LCCC 1829 (HARMONY): **H**arnessing the **A**nalysis of **R**NA expression and **M**olecular subtype to **O**ptimize **N**ovel Therap**y** for Metastatic Breast Cancer

Treatment of metastatic breast cancer (MBC) is breast cancer that has spread from breast tissue to other parts of the body. Treating patients with MBC currently involves multiple lines of therapy. Advances in breast cancer research have led to many new drugs and combinations of drugs to treat MBC. Physicians choose drugs most likely to help patients with MBC based on information from clinical subtype markers for estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2). However, we know not all MBC patients with the same clinical subtype markers will respond to the same drugs. We think analyzing genetic material (called RNA) from inside cancer cells can give physicians more information about an individual patient's metastases and help physicians choose better specific treatments for patients with MBC.

The information from the RNA is called a molecular subtype and is sometimes used when treating breast cancer that has not spread to other parts of the body. Currently, we do not know if molecular subtype information can help physicians choose treatments for patients with MBC because it is not standard to provide physicians this information. HARMONY will provide molecular subtype information to physicians in real-time and measure how molecular subtypes are used in treatment of MBC. This information could potentially improve lives of patients with MBC by tailoring therapy specifically to an individual patient. We will also measure how the tumor responds to each therapy to determine if the tumor responded better to therapy guided by molecular subtype or clinical subtype information. HARMONY provides molecular subtype information from both initial breast cancer (breast tumor) and from metastatic sites (tumor outside of the breast). This information will allow us to determine how the molecular subtype from the breast tumor or the metastatic site is important in the treatment of MBC.

In addition to molecular subtype, RNA from the breast tumor and metastatic tumor sites can provide more information about tumor growth. HARMONY will study all RNA from both the breast and metastatic tumor sites to learn more about how the tumor spread from the breast to other parts of the body. In order to do this, we will use a new technology called digital spatial profiling (DSP). We hope this information will help to develop new markers important to understanding how MBC develops and how to best treat an individual patient's MBC.

HARMONY combines molecular information in real-time to assist physicians in the treatment of current patients with MBC and explores genetic information to help develop methods to improve the lives of future patients with MBC.