

# Lifestyle biomarker linked to high blood pressure, increased stroke risk among Black adults

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Researchers have identified a lifestyle-related metabolite biomarker called gluconic acid that is associated with high blood pressure,

increased risk of ischemic stroke, eating a Southern diet, lower level of education and lack of exercise, among Black adults, according to preliminary research to be presented at the American Stroke Association's International Stroke Conference 2023. The meeting, to be held in person in Dallas and virtually Feb. 8-10, 2023, is a world premier meeting for researchers and clinicians dedicated to the science of stroke and brain health.

According to the American Stroke Association, a division of the American Heart Association, stroke is one of the leading causes of death and disability in the U.S., and African Americans have long experienced a higher rate of stroke. Currently, researchers are investigating new risk factors such as variations in [blood](#) levels of metabolites that might explain these differences. Metabolites are substances in the blood produced while exercising or in the breakdown of food and medications during metabolism.

"We have identified a biomarker called gluconic acid that we believe is a lifestyle-related biomarker, providing a direct link to diet and exercise," said Naruchorn Kijpaisalratana, M.D., Ph.D., lead study author and a research fellow in neurology at Massachusetts General Hospital in Boston. "Gluconic acid may be considered as a dietary-related oxidative stress marker due to its availability in food, potentially produced by the gut microbiome, and related to diseases with oxidative stress. We think that this biomarker may provide a pathway to improve diet and exercise habits to help prevent a future stroke."

The study analyzed health data for more than 2,000 people participating in the Reasons for Geographic and Racial Difference in Stroke (REGARDS) study. The ongoing REGARDS study has enrolled more than 30,000 Black and white adults since 2003 from the Southeastern U.S., known as the "stroke belt," and other states across the country. The aim of REGARDS is to investigate the reasons for the high rate of

stroke among African Americans.

This new analysis included 1,075 ischemic stroke survivors during a mean follow-up period of 7 years. Of those, 439 were Black adults and 636 were white adults (mean age of 70 years; 50% female). A random comparison group drawn from study participants consisted of nearly 1,000 Black adults and white adults who had not had a stroke (mean age of 65 years; 55% female).

The samples used in this study were collected from REGARDS participants over a 4-year period of enrollment (from 2003 to 2007). Using the samples, researchers extracted and measured levels of 162 metabolites in the blood of the participants. The data analysis examining the association between these metabolite levels and high blood pressure and future risk of ischemic stroke in both the Black and white adults was performed in 2021-2022.

The study found:

- Of the 162 metabolites that were measured, elevated levels of the metabolite gluconic acid were found in Black adults who had high blood pressure but not their white peers with high blood pressure.
- Black adults with the highest gluconic acid levels were 86% more likely to have high blood pressure.
- Black adults with the highest gluconic acid levels had a 53% increased risk of ischemic stroke. No such association was found for white participants.
- Gluconic acid accounted for 25% of the association between high blood pressure and stroke among Black adults.
- In Black adults, after adjusting for multiple factors, a higher level of gluconic acid was associated with a Southern diet (foods high in added fats, fried foods, processed meats and sugary

drinks), a lower level of education and a lack of exercise.

The researchers suggest that a blood test measuring metabolites may be able to determine if diet and exercise are working to lower stroke risk. "In the future, we envision that a metabolite like gluconic acid may be used as a biomarker to inform [health care professionals](#) whether the patient is eating healthy enough or exercising enough," Kijpaisalratana said. "A biomarker like gluconic acid may point individuals toward more targeted guidance for stroke prevention."

A limitation of the study was that the participants had [high blood pressure](#) at the beginning of the study, so researchers were not able to track the condition as it developed.

"Given the longstanding, higher risk of stroke among Black versus white adults in the United States—which is still not fully explained by a higher frequency of traditional stroke risk factors—the discovery of a new, potential prognostic marker or therapeutic target is very important," said Bruce Ovbiagele, M.D., M.Sc., M.A.S., M.B.A., M.L.S., FAHA, American Heart Association expert volunteer and associate dean and professor of neurology at the University of California, San Francisco and chief of staff at the San Francisco Veteran Affairs Health Care System. "Since previous studies have found that culturally tailored lifestyle educational approaches may help to improve blood pressure control in Black adults, gluconic acid might serve as an objective measure to inform health care professionals about how well their patients are doing reducing hypertension and stroke risk and may also be helpful to motivate Black patients to modify their lifestyles as appropriate to prevent stroke."

Ovbiagele, who was not involved in this study, also noted that future studies will need to examine the relationship between gluconic acid and the known social determinants of cerebrovascular health, including

psychosocial stress and stroke risk, among Black adults compared to their white counterparts. Additional research will also need to explore whether this relationship holds true for recurrent stroke risk, too, since about one out of four strokes is a recurrent [stroke](#).

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**More information:** [professional.heart.org/en/meet ... al-stroke-conference](https://professional.heart.org/en/meetings/2023-02-american-heart-association-stroke-conference)

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