Some early modern populations in Britain may have had dark skin

By Philip Guelpa
22 March 2018

A new genetic analysis of DNA from the Cheddar Man fossil, excavated in 1903 from Gough's Cave in Cheddar Gorge, Somerset, England, suggests that at least some of the early modern human inhabitants of the British Isles had a mixture of traits different from later populations. These characteristics include dark skin, curly dark brown hair, and blue or green eyes. In addition, Cheddar Man was lactose intolerant.

The finding of dark skin has raised much interest in the popular press, and stirred some racist comments. It runs counter to interpretations that the modern humans who first entered Europe from Africa, probably via the Near East, about 40-45,000 years ago, had already transitioned to lighter skin tone as compared to their darker skinned African ancestors, in order to increase their skin's manufacture of Vitamin D in the less sunny northern hemisphere. This latest research suggests a more complicated development.

The more complex picture of changes in human skin color is consistent with other recent research which indicates that this seemingly simple characteristic is actually controlled by a multiplicity of genes, leading to a wide range of phenotypic expressions, and that simplistic racial classifications based on skin tone are scientifically invalid. However, exactly that understanding has led some other researchers, including one member of the original team, to urge caution against overly specific characterizations of Cheddar Man's skin color.

The Cheddar Man fossil dates to approximately 10,000 years ago, during the Mesolithic Period in Europe, at least 30,000 years after the first arrival of modern humans. It is the oldest nearly complete skeleton of a Homo sapiens (modern human) that has been found in Britain. The Mesolithic immediately follows the end of the last Ice Age, roughly 12,000 years ago. It predates the introduction of full-blown agriculture, but involved a more sedentary lifestyle than that of the preceding Upper Paleolithic. This change in culture included a more intensive use of selected plant and animal resources, facilitated by new technologies, including microlithic tools. The famous archaeological site of Star Carr, in North Yorkshire, initially excavated in the late 1940s, dates to this period.

The new analysis of Cheddar Man was conducted by a research team at the Natural History Museum in London and University College London. The DNA used in the analysis was extracted from the fossil's petrous bone, part of the inner ear. This is a dense bone and thus provided greater protection from decomposition than for DNA in many other parts of the skeleton. The extracted sample was analyzed using up-to-date technology to reconstruct Cheddar Man's full genome.

A facial reconstruction of Cheddar Man was undertaken using standard forensic techniques and the results of Natural History Museum's genetic analysis, and employed 3D printing.

The interpretation that Cheddar Man had dark skin has been questioned. It was based on the use of a model developed by Susan Walsh of Indiana University-Purdue University Indianapolis. This model is designed to predict eye, hair, and skin color based on a person's DNA. The skin color prediction targets 36 loci in 16 genes. Tests on modern populations yielded a high level of predictability in differentiating light from dark skin. An initial announcement of the results for the test of Cheddar Man's DNA indicated dark skin. The announcement was made as part of the promotion for an upcoming British television documentary, which may have prompted a "rush to publish."

Subsequent statements by Walsh are less categorical. Due to the degradation of the DNA over 10,000 years, the interpretation that Cheddar Man had dark skin is the "most probable profile, based on current research," according to Walsh. At least two recent studies conclude that the genetic control of skin color in humans is a very complex phenomenon, involving many more than 16 genes. One of these studies concluded that only about 29 percent of the variation observed in modern populations could be attributed to known genetic factors.

Neolithic farmers migrated into Europe from the Near East and perhaps North Africa beginning roughly 9,000 years ago and culturally replaced the Mesolithic humans. As with the Neanderthals before them, however, the indigenous Mesolithic population did not disappear, but interbred with the more numerous immigrants. Genetic analysis indicates that the modern British population carries approximately 10 percent of its genetic makeup from the earlier Mesolithic inhabitants. Models intended to predict skin color based on studies of modern populations may not be directly applicable to those in the distant past, especially when major migrations and genetic inter-mixing have taken place.

The study of the physical development of human populations, as part of overall research into their cultural and biological development, is certainly a worthwhile pursuit. However, the complexity involved is staggering. Researchers should exercise caution on reaching conclusions based on data derived from limited samples.

The author also recommends:

Genetic study demonstrates that racial classification by skin color has no scientific basis
[9 November 2017]