



CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP130607

Project Title:
Role of Long Non-Coding RNAs in Breast Cancers: Identification,
Characterization, and Determination of Molecular Functions

Award Mechanism:
Individual Investigator

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

Lay Summary:

A key hurdle in developing better treatments for breast cancers is a lack of understanding at the molecular level of what promotes the growth of breast cancer cells. We are interested in determining why some breast cancers respond to estrogens, while others lose responsiveness and rely instead on growth factors. In this regard, we have developed a new method for detecting molecules in cells called "RNAs." This has allowed us to identify and characterize a large set of previously unidentified RNAs, called long non-coding RNAs (lncRNAs), in human breast cancer cells. lncRNAs are known to be aberrantly produced in cancer cells, and they play a key role in promoting and maintaining cancer cell characteristics. In this proposal, we will determine the role of lncRNAs in breast cancer cell biology. We predict that lncRNAs (1) are important regulators of estrogen- or growth factor-dependent breast cancer cell growth, (2) indicate the type or stage of breast cancer, or the response to therapeutic agents, and (3) are potentially useful therapeutic targets for treating breast cancer. We will use our new methodology in conjunction with a variety of biochemical, molecular, and cell-based assays to (1) identify all the lncRNAs in a panel of human breast cancer cell lines from the major breast cancer subtypes; (2) screen selected lncRNAs in human breast cancer samples and compare the results to clinical outcomes; (3) deplete selected lncRNAs in breast cancer cells and monitor the effects on cell proliferation; and (4) determine at the molecular level how specific lncRNAs turn genes on and off to control breast cancer cell proliferation. These studies will help to determine the role of specific lncRNAs in breast cancers, as well as the molecular mechanisms by which they act. Overall, our proposed studies will reveal a facet of breast cancer biology that is unknown and has great potential to change the way we think about, diagnose, and treat breast cancers.