Susan G. Komen

Research Grants – Fiscal Year 2015

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Control of mitochondrial function by EglN2 in breast cancer

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Public Abstract:

Among breast carcinomas, approximately 70% are estrogen receptor (ERa)-positive and estrogen-dependent. Tamoxifen is the single most effective drug for pre-menopausal patients, and targeting estrogen signaling is the core of therapeutics for metastatic disease in patients with ERa-positive tumors. The development of acquired resistance to ER-targeted therapies occurs in about 30-40% of women treated with tamoxifen for 5 years, which accounts for the greatest barrier to extended disease control in this cancer. In addition, the transition from tamoxifen sensitivity to tamoxifen resistance is associated with a rapid decline in survival time, essentially bringing about the beginning of the end for women with breast cancer. Therefore, it remains urgent to develop new therapeutic invention strategies to target breast cancer in addition to traditional tamoxifen treatment.

One of fundamental questions and challenges for cancer therapy is: What drives breast cancer cell growth and how we can stop it? In order for breast cancer cells to grow, they need to obtain necessary energy. The most important compartment in the cells for providing the energy is called the "mitochondrion". Mitochondria are essential for providing energy for cancer cells to grow. Therefore, if we can inhibit mitochondrial function in breast cancer cells, we may starve the cancer cells leading to cancer cell death. This strategy will benefit all cancer patients because it will help to solve the fundamental question for cancer therapy.

Our study aims to study how we can inhibit mitochondrial function in breast cancer. Our preliminary studies suggest that EglN2 is a master regulator controlling mitochondrial function. Our objectives are: (1) to validate and investigate the mechanism by which EglN2 regulates mitochondrial function in breast cancer; (2) to develop a small molecular screen to target EglN2 in breast cancer. Our ultimate goal from this study is to develop novel therapeutic interventions to target mitochondrial function and eliminate breast cancer growth. The outcome from this study will help identify new potential breast cancer therapies.