MALAT1 Silencing Reduces EDB-Fibronectin Expression and Invasive Morphology in Triple-Negative Breast Cancer

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Triple-negative breast cancer (TNBC) is one of the deadliest breast cancer subtypes because it lacks the receptors targeted by most therapies, leaving patients with few treatment options. This study explored whether silencing MALAT1, a gene known to drive cancer spread, could reduce EDB-fibronectin (EDB-FN), a protein that helps tumors invade surrounding tissue. TNBC tumor spheroids were grown in 3D and treated with MALAT1-silencing molecules (siRNA) or inactive controls. Gene expression was measured by qRT-PCR, EDB-FN protein was tracked using ZD2-Cy5.5 fluorescence imaging, and tumor shape was evaluated using a Solidity Index. Patient data from over 1,100 breast cancer cases were also analyzed to assess clinical relevance. Silencing MALAT1 reduced its expression by 91-95% and cut EDB-FN levels by 92-94%. Treated spheroids also became more compact and less invasive, with Solidity Index rising from 0.860 to 0.898. In patient data, high MALAT1 expression was linked to an 82% higher risk of death in TNBC. These results show that MALAT1 directly controls EDB-FN and invasive behavior in TNBC. This MALAT1-EDB-FN axis could serve as both a treatment target and an imaging biomarker, opening a path toward therapies that fight cancer while tracking it in real time.

Awards Won:
Third Award of $1,200