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Emily Bross
Washington University in St. Louis

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Downregulation of RNA Editing Enzyme ADAR1 Reduces the Oncogenic Potential of Triple-Negative Breast Cancer

Emily Bross

Mentor: Jason Weber

Adenosine deaminase acting on RNA (ADAR1) is a RNA-editing enzyme that converts adenosine into inosine, resulting in alterations of the RNA sequence and subsequent downstream effects. It has been shown to be over-expressed in a variety of cancers including breast cancer but its exact role in tumorigenesis remains unclear. To better understand the effects of ADAR1 on breast cancer tumorigenesis, we generated shRNA-containing lentiviruses to knock-down the expression of ADAR1 in human breast cancer cell lines. We performed Western blot analysis to verify the successful knock-down of ADAR1 protein. We conducted focus formation assay to test the effect of ADAR1 knock-down on human breast cancer cell lines' proliferative abilities. We also performed scratch assay to test the metastatic potential of the same cell lines.

ADAR1 expression was successfully downregulated in all of the human breast cancer cell lines we tested. Interestingly, downregulation of ADAR1 reduced proliferation of triple-negative breast cancer (TNBC) cell lines while having little effect on the proliferation of non-TNBC cell lines. Scratch assay also revealed the downregulation of ADAR1 inhibited the migratory abilities of TNBC cell lines. These results suggest that ADAR1 is a key player in the oncogenic nature of TNBC. We are in the process of performing in vivo mouse studies to verify our findings from the cell culture system and to develop an animal model for future development of potential innovative treatment options. Further investigation promises to illuminate novel targeted therapeutic approaches currently lacking in the treatment of TNBC.