Methods

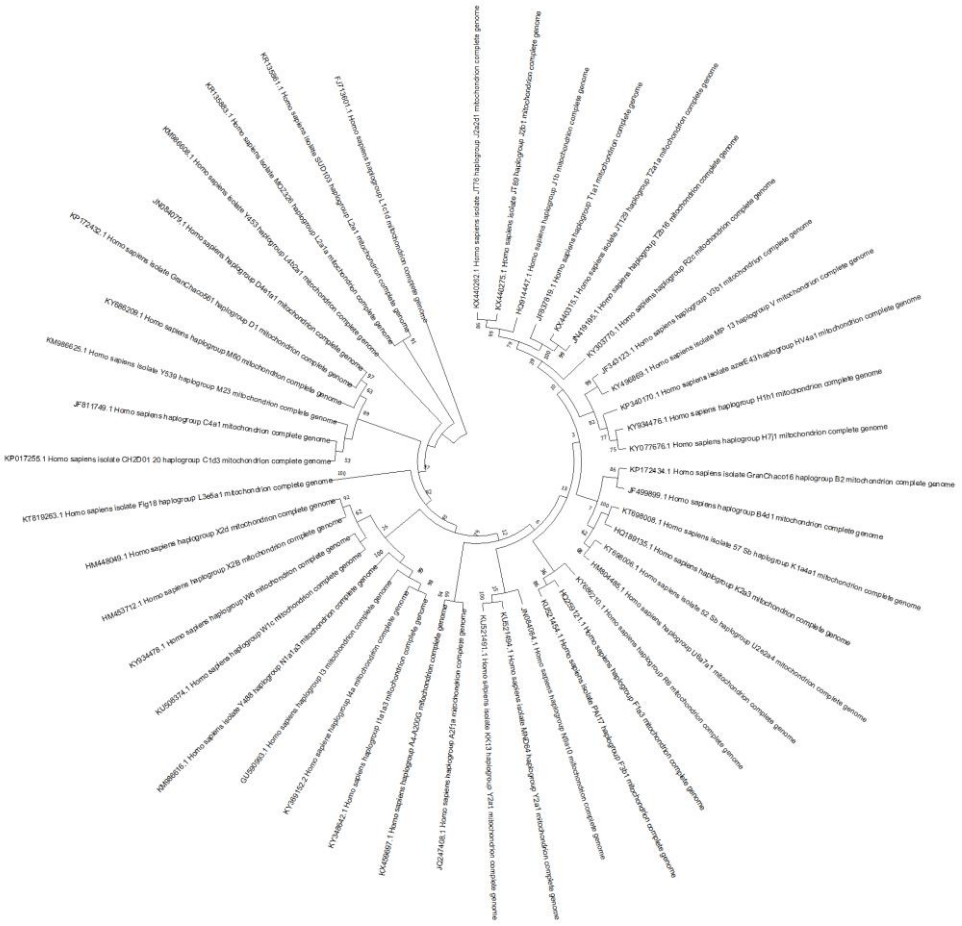
The following steps were performed during the analysis:

1) Mafft - multiple sequence alignment
2) MEGA - construction of phylogenetic tree using Neighbor Joining approach
3) MEGA - calculation of real pairwise distance
4) Nucleotide bp length – mean of length of 2 selected sequences
5) Age calculation:

$$\frac{number\ of\ differences}{mutation\ rate\ per\ nucleotide\ per\ year * mean\ sequence\ length}$$

6) Mutation rate was considered to be as much as $4^* 10^{-8}$ (based on mtDNA literature data obtained from trio sequencing (reference))

1. Mitochondrial Eve



In order to estimate the age of Mitochondrial Eve, max pairwise distance between samples was found.

Max difference corresponds to the following samples:

KX440262.1_Homo_sapiens_isolate_JT76_haplogroup_J2a2d1_mitochondrion_complete_genome

&

FJ713601.1_Homo_sapiens_haplogroup_L1c1d_mitochondrion_complete_genome

And equals to **95**

The age of Mitochondrial Eve:

(95/16567) /4 * 10^{-8} = **143,357**

2. Most recent ancestor of all non-Africans

In order to estimate the age of most recent ancestor of all non-Africans, we should find max distance for non-African populations.

It corresponds to these samples:

JQ247408.1_Homo_sapiens_haplogroup_A2f1a_mitochondrion_complete_genome (Nat American)

JF811749.1_Homo_sapiens_haplogroup_C4a1_mitochondrion_complete_genome (Turkish)

and equals to 58.

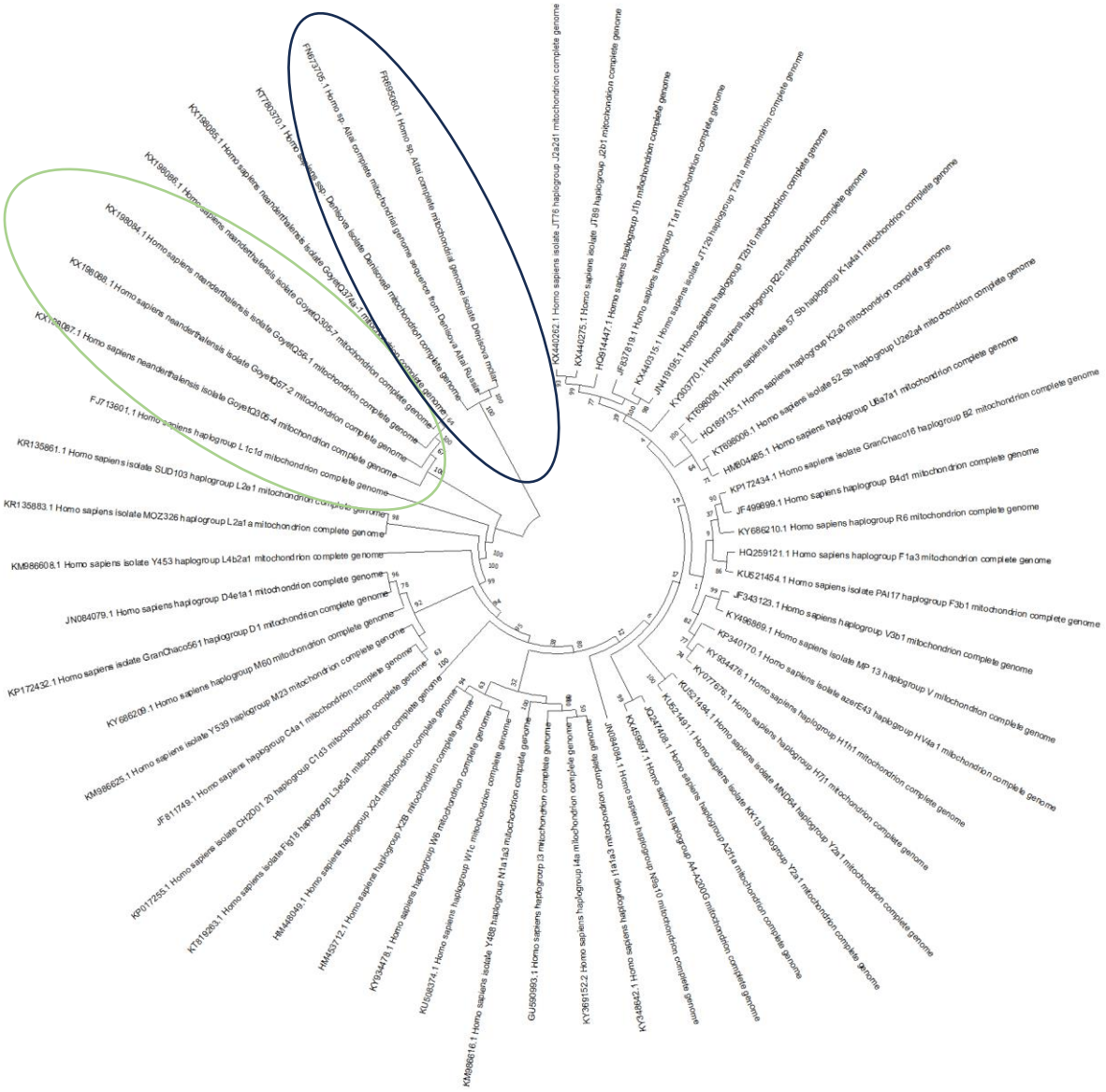
The age of most recent ancestor of all non-Africans:

(58/16569) /4 * 10^{-8} = **87,512**

3. Neanderthal and Denisovan samples

3.1 The most recent Denisova-modern human ancestor

Based on obtained tree topology, Denisovan (blue) and Neanderthal (green) samples comprise monophyletic groups.



Max difference between Denisova and modern human samples equals **401** and corresponds to the following samples:

FR695060.1_Homo_sp._Altai_complete_mitochondrial_genome_isolate_Denisova_molar

KR135861.1_Homo_sapiens_isolate_SUD103_haplogroup_L2e1_mitochondrion_complete_genome

The age of most recent ancestor of Denisovans and modern humans**:**

$401/(16570 * 4 * 10^{-8}) = 605{,}009$

4. The most recent Neanderthal-modern human ancestor

Max difference between Neanderthal and modern human samples equals **220** and corresponds to the following samples:

KX440262.1_Homo_sapiens_isolate_JT76_haplogroup_J2a2d1_mitochondrion_complete_genome

KX198086.1_Homo_sapiens_neanderthalensis_isolate_GoyetQ305-7_mitochondrion_complete_genome

The age of most recent ancestor of Neanderthals and modern humans**:**

220/(16565 * 4 * 10^{-8}) = 332,025

5. Pan mtDNA tree topology

Based on obtained tree, tree topology has not changed as Pan mtDNA samples comprise separate branch.