

Blonde hair evolved more than once

Golden locks of dark-skinned Melanesians have different genetic basis to those of Europeans.

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Does evolution have a soft spot for blondes? About 5–10% of people from Melanesia, a group of islands northeast of Australia, have naturally blonde hair — the highest prevalence outside Europe. Yet people from the region have the darkest skin pigmentation outside Africa.

Now, a study of people from the Solomon Islands in Melanesia shows that they evolved the striking blonde trait independently of people in Europe. This refutes the possibility that blonde hair was introduced by colonial Europeans, says Carlos Bustamante, a geneticist at Stanford University School of Medicine in Stanford, California, and a senior co-author on the study, which is published today in *Science*¹. "Blonde hair has clearly evolved twice," he says.

To investigate the genetic basis underlying the trait, Bustamante and his colleagues compared the genomes of 43 blonde and 42 dark-haired Solomon Islanders, and revealed that the islanders' blonde hair was strongly associated with a single mutation in the *TYRP1* gene. That gene encodes an enzyme that influences pigmentation in mice and humans. Several genes are known to contribute to blonde hair coloration in Europeans, but *TYRP1* is not involved.

Uniquely blonde

By comparing DNA between more than 900 Solomon Islanders and more than 900 other individuals from 52 populations around the world, the researchers found that the *TYRP1* mutation is probably unique to the Oceanic region which includes Melanesia. About one-quarter of Solomon Islanders carry the mutation in their genomes, but it is recessive, so an individual needs two copies to be blonde.

Not all occurrences of blonde hair in Melanesia are necessarily the result of the mutation, but the researchers predict that it accounts for about 30% of cases. They attribute another 16% of cases to age and gender (younger children and women are more likely to be blonde), with the rest likely to be caused by sun exposure and by other undiscovered genes. It is unusual that one particular mutation would explain so much of a population's observable trait, says Bustamante.

Bustamante thinks the Melanesian mutation might have arisen between 5,000 and 30,000 years ago. But he doesn't know how it reached such a high frequency in the Solomon Islands. Blonde hair could conceivably provide an evolutionary advantage in the competition for mates, but the researchers couldn't find any statistical genetic evidence for sexual selection. Nor have anthropological studies of Solomon Islanders and of Europeans settled whether blonde people are considered more attractive mates, says Sean Myles, the other senior co-author on the study and a geneticist at Nova Scotia Agricultural College in Truro, Canada. Simple chance could be another possibility, he notes.

David Reich, a geneticist at Harvard Medical School in Boston, Massachusetts, who was not involved in the work, says that the study was done well. However, he notes, the discovery that the trait doesn't come from European blonde genes is no surprise, given the lack of evidence for European mixture in most or any of these populations.

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References

1. Kenny, E. E. *et al. Science* **336**, 554 (2012).



Sean Myles

The blonde hair of some Solomon Islanders results from a unique gene mutation, not shared by blonde Europeans.