

# The Genetic Legacy of Neanderthals in the Human Nose

### Why in News?

Recent research conducted by a team of scientists from the University College London and Fudan University, in collaboration with researchers worldwide, has shed light on the <u>genetic</u> factors influencing the human nose.

 The study identified genetic loci associated with the nose, including one locus influenced by Neanderthal ancestry.

#### What are the Key Highlights of the Reasearch?

- The Genetic Study:
  - The study analyzed 2D images and measured distances between facial landmarks in over 6,000 Latin American individuals.
  - The research identified 42 new genetic loci associated with the nose, with 26 of them being replicated in diverse populations including Asians, Europeans, and Africans.
    - A 'locus', plural **'loci', is the position of a particular gene** on the human chromosome.
  - One specific locus, 1q32.3, previously linked to Neanderthal genetic contributions, was found to influence midface height.
    - The 1q32.3 locus contains the gene ATF3 (activating transcription factor 3), which is regulated by the forkhead box L2 (FOXL2) gene involved in skull and facial development.
- The Legacy of Neanderthals:
  - Genetic evidence suggests that **Neanderthals and early humans interbred**, leading to the **introgression of Neanderthal genomic sequences** into the **human population**.
  - The influential work of evolutionary geneticist <u>Svante Pääbo, who won the Nobel Prize</u> <u>for Physiology</u> and Medicine in 2022, has provided key insights into the interbreeding events between archaic hominids, such as <u>Neanderthals</u> and <u>Denisovans</u>, and modern humans.
    - This interbreeding has left lasting genetic imprints on our species, affecting various traits and disease susceptibilities.
    - Non-African populations today carry about 1-2% of Neanderthal DNA, highlighting the genetic legacy of this interbreeding event.
  - Apart from nose shape, Neanderthal genetic contributions have been implicated in the way humans respond to <u>pathogens</u> and their susceptibility to certain skin and blood conditions, cancers, and even depression.
  - The study highlights the growing body of evidence indicating **the profound impact of Neanderthal and Denisovan genomes** on modern human biology and health.



- The Future of Genomic Research:
  - The investigation of interbreeding events and their consequences represents an **exciting** frontier in genomic research.
  - As more studies contribute to **our understanding of the interplay between archaic and modern human genomes,** we will gain a more comprehensive picture of our genetic heritage.
  - This knowledge has **the potential to revolutionize the study of diseases** and enhance our appreciation for the intricate tapestry of human genetic diversity.

## Who are Neanderthals?

- About:
  - Neanderthals lived in **Eurasia** from approximately 400,000 to 40,000 years ago.
  - They were a species of archaic humans closely related to modern humans, sharing a common ancestor.
- Physical Characteristics:
  - Neanderthals had a robust build and a stocky physique, adapted for survival in colder environments.
  - They possessed distinct physical features, including:
    - Prominent brow ridge.
    - Large nose.
    - Receding chin.
- Skills and Tools:
  - Neanderthals were skilled hunters and toolmakers.
  - They utilized stone tools and weapons for various purposes, reflecting their adaptability and resourcefulness.
- Cultural Sophistication:
  - Neanderthals had a sophisticated culture, as evidenced by:
    - Symbolic behavior, such as cave paintings and personal ornaments
    - Burial rituals, indicating an awareness of death and possibly spiritual beliefs.
      - Artistic expressions, showcasing their creativity and cognitive abilities.



#### Source: TH

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