

More traits associated with your Neandertal DNA

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After humans and Neandertals met many thousands of years ago, the two species began interbreeding. Although Neandertals aren't around anymore, about two percent of the DNA in non-African people living today comes from them. Recent studies have shown that some of those Neandertal genes have contributed to human immunity and modern diseases. Now researchers reporting in the *American Journal of Human*

Genetics on October 5th have found that our Neandertal inheritance has contributed to other characteristics, too, including skin tone, hair color, sleep patterns, mood, and even a person's smoking status.

Inspired by an earlier study that found associations between Neandertal DNA and disease risk, Janet Kelso at the Max Planck Institute for Evolutionary Anthropology in Germany says her team was interested in exploring connections between Neandertal DNA and traits unrelated to disease. In other words, they wanted to uncover the "influence Neandertal DNA might be having on ordinary variation in people today."

Because Neandertal alleles are relatively rare, the researchers needed data representing a really large number of people. They found what they were looking for in data representing more than 112,000 participants in the UK Biobank pilot study. The Biobank includes genetic data along with information on many traits related to physical appearance, diet, sun exposure, behavior, and disease.

Earlier studies had suggested that human genes involved in [skin](#) and hair biology were strongly influenced by Neandertal DNA, Kelso says. But it hadn't been clear how.

"We can now show that it is skin [tone](#), and the ease with which one tans, as well as [hair color](#) that are affected," Kelso says.

The researchers observe multiple different Neandertal alleles contributing to skin and hair tones. What they found somewhat surprising is that some Neandertal alleles are associated with lighter skin tones and others with darker skin tones. The same was true for hair color.

"These findings suggest that Neandertals might have differed in their hair and skin tones, much as people now do" adds Michael Dannemann,

first author of the study.

Kelso notes that the traits influenced by Neandertal DNA, including skin and hair pigmentation, mood, and sleeping patterns are all linked to sunlight exposure. When [modern humans](#) arrived in Eurasia about 100,000 years ago, Neandertals had already lived there for thousands of years. They were likely well adapted to lower and more variable levels of ultraviolet radiation from the sun than the new human arrivals from Africa were accustomed to.

"Skin and [hair](#) color, circadian rhythms and mood are all influenced by light exposure," the researchers wrote. "We speculate that their identification in our analysis suggests that [sun exposure](#) may have shaped Neandertal phenotypes and that gene flow into modern humans continues to contribute to variation in these traits today."

Kelso and her colleagues say they'll continue to explore Neandertals' influence on modern-day traits as more data becomes available.

More information: *American Journal of Human Genetics*, Dannemann and Kelso, "The contribution of Neandertals to phenotypic variation in modern humans" [www.cell.com/ajhg/fulltext/S0002-9297\(17\)30379-8](http://www.cell.com/ajhg/fulltext/S0002-9297(17)30379-8) , DOI: [10.1016/j.ajhg.2017.09.010](https://doi.org/10.1016/j.ajhg.2017.09.010)

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