

# Predicting ovarian cancer survival through tumor-attacking immune cells

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One way to predict survival of many types of cancer is by counting the number of tumor-attacking immune cells that have migrated into the tumor in an effort to eradicate it – a sign of the body's immune response to the cancer. However, quantifying these armies of immune cells has been difficult – until now.

Scientists at Fred Hutchinson Cancer Research Center have developed a new method for counting a special class of cancer-fighting cells – called tumor-infiltrating T lymphocytes, or TILs – reliably, quickly and cheaply in patients with early stage and advanced [ovarian cancer](#). They describe their findings online Dec. 4 in *Science Translational Medicine*.

Such technology, a DNA-amplification technique, has the potential to predict treatment response, cancer recurrence and disease-free survival earlier and more effectively than any current method, according to lead researcher and cancer geneticist Jason H. Bielas, Ph.D., an associate member of the Human Biology and Public Health Sciences divisions at Fred Hutch.

"Our experiments demonstrate an association between higher TIL counts and improved survival among women with ovarian cancer, and are consistent with prior observations that the immune response against ovarian cancer is a meaningful and independent prognostic factor," said Bielas, who was also the paper's corresponding and senior author.

"While variations in the measurement and characterization of TILs have

limited their clinical utility as biomarkers of survival, our results highlight the significant translational potential of a robust, standardized, DNA-based assay to assess TILs in a variety of cancer types, including ovarian," he said.

Fred Hutch researchers developed the digital assay to count TILs, determine their frequency and develop a grouping system to determine their "clonality," a measure of the tumor's T-cell population.

In developing the test, Bielas and his team leveraged a technology co-created by first author Harlan S. Robins, Ph.D., a computational biologist and associate member of the Public Health Sciences and Human Biology divisions at Fred Hutch. They devised a way to easily screen T cells by capturing the genetic information of unique proteins these cells carry on their surface. Fred Hutch licensed the technology to Adaptive Biotechnologies, a company Robins co-founded.

In the present study, Robins, Bielas and colleagues tested this novel technique, called "QuanTILfy," on tumor samples from 30 ovarian cancer patients with known survival outcomes ranging from one to 22 months. They looked at the levels of TILs in their tumors and compared those levels to the women's survival. They found that higher TIL numbers correlated with better survival. For example, the percentage of TILs was approximately threefold higher on average for patients with a survival rate of more than five years as compared to patients with a survival rate of less than two years.

"Now that we have the sensitivity and ability to reproducibly count TILs in tumors, we may be able to stratify and more effectively treat patients based on tumor TIL count," Bielas said.

**More information:** "Digital Genomic Quantification of Tumor-Infiltrating Lymphocytes," *Science Translational Medicine*, 2013.

Provided by Fred Hutchinson Cancer Research Center

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