

Bankhead-Coley Cancer Research Program

Thompson, Aubrey

*Cancer Biology
Mayo Clinic*

*2010 Program
Research Project Grant
(5-year project)*

Project Title: Translational Genomic of Triple Negative Breast Cancer

Project Summary: Triple negative breast cancer affects some 30,000 women yearly in the U.S., with a predominant effect on young women and those of African descent, and is the most challenging type of breast cancer from a clinical standpoint. The disease is heterogeneous, some women do well while others do poorly; and there are no targeted therapies available for this type of breast cancer. Thus, there are two pressing clinical needs. We need new biomarkers to assess the risk of relapse in women with triple negative cancer, and we need to identify new therapeutic targets for treatment. These are our objectives. We will use massively parallel DNA sequencing protocols to identify a novel sort of mutation that arises due to gene fusion in primary tumors from triple negative patients. These mutations are absolutely tumor specific, not found in normal cells, and are therefore ideal biomarkers for risk prediction and stratification of this class of breast cancer. Since these mutations are tumor specific, they are also ideal therapeutic targets; and our objectives include identification of fusion gene mutations (which occur when two different genes are accidentally broken and stitched back together to form a new gene) that are required for tumor survival, growth, and/or spread. Our long-term goal is to apply this technology to individual patients, identify every mutation in each tumor, and tailor therapy to the specific types of mutations that drive the tumor.