

Genomic differences between breast cancers of African American and white women identified

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A study from investigators at the Massachusetts General Hospital (MGH) Cancer Center has, for the first time, identified genomic differences between the breast tumors of African American and white women, differences that could contribute to the recognized differences in recurrence rate and survival. In their paper published online in the *Journal of Clinical Oncology*, the researchers report that several genetic characteristics of more aggressive tumors were significantly more prevalent in African American patients and appeared to be associated with a greater risk of tumor recurrence.

"In addition to having a higher prevalence of triple-negative breast cancers than Caucasian women - something that has been documented in previous studies - we found that African American women with [breast cancer](#) had a significantly higher prevalence of the TP53 driver mutation, basal tumor subtype and greater genomic diversity within tumors, all of which suggest more aggressive tumor biology," says Tanya Keenan, MD, of the MGH Cancer Center, lead author of the study. "The higher risk of [tumor recurrence](#) that we observed among African American women was reduced when controlling for those factors, suggesting that these genomic differences contribute, at least partly, to the known racial disparity in the survival of African American and Caucasian [breast cancer patients](#)."

While improved diagnostic and treatment methods have reduced the overall death rate from breast cancer, the study authors note, that reduction has not been as pronounced among African American patients. Currently African American women with breast cancer in the U.S. are 40 percent more likely to die from their cancer than are [white women](#). While socioeconomic factors such as income, health insurance and access to health

services contribute to those disparities, they cannot explain the whole difference. It has been recognized that the more aggressive [triple-negative breast cancer](#) occurs more frequently in African American women, but no previous study has examined racial differences in tumor genotype and how they might contribute to the risk of cancer recurrence.

The researchers analyzed whole-exome sequencing data from the tumors of African American and white women diagnosed with breast cancer between 1988 and 2013 - a group of 105 African American and 664 white patients - from the National Cancer Institute's Cancer Genome Atlas. Although the same five tumor-specific mutations were most prevalent among both groups, more African American patients' tumors were driven by the TP53 mutation, while the PIK3CA mutation was more common among the tumors of white patients. The number of mutations within each tumor and the prevalence of the basal-like and mesenchymal stem-like subtypes - all of which suggest more [aggressive tumors](#) - was also greater in the tumors of African American patients. Tumor recurrence was faster and more likely among African American patients, particularly for basal subtype tumors or those driven by the TP53 mutation.

"Our study adds important pieces to the puzzle of why African American women with breast cancer are less likely to survive," says senior author Aditya Bardia, MBBS, MPH, attending physician at the MGH Cancer Center and assistant professor of Medicine at Harvard Medical School. "If our findings are confirmed by additional studies, they may open doors to the development of targeted therapies against the tumor subtypes more likely to affect African Americans and potentially help reduce racial disparities in breast cancer."

Provided by Massachusetts General Hospital

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