A new approach for detecting tumor heterogeneity to assess breast cancer patient outcomes

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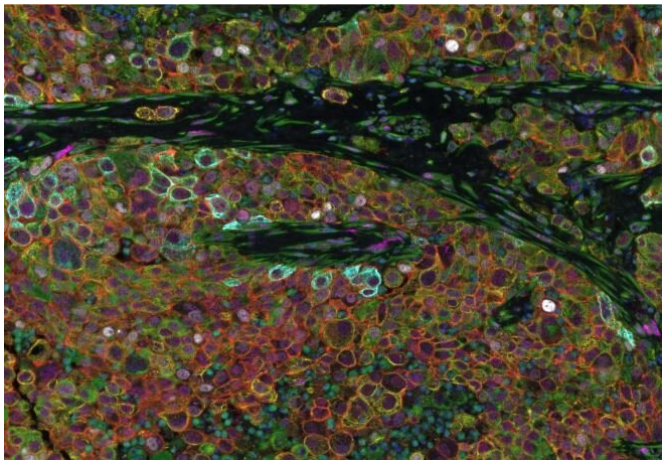

Novel approach to identify and quantify tumor heterogeneity reveals the presence of high levels of diversity within breast tumors. Credit: Diwakar R. Pattabiraman

Tumor heterogeneity refers to the presence of a variety of distinct cell types within a tumor. High tumor heterogeneity is thought to contribute to breast cancer progression and metastasis, or spreading to other parts of the body. Researchers at Dartmouth Cancer Center have developed a new approach for detecting and quantifying tumor heterogeneity to assess patient outcomes in breast cancer. The approach will pave the way to utilizing the extent of tumor heterogeneity as a factor in therapeutic decision-making.

The study finds that high levels of heterogeneity in a patient's tumor are typically associated with poor prognosis. However, they were also able to identify specific proteins that regulate the extent of heterogeneity in a tumor and its potential to spread.

These findings are newly published in *Science Advances*.

"This work is exciting because we have developed an approach to quantify tumor heterogeneity that can be applied to patient specimens obtained in a pathology lab," says corresponding author Diwakar R. Pattabiraman, Ph.D.

Recognizing the impact of tumor heterogeneity and developing ways of quantifying it, are the initial steps to ultimately being able to decrease or curtail the development of high levels of heterogeneity in patient tumors as a therapeutic avenue.

The team's next steps are to assess how the extent of tumor heterogeneity determines treatment outcomes in breast cancer. "If we can obtain tumor specimens from a patient before therapy, we can try to predict how they respond to the current standard-of-care regimens," says Pattabiraman.

More information: Meredith S. Brown et al, Phenotypic heterogeneity driven by plasticity of the intermediate EMT state governs disease progression and metastasis in breast cancer, *Science Advances* (2022). DOI: 10.1126/sciadv.abj8002

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