

1 **Swarthy, blue-eyed caveman with strong immune system revealed using ancient DNA**

2 DNA taken from the wisdom tooth of a European hunter-gatherer has given scientists an **unprecedented** glimpse of
3 modern humans before the rise of farming. The **invention** of farming brought humans and animals into much closer
4 contact, and humans likely **evolved** more robust immune systems to fend off infections that the animals passed on.
5 But scientists may have **over-estimated** the **impact** farming had in shaping the human immune system, because tests
6 on the hunter-gatherer's DNA found that he already carried mutations that **boost** the immune system to tackle **various**
7 nasty bugs. Some live on in modern Europeans today.

8 The Spanish team started their work after a group of cavers stumbled upon two skeletons in a deep and **complex** cave
9 system high up in the Cantabrian Mountains of northwest Spain in 2006. The human remains, which belonged to two
10 men in their early 30s, had been extremely well preserved by the cool **environment** of the cave. Carbon dating put
11 the remains at around 7,000 years old, before farming had swept into Europe from the Middle East. The timing fitted
12 with ancient artefacts found at the **site**, including perforated reindeer teeth that were strung and hung from the
13 people's clothing. The scientists **focused** their efforts on the better preserved of the two skeletons. After several failed
14 attempts, they **managed to reconstruct** the man's entire genome from DNA found in the root of a third molar. It is
15 the first time **researchers** have **obtained** the **complete** genome of a modern European who lived before the Neolithic
16 revolution.

17 The DNA threw up a **series** of surprises. When project leader Carles Lalueza-Fox looked at the genome, he found
18 that rather than having light skin, the man had gene **variants** that **tend to** produce much darker skin. Another surprise
19 finding was that the man had blue eyes. That was unexpected, said Lalueza-Fox, because the mutation for blue eyes
20 was thought to have **arisen** more recently than the mutations that **cause** lighter skin colour. The results suggest that
21 blue eye colour came first in Europe, with the **transition** to lighter skin ongoing through Mesolithic times. On top of
22 the scientific **impact**, artists might have to rethink their drawings of the people. "You see a lot of reconstructions of
23 these people hunting and gathering and they look like modern Europeans with light skin. You never see a
24 reconstruction of a mesolithic hunter-gatherer with dark skin and blue eye colour," Lalueza-Fox said. The Spanish
25 team went on to **compare** the genome of the hunter-gatherer to those of modern Europeans from different **regions** to
26 see how they might be related. They found that the ancient DNA most **closely matched** the genetic **makeup** of
27 people living in northern Europe, **in particular** Sweden and Finland.

28 The **discovery** of mutations that bolstered the immune system against bacteria and viruses suggests that the **shift** to a
29 farming culture in Neolithic times did not drive all of the changes in immunity genes that Europeans carry today. At
30 least some of those genetic changes have a history that stretches further back. "One thing we don't know is what sort
31 of pathogens were **affecting** these people," said Lalueza-Fox. Martin Jones, professor of archaeological science at
32 Cambridge University, said the immunity genes were the most striking **result**. "There is a no doubt oversimplified
33 grand narrative that the move from a hunter-gatherer lifestyle to settled farming was **initially** bad for our health. A
34 number of **factors** contributed, **particularly** living closely together with other humans and animals, shrinking the
35 food web, and crowding-out water supplies. The authors are drawing attention to the **role** of pathogens in pre-
36 agricultural lives, and that is interesting."

37 Adapted from: [The Guardian](#)

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