Cure of Breast Cancer Stage III: Discovering Inflammation Inhibitors as a Novel Approach to Treatment of Triple Negative Breast Cancer Using 3-D Organoid Culture

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Triple negative breast cancer (TNBC) has a higher mitotic index compared to other types of breast cancer yet Ki-67 values are still being used, despite an unclear mechanism. Here we found that the gene Cell-Division Cycle 20 (CDC20), an essential mitotic factor, was highly expressed in TNBC cell lines by using a NCBI GEO database. CDC20 was also negatively correlated with TNBC metastasis and recurrence. CDC20 deficiency results in the decreasing of TNBC cancer cell growth and migration, and mitosis inhibitors blocked TNBC cancer cells growth and metastasis. Interestingly, CDC20 stability is regulated by tumor necrosis factor, alpha-induced protein 3 (TNFAIP3 /A20). CDC20 expression show positive correlation with A20 in TNBC patient samples but not HR positive or HER2 breast cancer patients. A20 deficiency also inhibits cell migration and invasion through the decreasing of CDC20 protein level. Our findings uncover a critical role of the A20-CDC20 axis in tumor growth and metastasis of TNBC and suggest A20 or CDC20 is a novel therapeutic target in TNBC.

Awards Won: