Patient-derived scaffolds influence breast cancer cell secretion profiles

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Video Byte

Keywords: breast cancer, cancer, tumor microenvironment, TME, secretion, secretome, secretion profile, patient-derived scaffold, scaffold, IL-6, PAI-1, CCL2, MCF7, MDA-MB-231, malignant behavior, 3D cell culture, cancer stem cell, metastasis, proximity extension assay, Cell Communication and Signaling

Posted Date: October 13th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-966221/v1>

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Abstract

Breast cancer is the most common cancer among women, and some subtypes remain difficult to treat. The tumor microenvironment is known to play a key role in breast cancer progression, but how specific microenvironments affect the secretion of cancer-related proteins remains unclear. To clarify this issue, a new study cultured two breast cancer cell lines, MCF7 and MDA-MB-231, in scaffolds derived from patient breast tumors. Application of culture medium from scaffold-cultured cells to normally cultured cancer cells increased cancer stem cell activity, an important driver of cancer metastasis. Molecular analysis revealed that scaffold-cultured cancer cells secreted more and different proteins than normal monolayer-cultured cells and that culturing cells with scaffolds derived from different patients resulted in different secretion profiles. For one cell line, the secretion profiles clustered into three groups, or self-organizing maps (SOMs), that were associated with specific clinical characteristics of the patients. For example, the group associated with aggressive breast cancer showed elevated secretion of the metastasis-related proteins IL-6, CCL2, and PAI-1. Although additional research is needed, the findings suggest that specific tumor microenvironments can promote breast cancer progression by influencing protein secretion and indicate that patient-derived scaffolds may help researchers identify biomarkers of microenvironments that promote aggressive breast cancer.