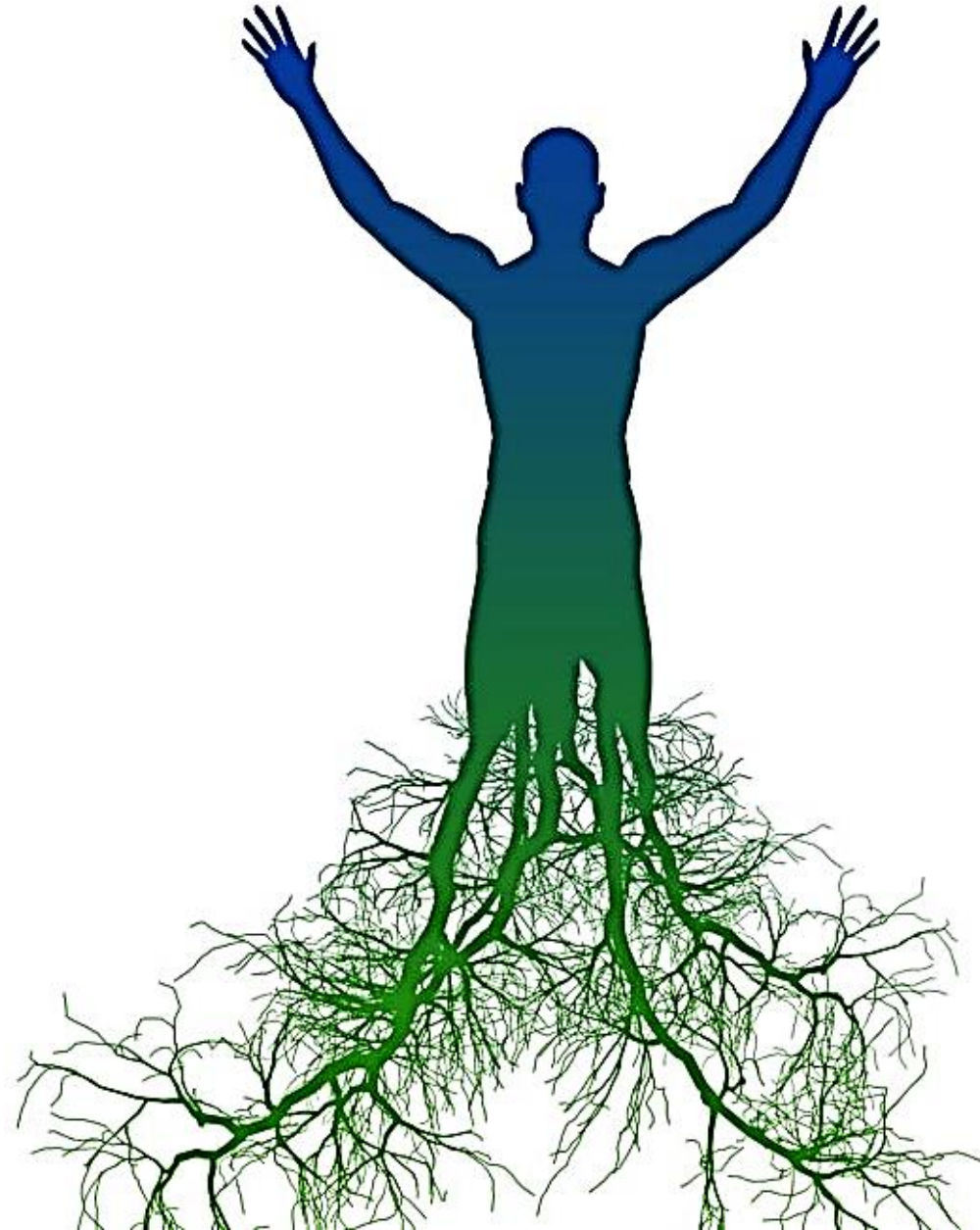


DNA informs about
Migrations and the spread of languages
Genetic origins of ethnic groups
Population bottlenecks

Multiple species existed in the same time same time and place.

**Some takeaways, all of which deduced
from genetic analysis . . .**



➤ In Africa: Homo Sapiens lived in isolated groups which on occasion (every-few-generations to thousand-of-years) connect with one another, only to then return to isolation

There are some questions which relate to our species...

1. Who were our direct evolutionary ancestor? (Many paleoanthropologists think Homo Heidelbergensis). Homo antecessor was closely related to the last common ancestor of Homo Sapiens, Neanderthals and Denisovans.
2. How common was interbreeding between Homo sapiens and our now-extinct relatives, including Neanderthals?
3. What does the future hold for our species in an evolutionary sense?
(*Certainly, we are not done evolving*)

➤ Neanderthal DNA is found in humans, but not on the mtDNA line.
↳ Meaning – for all girls today – when you trace back their continuous maternal line there is no Neanderthal matriarch whose direct line survived to the present day.

➤ The book makes clear how a population might occupy a land, die off for whatever reason, and then hundreds or thousands of years later a replacement population would migrate into the void.

➤ Contributions to modern humans...

- ↳ Neanderthal – genes help immune system; protection against food scarcity (NOTE diabetes), lower risk of some cancers
- ↳ Denisovan – genes to help breathing at higher elevation, “medically relevant” immune response (in one peoples, the gene inhibits starch digestion)

- People outside of Africa possess an average of 2% of their genome being Neanderthal in origin, and no single person has more than 4% genetic inheritance from Neanderthals.
- ↳ However, we did not inherit the same amount in the same place.
- ↳ As much as 40% of the Neanderthal DNA persists in homo sapiens. And while some areas of our genome have no such genetic inheritance, other areas are up to 50% from Neanderthals!
- ↳ Denisovan dna has been found in highlands of Asia and on one the islands of Asia. The islands have two distinct Denisovan Haplogroups, which arrived there thousands (350,000 years) of years apart.

➤ “Because of their population bottlenecks, rare disease-causing mutations that happened to have been carried in the founder individuals have dramatically increased in frequency.”

➤ “Seven “ghost populations” have been identified

↳ That is, genetically distinct populations for which we have not yet found any evidence of their physical remains yet which have clearly contributed genetic material to the genomes studied.

➤ “The extraordinary fact that emerges from ancient DNA is that just five thousand years ago, the people who are now the primary ancestors of all existing northern Europeans had not yet arrived.”

➤ “The separation between the Neanderthal and Denisovan ancestral population occurred 470,000 to 380,000 years ago, and the separation between the common ancestral populations of both of these archaic groups and modern humans would have occurred 770,000 to 550,000 years ago.”

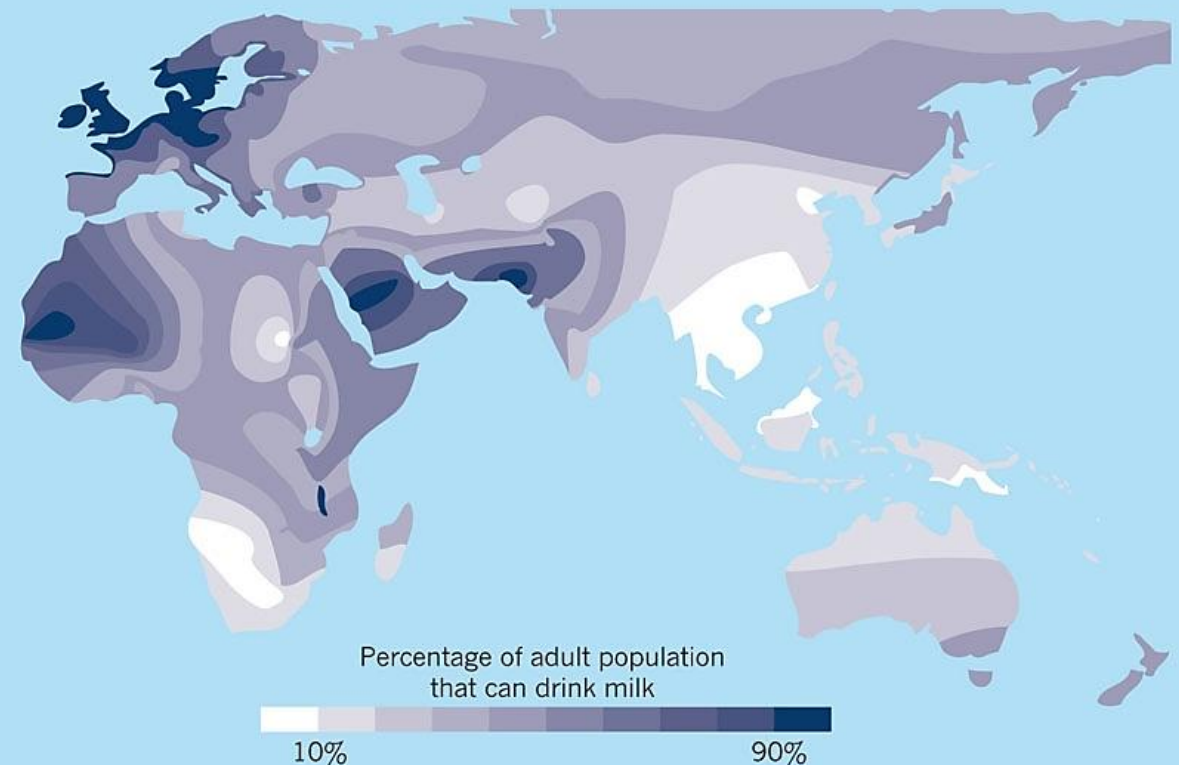
➤ “Around 39,000 years ago, a super-volcano near Naples in Italy erupted
↳ Almost no Neanderthal remains or tools are found above this layer [of ash] suggesting that the climate disruption produced by the volcano, which could have produced multi-year winters, may have compounded competition with modern humans to create a crisis that drove Neanderthals to extinction. . . . Modern human archaeological cultures that left remains below the ash layer left none above it.”

➤ About 7,500 years ago, a single mutation in a single person enabled people to tolerate lactose (the sugar in milk). Only 35% of the human population can digest lactose beyond age 8. This mutation would have occurred in the broad, fertile plains between central Europe and the Balkans.

↳ It was an evolutionary event preceded by several centuries of adaptation: 11,000 years ago, cattle herders learned how to reduce lactose in dairy products to tolerable levels by fermenting milk to make cheese or yogurt. The mutation which arrived 7,500 years ago is prompted by this dietary change.

LACTASE HOTSPOTS

Only one-third of people produce the lactase enzyme during adulthood, which enables them to drink milk.



➤ There is a high percentage of common ancestry in members of the Ashkenazi population, high enough to suggest a genetic bottleneck event occurring about 100 generations ago (2,000 to 2,500 years ago).

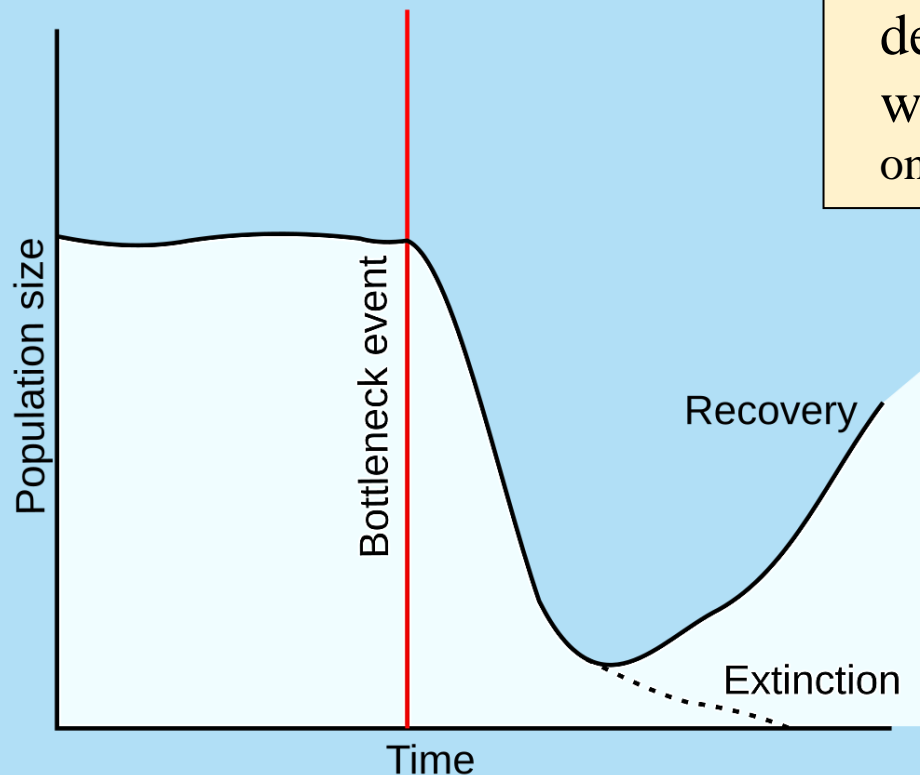
↳ Genetic evidence also suggests there was a severe bottleneck in the Medieval era (700 years ago), where only 350 peoples were the forebearers of the genetics which survive to the modern day.

Why a concern?

↳ Population bottlenecks decrease genetic diversity and increase incidents of recessive heredity disease

↳ Many Native American populations and ethnic Ashkenazi Jews were among these groups.

➤ All people of Ashkenazi ancestry alive today descend today from one of four Jewish women (they were not the only women alive then, but only their lines survived to the modern age).



➤ Example: a human species bottleneck occurred about 930,000-813,000 years ago, and lasted for about 117,000 years. During this time, there were just about 1280 breeding individuals.

↳ Why? Africa's climate got colder and wetter