Award ID:
RP110080

Project Title:
Role of ST6GALNAC5's sialoside products in breast cancer metastasis to the brain

Award Mechanism:
Individual Investigator

Principal Investigator:
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Entity:
The University of Texas Southwestern Medical Center

Lay Summary:

The goal of this proposal is to identify the molecules that are involved in the ability of breast cancers to metastasize to the brain. Early detection and improved treatment options have enhanced the survival and remission rates for breast cancer patients. However, in 20-25% of breast cancer patients, the cancer metastasizes to the brain and, in those cases, life expectancy decreases dramatically. If we can understand why certain breast cancers metastasize to the brain, it may be possible to develop a way to prevent metastasis. Metastasis is believed to occur when breast cancer cells that are circulating in the bloodstream adhere (stick) to the capillary walls in the brain. Once they adhere, the cancer cells can cross the capillary walls and enter the brain tissue, where they begin to form metastatic tumors. Recent work identified a gene called ST6GALNAC5 that enables breast cancer cells to enter the brain, but the way that the gene works remains unknown. We propose that ST6GALNAC5 causes production of an unusual molecule that appears on the surface of breast cancer cells. This molecule can interact with a complementary molecule present in the lining of brain capillaries, in a Velcro-like fashion, causing the cells to stick together. Our research plan is to identify the cell surface molecules whose production is induced by the ST6GALNAC5 gene and to determine which of these molecules enables breast cancer cells to adhere to brain capillaries. Once we identify the critical molecules on the breast cancer cells, we will find the molecules they interact with in the brain capillaries. By uncovering the molecular details of breast cancer metastasis to the brain, we hope to facilitate future efforts to create therapies that will prevent brain metastasis.