

Bankhead-Coley Cancer Research Program

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Bridge (1-year project)*

Project Title: Cdk Activation Specifies Breast Tumor Subtype and Initiates Genetic Instability

Project Summary: Cancer is a disease of uncontrolled cell proliferation. A family of proteins called the Cdks stimulates cell proliferation and these proteins are over-activated in most breast cancers. Interestingly, different members of the Cdk family are over-activated in different types of breast cancer. This suggests that excessive activation of different Cdks may cause alternate types of breast cancer. This is significant because some types of breast cancer are associated with high survival rates whereas patients with other breast tumor types fare poorly. The first goal of this grant is to test the idea that different members of the Cdk family cause distinct types of breast cancer that differ in their aggressiveness. In addition to causing cell proliferation, Cdks can also cause mistakes during cell division. This leads to permanent genetic damage to the breast cell. This type of damage is present in almost all breast cancers and is thought to contribute to their aggressiveness. Thus, Cdks contribute to cancer in two ways: first by promoting cell division and second by causing mistakes during cell division. It is not clear which of these effects is more important for Cdk family members to promote breast cancer. The second major goal of this grant is to determine whether Cdk stimulation of cell division, or mistakes in cell division caused by Cdks, are more important to the ability of this family of proteins to promote breast cancer formation and growth. The ultimate goal of these studies is to determine whether inhibiting the activity of the Cdk proteins is an effective strategy for suppressing breast tumor growth, and more importantly, assessing whether inhibiting different Cdk family members can prevent the formation of specific types of breast cancer.