

MEETINGBRIEFS>>

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European Skin Turned Pale Only Recently, Gene Suggests

Researchers have disagreed for decades about an issue that is only skin-deep: How quickly did the first modern humans who swept into Europe acquire pale skin? Now a new report on the evolution of a gene for skin color suggests that Europeans lightened up quite recently, perhaps only 6000 to 12,000 years ago. This contradicts a long-standing hypothesis that modern humans in Europe grew paler about 40,000 years ago, as soon as they migrated into northern latitudes. Under darker skies, pale skin absorbs more sunlight



Lighten up. A gene for pale skin swept through Europeans relatively recently.

than dark skin, allowing ultraviolet rays to produce more vitamin D for bone growth and calcium absorption. “The [evolution of] light skin occurred long after the arrival of modern humans in Europe,” molecular anthropologist Heather Norton of the University of Arizona, Tucson, said in her talk.

The genetic origin of the spectrum of human skin colors has been one of the big puzzles of biology. Researchers made a major breakthrough in 2005 by discovering a gene, *SLC24A5*, that apparently causes pale skin in many Europeans, but not in Asians.

A team led by geneticist Keith Cheng of Pennsylvania State University (PSU) College of Medicine in Hershey found two variants of the gene that differed by just one amino acid. Nearly all Africans and East Asians had one allele, whereas 98% of the 120 Europeans they studied had the other (*Science*, 28 October 2005, p. 601).

Norton, who worked on the Cheng study as a graduate student, decided to find out when that mutation swept through Europeans. Working as a postdoc with geneticist Michael Hammer at the University of Arizona, she sequenced 9300 base pairs of DNA in the *SLC24A5* gene in 41 Europeans, Africans, Asians, and American Indians.

Using variations in the gene that did not cause paling, she calculated the background mutation rate of *SLC24A5* and thereby determined that 18,000 years had passed since the light-skin allele was fixed in Europeans. But the error margins were large, so she also analyzed variation in the DNA flanking the gene. She found that Europeans with the allele had a “striking lack of diversity” in this flanking DNA—a sign of very recent genetic change, because not enough time has passed for new mutations to arise. The data suggest that the selective sweep occurred 5300 to 6000 years ago, but given the imprecision of method, the real date could be as far back as 12,000 years ago, Norton said. She added that other, unknown, genes probably also cause paling in Europeans.

Either way, the implication is that our European ancestors were brown-skinned for tens of thousands of years—a suggestion made 30 years ago by Stanford University geneticist L. Luca Cavalli-Sforza. He argued that the early immigrants to Europe, who were hunter-gatherers, herders, and fishers, survived on ready-made sources of vitamin D in their diet. But when farming spread in the past 6000 years, he argued, Europeans had fewer sources of vitamin D in their food and needed to absorb more sunlight to produce the vitamin in their skin. Cultural factors such as heavier clothing might also have favored increased absorption of sunlight on the few exposed

areas of skin, such as hands and faces, says paleoanthropologist Nina Jablonski of PSU in State College.

Such recent changes in skin color show that humans are still evolving, says molecular anthropologist Henry Harpending of the University of Utah, Salt Lake City: “We have all tacitly assumed for years that modern humans showed up 45,000 years ago and have not changed much since, while this and other work shows that we continue to change, often at a very fast rate.”

Gorillas’ Hidden History Revealed

Although gorillas are our closest living relatives other than chimpanzees, their evolution is something of a mystery. There are no fossils of gorillas and little DNA from wild ones. Now, a new study of nuclear DNA from the two species of wild gorillas offers a glimpse of their mysterious past and of how new species of primates arise.

Unlike their cousins the chimps, these shy herbivores turn out to have diverged slowly into two species, apparently taking the better part of a million years, according to a talk at the meeting by molecular anthropologist Linda Vigilant of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany. “It shows us how little we’ve known about speciation in gorillas,” says anthropological geneticist Anne Stone of Arizona State University in Tempe.

Previous studies of the paternally inherited Y chromosome from gorillas suggested that the two species—eastern gorillas and western gorillas—interbred until recently. But maternally inherited mitochondrial DNA suggested that they separated more than 1 million years ago. Nuclear DNA studies sampled too few individuals to clear up the confusion, says evolutionary biologist Michael Jensen-Seaman of Duquesne University in Pittsburgh, Pennsylvania.

Vigilant and her colleagues isolated DNA from the blood, liver, or feces of 18 of the 14,000 wild gorillas left on the planet, including three eastern gorillas from Uganda and the Congo; the western gorillas were chiefly from Cameroon. The team sequenced 14,000 base pairs of noncoding (and therefore presumably not under selection) nuclear