Small Biopsies, Big Insights: How Tiny Tissue Samples Could Transform Glioblastoma Research

New study from Break Through Cancer TeamLab unveils the power of investigational biopsies, unlocking a promising tool for real-time monitoring of glioblastoma

CAMBRIDGE, MA, UNITED STATES, April 30, 2025 /EINPresswire.com/ -- Glioblastoma (GBM) is a highly aggressive form of brain cancer, leaving patients with limited treatment options. In a new study published in Nature Communications, the Break Through Cancer Accelerating GBM Therapies Through Serial Biopsies TeamLab has demonstrated how "investigative biopsies" can unlock critical insights into tumor biology.

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> *Dr. Kenny Kwok Hei Yu, MBBS, PhD, FRCS*

To address the challenge of understanding how GBM evolves over time—complicating treatment and contributing to recurrence—this study explored how routine diagnostic biopsies could be re-purposed into a powerful tool for advanced molecular analyses. By leveraging these biopsies, researchers demonstrated the potential to track changes in GBM and its microenvironment over time.

This approach could revolutionize how GBM is studied and treated, enabling real-time monitoring of disease progression and therapeutic response. "Currently, in clinical trials, we only perform biopsies at the beginning and end of treatment. In between, we rely on scans," said Dr. Kenny Kwok Hei Yu, MBBS, PhD, FRCS, Neurosurgeon Scientist at

Memorial Sloan Kettering Cancer Center and co-lead investigator on the study. “But scans can be misleading. When we review scans, we often question whether the changes we see are due to disease progression or treatment effects—we can’t see what is really happening in the brain.”


The laboratory of Dr. Nathalie Agar, Brigham and Women's Hospital and Dana-Farber Cancer Institute

Expanding Tools for GBM Research and Monitoring.

The study highlights the potential of investigative biopsies to generate high-resolution molecular data. Using advanced technologies—including single-cell RNA sequencing, immune profiling, spatial proteomics, and metabolomics—researchers demonstrated that even tiny tissue samples could yield detailed insights into tumor biology, immune interactions, and molecular pathways in remarkable detail and resolution.

“This study comprehensively characterizes immune cell subsets and cell-cell interactions in GBM, which are critical data that will guide us as we plan longitudinal studies and develop new treatments for GBM patients,” said Dr. Sreyashi Basu, PhD, Institute Associate Director, Immunotherapy Platform, James P. Allison Institute at The University of Texas MD Anderson Cancer Center and co-lead investigator on the study.

Dr. Nathalie Y.R. Agar, PhD, of Dana-Farber Cancer Institute, Brigham and Women's Hospital, Mass General Brigham, Boston, and key investigator on the study explained the true value of this approach. “These biopsies allow us to create a platform for informative clinical trials, improving our understanding of treatment responses while reducing reliance on imperfect imaging techniques like MRI.”

“What’s really important is that this isn’t just a technical exercise to prove we can do it,” Yu explained. “Rather, it demonstrates that with a few minor adjustments, we can transform a common technique into a massive data source—investigational biopsies.”

Yu likened this approach to shining a light in the dark. “These biopsies are like floodlights. The more light we shine, the more we can see what’s happening in the tumor—giving us the ability to better understand how to fight it.”

A Paradigm Shift for Brain Tumor Research.

If widely adopted, investigational biopsies would represent a significant shift in brain tumor

research—one where on-treatment biopsies could be used to better understand how and why treatments succeed or fail. “Essentially, in other types of cancers, patients can receive a drug and then get biopsies throughout treatment, so you can learn where the drug is going and what kind of effect it’s having on the tumor,” said Dr. Agar. “The field has not done those biopsies during treatment in the brain because the thought was, it is too invasive.” However, this TeamLab saw the potential of investigational biopsies as a safe and valuable tool for deeper insights. “The diagnostic biopsies have become increasingly safer, and so we really thought this was the time to move toward an investigative biopsy,” Agar explained.

Dr. Agar emphasized the transformative value of these tiny samples, as with the advent of cutting-edge technologies, it is now possible to extract far more information from even the smallest tissue samples including molecular insights at the single-cell level and spatial organization of the tumor microenvironment. “There was a thought that core needle biopsies might not provide enough material for analysis, or the specimens might not be high quality enough. But in this study, we optimized protocols to conduct multiple types of analyses, even from a single sample,” said Agar.

Collaborative Power.
The success of this study reflects the power of radical collaboration. Researchers, surgeons, and data scientists from some of the best cancer centers in the nation—Memorial Sloan Kettering Cancer Center, Dana-Farber Cancer Institute, MD Anderson, Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins, and the Koch Institute for Integrative Cancer Research at MIT—worked together to design and execute the study.

“The data that’s coming out of this study is fascinating and eye-opening,” said Agar. “It’s because of the way this study came together, with input from so many different experts. We’ve been able to bring all of this together.” Reflecting on the study’s broader implications, Agar said, “This approach gives me sincere and informed hope that we can make a difference. By taking a strategic approach, we can finally start to learn all the tricks that GBM is playing on us and develop better treatments.”

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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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