Discovering the Oncogenic Addiction of CD47 in Breast Cancer

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Triple-negative breast cancer (TNBC) is a molecular subset of breast cancer defined by a lack of estrogen, progesterone, and the human epidermal growth factor 2 (HER2) receptors. Currently, TNBC is the second most common subset of breast, accounting for 10-15% of all breast cancers. Due to TNBC's molecular characteristics, TNBC is highly aggressive and metastatic in patients. Currently, treatment options for TNBC remain limited and ineffective, inducing the need to produce alternative targeted therapies. To identify molecular targets, oncogenic addiction, or the concept that cancer cells rely on a select few genes to drive proliferation and survival, has been to evaluate specific genes. In TNBC, the cluster of differentiation 47 (CD47) was previously shown to be associated with proliferation, migration, and apoptosis in human TNBC cells. Thus, this study investigates the hypothesis that CD47 is a potential addiction in TNBC cells. Using TNBC cell line MDA-MB-231, cells were cultured and transfected using the CRISPR/Cas9 gene editing system. Two CD47 homology-directed repair (HDR) plasmids and a control double nickase plasmid were used for transfection. Flow cytometry tests were then conducted to evaluate the transfection efficiency of cell lines. Upon CD47 knockout validation, this study evaluated the role of CD47 in oncogenic addiction via cytotoxicity and proliferation assays. Due to the initial stages of experimentation, this study is underway to confirm CD47's role as an oncogenic addition gene in TNBC cells.