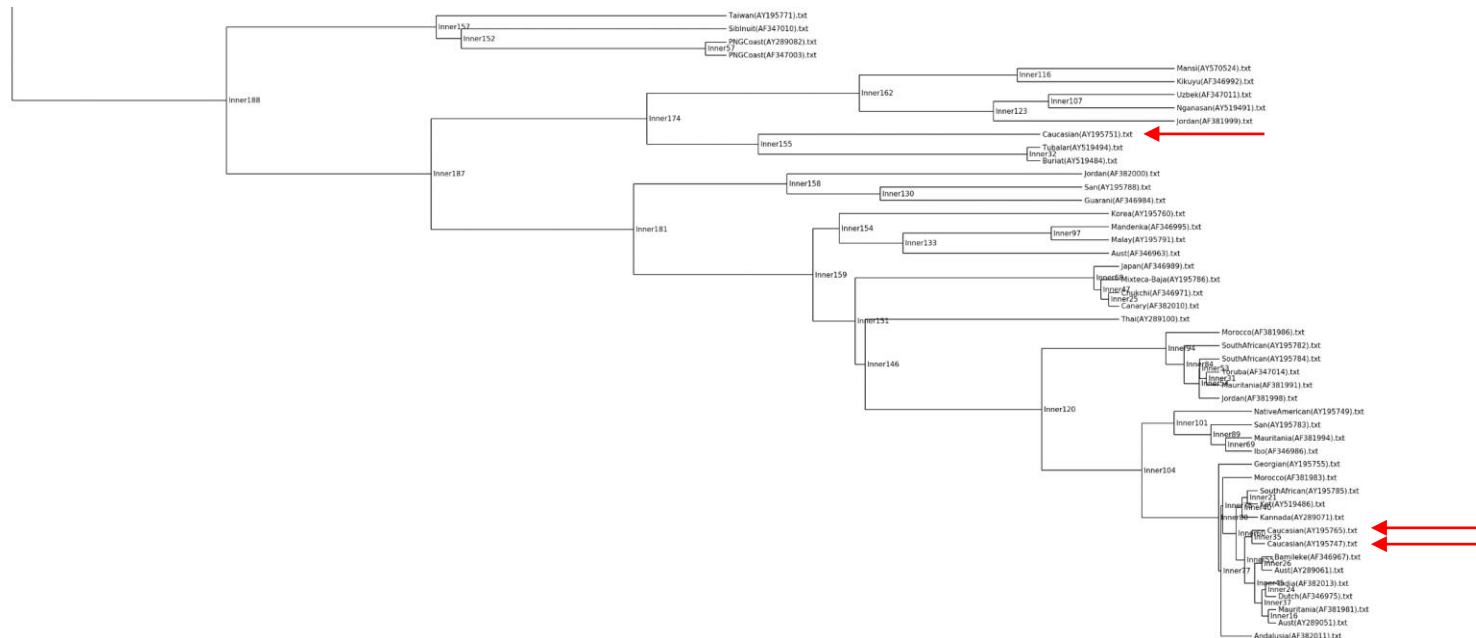
UPGMA







- Phylogenetic tree of 206 modern humans and 2 neanderthals
- neanderthals are genetically distant from modern humans



Conclusion

- **Neanderthal** closely related to **modern humans**, when compared to other primates
- The distance between **Neanderthals** and **Humans** show that they were two different species
- Our results don't show whether there was a geneflow between the two species
- The split-off of Georgians from the other human groups, indicates that there might be inaccurate measurements. This could potentially be fixed by using different distance matrices.

References

- Sriram Sankararaman et al.: The genomic landscape of Neanderthal ancestry in present-day humans. In: Nature. Band 507, 2014, S. 354–357, doi:10.1038/nature12961
- <https://www.ncbi.nlm.nih.gov/pubmed/20448178>
- https://www.eurekalert.org/pub_releases/2016-02/m-egf021616.php
- Richard E. Green et al.: A Complete Neandertal Mitochondrial Genome Sequence Determined by High-Throughput Sequencing
- <https://www.theverge.com/2017/10/9/16448412/neanderthal-stone-age-human-genes-dna-schizophrenia-cholesterol-hair-skin-loneliness>

Picture Courtesies

- title picture (skulls): hairymuseummat
<https://www.theverge.com/2017/10/9/16448412/neanderthal-stone-age-human-genes-dna-schizophrenia-cholesterol-hair-skin-loneliness>
- Neanderthal skeleton:
[Claire Houck](#) from New York City, USA - [Neanderthal Skeleton](#)
- geneflow picture:
http://news.bbc.co.uk/nol/shared/spl/hi/sci_nat/10/neanderthal/img/neanderthals_786.gif
- mtDNA Picture: [Emmanuel Douzery](#)