

Fifty-five genes linked to a powerful tumor suppressor predict breast cancer survival

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A panel of 55 genes, almost all of which are impacted by the loss of a particular protein, appears to predict if breast cancer will become invasive, leading to poorer survival, researchers at Georgetown Lombardi Comprehensive Cancer Center report in *PLOS ONE*.

The panel represents loss of a powerful [tumor suppressor gene](#), SYK, as well as genetic alterations in 51 other genes that are directly affected by the loss of a copy of the SYK gene and the absence of its protein.

"Without SYK, the protein it makes, and genetic disruption in a set of genes thought also to be controlled by SYK, cancer invades and metastasizes," says the study's senior investigator, Susette C. Mueller, PhD, professor of oncology emeritus at Georgetown Lombardi.

Mueller and her colleagues examined the loss of SYK in tissue from breast ductal carcinoma in situ (DCIS), a cancer contained within the breast ducts that sometimes morphs and invades surrounding tissue. Samples that had a loss of one copy of the SYK also had evidence of invasive ductal carcinoma nearby. None of the normal [breast tissue](#) samples, or of the DCIS-only tissue, had loss of SYK.

"This was the first time that a loss of a SYK gene was found in DCIS breast tissue, but we needed information about the outcomes of these cases to determine the significance of this finding," says Mueller.

So the scientists turned to The Cancer Genome Atlas at the National

Institutes of Health, a catalogue containing gene sequencing and gene mutations from [cancer patients](#) with invasive disease, along with outcome information.

When they matched changes in the 55 genes to the patients' outcomes, the researchers found that the panel was predictive of which [breast cancer](#) patients fared better, Mueller says.

"Survival was much better in the [invasive ductal carcinoma](#) patients who did not have any change in the 55 genes," she adds.

At the end of more than 18 years of follow-up, an estimated 80 percent of patients without gene changes were still alive. In contrast, about 20 percent of patients with changes in one or more of the [genes](#) were alive.

"The panel is not ready for use as a prognostic tool in the clinic, and much work is required to test it in that way," Mueller cautions.

Provided by Georgetown University Medical Center

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