Percentage of African ancestry affects gene expression

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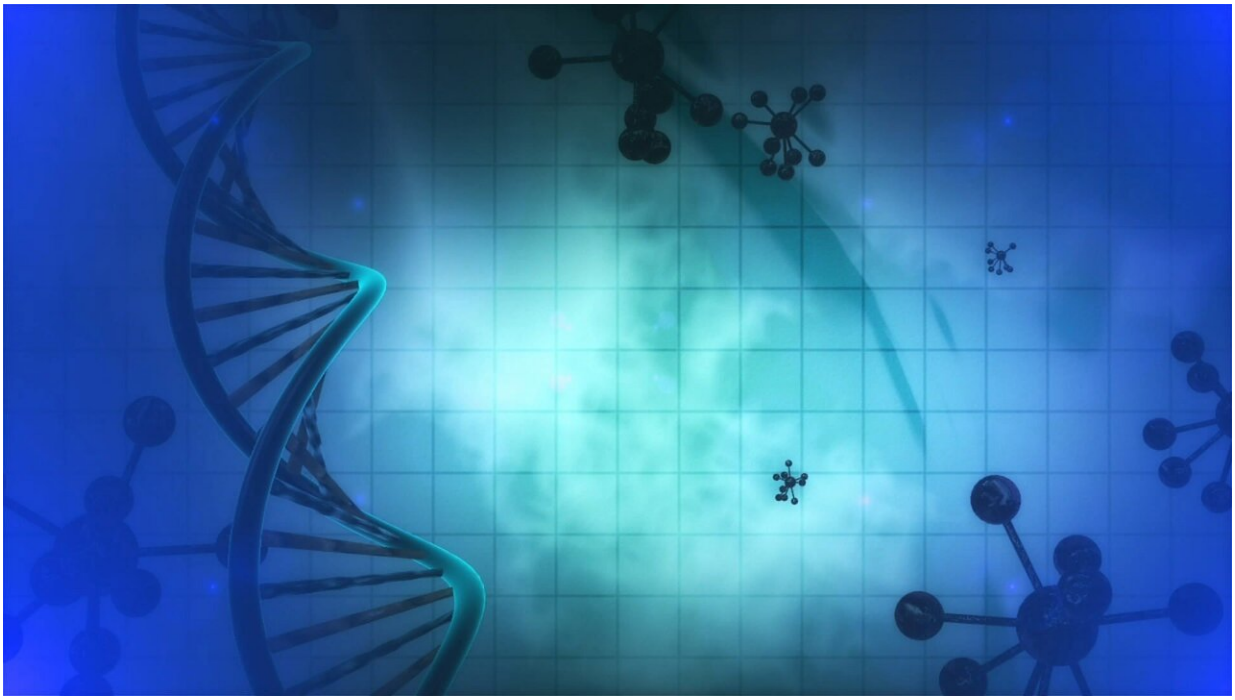

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The percentage of African ancestry in a person's genome determines the level that certain genes are expressed, called mRNA, according to a new Northwestern Medicine study. The discovery could offer insight into the different risk of diseases as well as a different response to medications in African Americans.

This is the first study to compare gene production between African Americans. Previous studies compared only black and white individuals.

"We know there is a difference between black and white. We asked, does 'the shade gray' matter? Apparently it does," said lead study author Minoli Perera, associate professor of pharmacology at Northwestern University Feinberg School of Medicine. "We continue to lump individuals into racial categories to determine what will work best in them as a group. But African Americans are not a monolithic group."

The study on gene expression in African Americans was published Nov. 25 in *Genomic Medicine*.

The research examined the gene products, or mRNA, in the liver, which metabolizes drugs. The gene production, or mRNA levels, indicate how much protein will be made for a gene in specific tissue. Proteins are the workers that carry out the biological functions in our body.

There were at least 28 genes whose expression (mRNA level) varied with the proportion of African Ancestry. These genes were linked to 220 diseasesor clinical outcomes such as coronary heart disease and triglyceride levels. Some of the identified genes that vary with African ancestry are related to drug metabolism (CYP2C19), renal disease (APOL1) and an important target for cancer therapy (VGEF.)

This study was done by isolating hepatocytes, the major cell type in the liver, from 60 African American livers. These living cells contain the genome of the donor.

For groups like African Americans and other "admixed" populations like Latinos, variability within the group may be important to how we interpret findings, Perera said.

"To have precision medicine may require understanding ancestry and not just the DNA sequence in these minority populations," she said.

The aim of the study is to add information on African Americans to the scientific sphere.

"These types of data are sorely missing in most of the public databases," Perera said. "If African Americans are not represented in these databases, the factors that are unique to them will never be considered for precision medicine or drug target discovery."

More information: C. S. Park et al. Hepatocyte gene expression and DNA methylation as ancestry-dependent mechanisms in African Americans, *npj Genomic Medicine* (2019). DOI: 10.1038/s41525-019-0102-y

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