



CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP160318

Project Title:
Role of Long Non-Coding RNAs in Breast Cancer: 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:

Breast cancer is the second leading cause of cancer-related mortality in women, with a 1 in 8 lifetime of risk for women in the United States. 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, and why some breast cancers grow in response to estrogens, while others do not. In this regard, we are studying a relatively new and uncharacterized class of molecules called long non-coding RNAs (lncRNAs). In successful and productive work in the previous round of funding of this grant, we identified ~1,900 lncRNAs in breast cancer cells differentially expressed across all subtypes of breast cancer. Some of them show elevated expression in breast cancer biopsies and act to control the growth of breast cancer cells. In the current application, we propose to study the molecular mechanisms by which breast cancer-associated lncRNAs drive proliferation, tumor formation, migration, invasion, and metastasis in breast cancers. We think that the molecular features of lncRNAs determine their ability to turn growth-regulating genes on or off, which in turn controls the growth and clinical phenotypes of breast cancers. Our experiments will test this using an integrated set of state-of-the-art experimental approaches from molecular biology, biochemistry, genomics, proteomics, cell biology, and animal models. Our studies will elucidate the molecular functions of lncRNAs in breast cancers, as well as provide the research community with new tools and approaches for studying lncRNAs. Collectively, our studies will: (1) advance the way that breast cancer research is conducted, (2) provide a new set of markers with great diagnostic and prognostic potential, and (3) provide a new set of targets for controlling breast cancer cell growth, which have therapeutic potential. As such, the proposed studies have the potential to reduce the mortality of breast cancer.