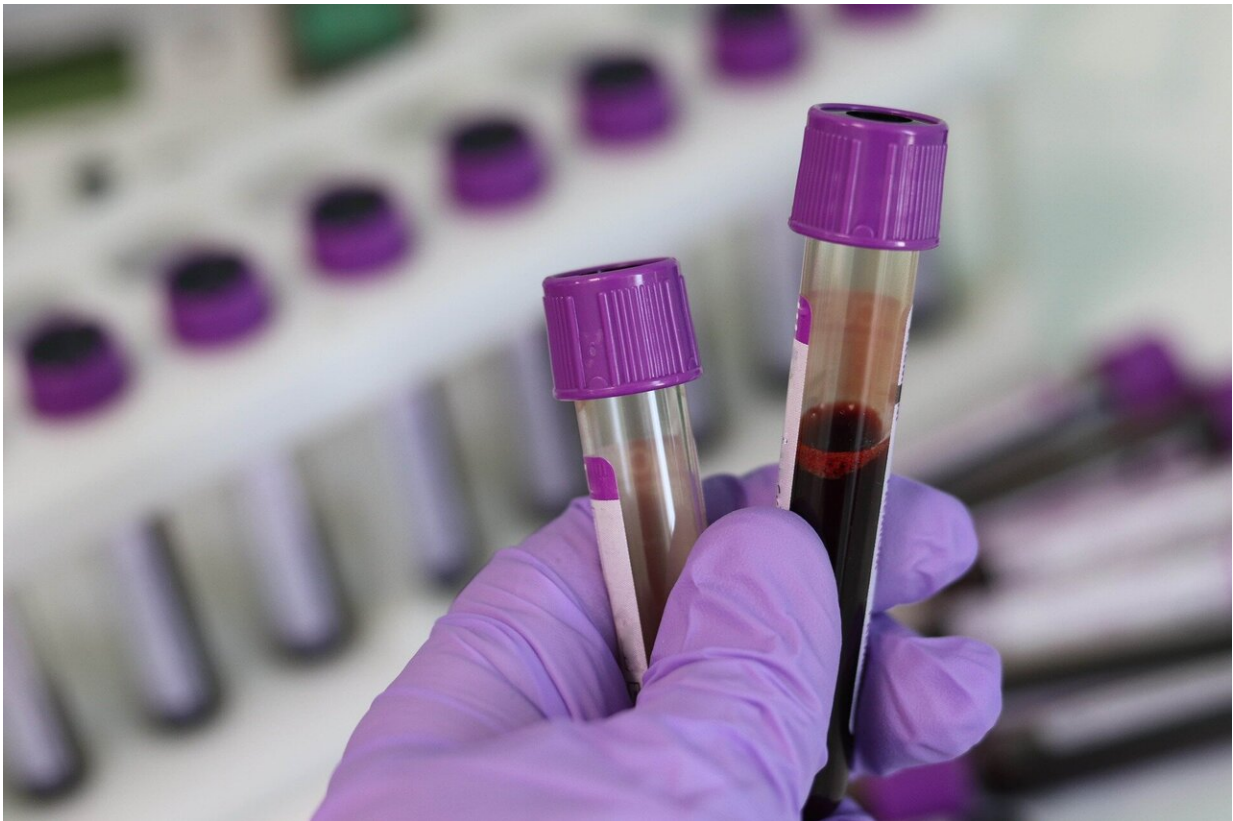


# Blood test may predict risk of recurrence for breast cancer patients

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A special blood test may one day predict if a newly diagnosed breast cancer patient will likely relapse years later, a City of Hope study suggests.

"This is the first success linking a solid tumor with [blood](#) biomarkers—an indicator of whether a patient will remain in remission," said Peter P. Lee, M.D., chair of the Department of Immuno-Oncology at City of Hope and corresponding author of the study. "When patients are first diagnosed with cancer, it is important to identify those at higher risk for relapse for more aggressive treatments and monitoring. Staging and new tests based on genomics analysis of the tumor are currently available for risk stratification. However, a predictive blood test would be even more attractive but is not yet available. We are trying to change the status quo."

The effectiveness of a person's anti-tumor [immune response](#) is determined by the balance between pro-inflammatory and anti-inflammatory signaling pathways in [response](#) to cytokines, according to the July 8 *Nature Immunology* study. Lee and his colleagues used data on 40 breast cancer patients who were followed for a median of four years. Results were validated in a separate cohort of 38 additional breast cancer patients to create a benchmark that predicts if a breast cancer patient will likely relapse within a handful of years.

The balance of cytokine signaling responses in "peripheral blood [immune cells](#)"—the engine behind a healthy immune system—are indicators of the overall state of a person's immune system, said Lee, the Billy and Audrey L. Wilder Professor in Cancer Immunotherapeutics at City of Hope.

"So, these findings may go beyond cancer to address other diseases the immune system must battle," he added. "This general approach may also be useful for predicting outcomes in patients with autoimmune and infectious diseases."

A cancer patient's peripheral blood immune cells, a critical part of the immune system, tends to have decreased pro-inflammatory cytokine

signaling responses and increased immune suppressive cytokine signaling responses, meaning a systemic immune environment is created that is conducive to the spread of cancer.

Lee and his colleagues analyzed signaling responses to many pro- and anti-inflammatory cytokines in different immune cell types that are found in peripheral blood from [breast cancer patients](#) who were newly diagnosed with the disease. They found altered signaling to four different cytokines (two pro- and two anti-inflammatory) in regulatory T cells in some [patients](#). These cytokine signaling patterns in peripheral blood at diagnosis reflects the state of the immune system and predicts future relapse three to five years later.

The scientists used their data to create a [cytokine](#) signaling index (CSI), a sort of benchmark. The idea is that a patient could go in for a blood test and have their data run through an algorithm that will output a number which informs doctors what the patient's risk of cancer recurrence is within three to five years.

"Knowing the chance of cancer relapse will inform doctors how aggressive a particular patient's [cancer](#) treatment should be," Lee said. "The CSI is an overall reflection of a patient's [immune system](#) at diagnosis, which we now know is a major determinant of future relapse."

**More information:** Connecting blood and intratumoral Treg cell activity in predicting future relapse in breast cancer, *Nature Immunology* (2019). [DOI: 10.1038/s41590-019-0429-7](https://doi.org/10.1038/s41590-019-0429-7) , [nature.com/articles/s41590-019-0429-7](https://www.nature.com/articles/s41590-019-0429-7)

Provided by City of Hope

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