



Nobel Prize in Medicine 2022

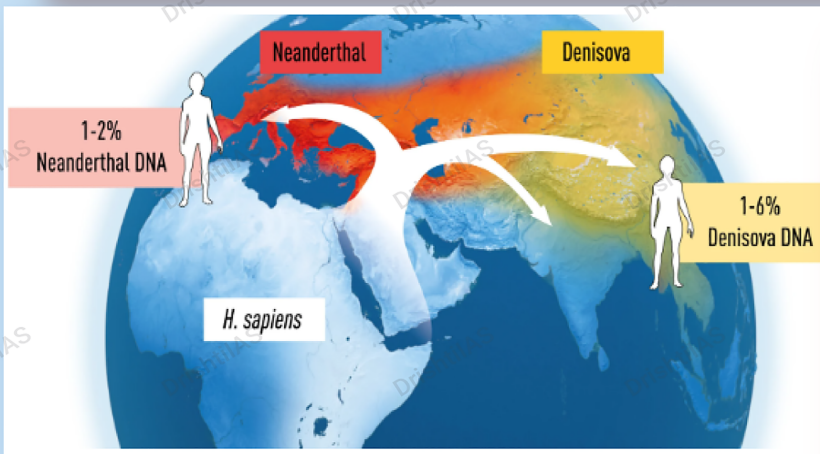
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Nobel Prize in Physiology or Medicine 2022

Winner: Svante Pääbo

About

- Swedish geneticist **Svante Pääbo** for his **research in the field of genomes of extinct hominins and human evolution.**
- His research led to the rise of **new field of paleogenomics**, the branch of science based on the reconstruction and analysis of genomic information in extinct species.



Novel Methodology

- It is **not easy to amplify and sequence ancient DNA** because it is highly fragmented and full of contamination from microbes like fungi and bacteria. Over time, DNA tends to degrade and become chemically modified.
- Therefore, **Pääbo decided to study mitochondrial DNA from Neanderthals.**
 - Mitochondria, popularly called the powerhouse of the cell, is an organelle inside the cell that has its own DNA.
 - Although the mitochondrial genome is small and only contains a fraction of genetic information in the cell, it is present in thousands of copies. This increases the chance of its successful sequencing.

Findings of Research

- **Sequencing an entire Neanderthal genome** to reveal the link between extinct people and modern humans.
 - Neanderthal is an ancient group of humans.
- **Discovery of a previously unknown human species called the Denisovans**, from a 40,000-year-old fragment of a finger bone discovered in Siberia.
 - Hominins, of which only one species—**Homo sapiens**—**currently exists**, are members of the family **Hominidae.**
- **In the past, Homo sapiens had encountered and interbred with Neanderthals and Denisovans.**
 - Neanderthals lived in western Eurasia, whereas Denisovans populated the eastern parts of the continent.
- **Gene transfer had occurred** from these now extinct hominins to Homo sapiens following the migration out of Africa around 70,000 years ago.
 - For instance, the **Denisovan version of the gene EPAS1 confers an advantage for survival at high altitude and is common among present-day Tibetans.**
 - Other examples are **Neanderthal genes that affect our immune response** to different types of infections.
- Pääbo's discoveries have generated **new understanding of human evolutionary history.**



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