

Genetic ancestry of African-Americans reveals new insights about gene expression

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The amount of proteins produced in cells—a fundamental determinant of biological outcomes collectively known as gene expression—varies in African American individuals depending on their proportion of African or European genetic ancestry. These findings, by researchers based in Boston, Philadelphia and Oxford, are published December 5 in the openaccess journal *PLoS Genetics*.

Gene expression is known to vary among individuals and to be influenced by both genetic and environmental factors. Previous studies have reported gene expression differences among human populations, but it has been suggested that this could be due to non-genetic effects. Populations of recently mixed ancestry such as African Americans, who on average inherit about 80% African and 20% European ancestry, offer a solution to this question, since individuals vary in their proportion of European ancestry while the analysis of a single population minimizes non-genetic factors.

In this study, the researchers show that gene expression levels in African Americans vary as a function of each individual's proportion of European ancestry. The differences due to ancestry (i.e. population differences between all Africans and all Europeans) were generally small—much smaller than differences between individuals within the same population; nevertheless, the authors were able to draw a distinction between effects of genetic ancestry at the location of the expressed gene (cis) and genetic ancestry elsewhere in the genome (trans). They conclude that only about 12% of heritable variation in



human gene expression is due to cis regulation.

First author Alkes Price says, "It was a surprise that these conclusions could be drawn given that the differences due to genetic ancestry are so small." However, he cautioned that the results were confined to gene expression levels in a particular type of tissue known as lymphoblastoid cell lines, and have yet to be verified in other tissue types.

Citation: Price AL, Patterson N, Hancks DC, Myers S, Reich D, et al. (2008) Effects of cis and trans Genetic Ancestry on Gene Expression in African Americans. PLoS Genet 4(12): e1000294. doi:10.1371/journal.pgen.1000294 dx.plos.org/10.1371/journal.pgen.1000294

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