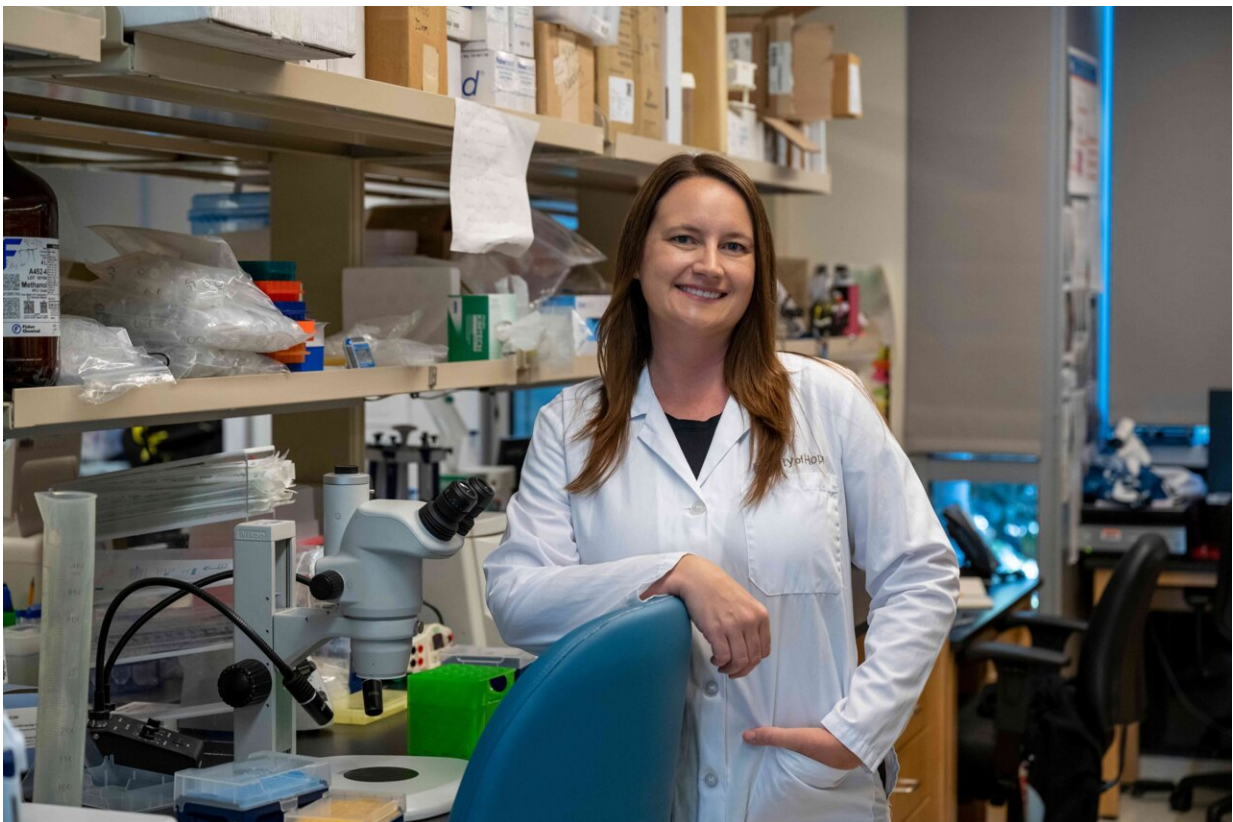


# Researchers identify biomarkers that may detect risk of advance prostate cancer in Black men

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Scientists at City of Hope have identified a cell metabolism process found in men with diabetes and metastatic prostate cancer that could one day lead to improved testing and treatments for Black men with these diseases. Credit: City of Hope

Scientists at City of Hope, one of the largest cancer research and treatment organizations in the United States and a leading research center for diabetes and other life-threatening illnesses, have identified a cell metabolism process found in men with diabetes and metastatic prostate cancer that could one day lead to improved testing and treatments for Black men with these diseases.

The research will be highlighted in the press program for the [American Chemical Society \(ACS\) Fall 2023](#), a hybrid meeting that will be held virtually and in person in San Francisco from Aug. 13 to 17.

Black men are more than twice as likely than other men to die from [prostate cancer](#). In a continued search to develop inclusive diagnostic and predictive tests and personalized treatments, City of Hope researchers conducted a small clinical trial that identified four metabolism-related biomarkers linked to an increased risk of [metastatic prostate cancer](#), or prostate cancer that has spread to other parts of the body, in men of West African heritage. City of Hope leads the nation in having the first research department focused on the intersection between cancer and [diabetes](#).

"We have identified genetic and molecular changes that can be developed into a tool to predict which Black men are at the highest risk of developing metastatic prostate cancer," said Sarah Shuck, Ph.D., principal investigator of the trial who will present the data at ACS. Shuck is an assistant professor in the Arthur Riggs Diabetes & Metabolism Institute and Department of Diabetes & Cancer Metabolism at City of Hope.

"This test would give doctors the ability to more accurately predict patients' prognoses and equip scientists with more data as they work to design therapies that prevent prostate cancer from developing in the first place," Shuck added.

The problem appears to be production of a highly reactive compound known as methylglyoxal (MG), a byproduct of metabolism that is elevated in people with diabetes. MG binds to DNA, RNA and protein, creating a complex that may promote cancer emergence due to its instability and disrupted function.

Prostate cancer is the second most common cancer in men. Black men are 70% more likely than white men to be diagnosed with prostate cancer and two to four times more likely than other racial and ethnic groups to die from the disease, according to [2023 data](#) from the American Cancer Society.

Diabetes is a chronic metabolic disease characterized by elevated levels of blood glucose or sugar, which over time leads to serious damage to the heart, blood vessels, eyes, kidneys and nerves. Black adults are [60% more likely](#) than white adults to be diagnosed with diabetes and twice as likely to die from diabetes, according to the most recent data available from the U.S. Department of Health and Human Services Office of Minority Health.

Shuck's lab focuses on the study of how metabolic dysregulation causes diabetes and cancer. She and her colleagues investigate the biochemistry involved when excess sugar damages important molecules.

To see if the identified dysregulated complexes were linked to race and genetics, the team conducted a small clinical study where they gathered [blood samples](#) from 371 men with and without prostate cancer from across the nation. To determine race, they assessed samples for genetic evidence of West African heritage using methods developed by collaborators Rick Kittles, Ph.D., M.S., and Leanne Woods-Burnham, Ph.D., who were at City of Hope when the research was conducted.

Next the researchers, including John Termini, Ph.D, professor in the

Department of Cance Biology and Molecular Medicine at City of Hope, looked at four biomarkers associated with MG and the complexes it forms with DNA, RNA and protein. The biomarkers also included variation in a gene, GLO1, that encodes a protein which detoxifies these complexes.

Surprisingly, the men of West African descent had fewer of these malignancy-promoting complexes in their blood. Contrary to expectations, a lower level of these complexes was linked to greater risk of metastatic disease.

The researchers hypothesize that, in men of West African descent, tumor cells sequester these complexes and spur metastatic processes from within. These findings did not apply to men of European descent. (In technical terms, they hypothesize that MG-AGEs, sRAGE, GLO1 and AGER SNPs may be used as biomarkers for prostate cancer in Black men and that the gene variation GLO1 may play a role in the accumulation of mutations that lead to prostate cancer cell growth.)

City of Hope researchers intend to gain a better understanding of [prostate cancer](#) disparities in the hopes of developing a [diagnostic test](#).

**More information:** "Reactive metabolic by-products induced by the exposome are associated with and may drive prostate cancer metastasis in African American men," ACS Fall 2023.

Provided by City of Hope National Medical Center

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