New Blood-Based Technology Tracks Tumor Evolution in Ovarian Cancer Patients

Break Through Cancer researchers uncover hidden cell populations driving relapse — findings could pave the way for more targeted treatments

CAMBRIDGE, MA, UNITED STATES, October 1, 2025 /EINPresswire.com/ -- A new study published in Nature uncovers how ovarian cancers evolve during treatment, and how blood samples taken throughout disease progression could help guide therapies more effectively. The research shows that drug-resistant cancer cell populations may exist long before treatment begins, and that tracking these populations over time can reveal vulnerabilities that may be exploited for more targeted care.

Understanding a Major Challenge in Ovarian Cancer
High-grade serous ovarian cancer (HGSOC), the most common and deadly form of ovarian cancer, is usually diagnosed at advanced stages and initially responds well to surgery and chemotherapy. However, relapse is almost inevitable, and each recurrence becomes harder to treat. This recurring pattern reflects a deeper challenge: tumors contain diverse cell populations, and some may resist treatment from the start.

A New Way to Track Tumor Evolution
In this study, led by Sohrab Shah, Chief of Computational Oncology at Memorial Sloan Kettering Cancer Center, and Marc Williams a postdoctoral researcher in Dr. Shah's lab, researchers from the Break Through Cancer Targeting Minimal Residual Disease in Ovarian Cancer TeamLab with the Data Science TeamLab developed CloneSeq-SV, a blood-based technology that leverages large-scale structural variants (SVs) — unique rearrangements in tumor DNA — as personalized "barcodes" to track different cancer cell populations over time. By sequencing single cells from tumor samples and detecting these SVs in blood, CloneSeq-SV allows scientists to monitor how individual tumors evolve as treatment progresses. The approach proved more sensitive and

specific than conventional mutation-based tracking, revealing that while many cancer cell populations are eliminated by therapy, one or a few resistant clones almost always persist and expand at recurrence.

Hidden Resistant Cells Point to New Treatment Opportunities

Analysis of 18 patients from diagnosis through recurrence revealed that drug-resistant cancer cell populations were already present at the time of diagnosis, even if they were initially rare. These surviving cells often carried distinctive genomic features, including amplification of cancer-promoting genes, whole-genome doubling, and widespread chromosomal changes. While larger studies are needed to confirm observations, these features could serve as valuable targets for future therapies.

The study also shows how understanding these resistant populations can directly influence patient care. In one case, when treatment eliminated other tumor cell types, the remaining population carried a specific genomic feature that made it highly responsive to a targeted therapy, leading to a lasting remission. This highlights how tracking tumor changes over time could help guide more effective, personalized treatment decisions.

Looking Ahead

This study points toward more personalized approaches for treating ovarian cancer, but importantly, the methods developed could, in the future, be applied more broadly. By combining genomic analysis with blood-based monitoring, this approach offers a way to track how cancers change and adapt over time and could, in principle, be used to study other tumor types.

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About Break Through Cancer

Founded in 2021, Break Through Cancer empowers outstanding researchers and physicians to both intercept and find cures for several of the deadliest cancers by stimulating radical collaboration among outstanding cancer research institutions, including its founding partners: Dana-Farber Cancer Institute, Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins, Memorial Sloan Kettering Cancer Center, MIT's Koch Institute for Integrative Cancer Research, and The University of Texas MD Anderson Cancer Center.

The Foundation is supported by a Board of Directors from the five partner institutions and a Scientific Advisory Board of U.S. cancer experts. The Foundation was launched with an extraordinary challenge pledge of $250 million from Mr. and Mrs. William H. Goodwin, Jr. and their family, and the estate of William Hunter Goodwin III.

For further information, please visit the Foundation's website at www.breakthroughcancer.org.

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