Susan G. Komen

Research Grants – Fiscal Year 2015

This research grant was approved for FY2015 Research Programs funding. This grant will be funded upon the execution of grant agreements between Komen and the grantee institutions.

Targeting the stem cell niche in aggressive breast cancers

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Lead Organization: University of California, San Diego

Grant Mechanism: CCR Basic and Translational **Grant ID:** CCR15330839

Public Abstract:

There are still no effective therapies for patients with the most aggressive types of breast cancer. Increasingly, we are becoming aware that this is because breast cancers are complex. We now know that a single human breast tumor can consist of many different types of tumor cells, each with different jobs. Some of these cells are very similar to the normal stem cells present in adult breast tissue. These "stem-like" tumor cells are actually the most devious cells, causing tumors to recur after treatment or surgery and forming distant metastases that can often prove fatal. My project focuses on ways to specifically block these "stem-like" tumor cells. By targeting a molecular pathway that I recently discovered was important for normal breast stem cells, I hope to show that this strategy can eradicate "stem-like" tumor cells, offering a new treatment option for patients with the most aggressive breast cancers and reducing mortality due to recurrence and metastasis in breast cancer patients.

Clinical trials testing potential breast cancer drugs, including Src inhibitors, have had an alarmingly low rate of success, indicating a great need for new approaches to this problem. My proposed studies represent a change in how potential breast cancer therapies are identified and tested in the laboratory. Instead of focusing on the ability of Src inhibitors to shrink the tumor bulk, my project will assess how

targeting “stem-like” tumor cells will reduce recurrence and metastasis, effects that are arguably more clinically relevant than tumor shrinkage. In fact, our preliminary data indicates that this approach will have no effect on tumor size. Importantly, we plan to use a Src inhibitor, dasatinib, already approved for use in patients, thereby accelerating the potential for translating successful outcomes from these studies into the clinic.

This research project represents a synthesis of many distinct areas of cancer biology, all brought together with the goal of “changing the game” with respect to how we think about and treat breast cancer. I believe this research may prove very important to the breast cancer patient and survivor community as it has the potential to offer new therapeutic possibilities for aggressive breast cancers that are currently untreatable, leading to a reduction in breast cancer mortality. Additionally, if successful these studies may lead to fundamental changes in breast cancer therapy in the clinic, with a focus on targeting the “stem-like” tumor cells to prevent recurrence and metastasis post-surgery or chemotherapy.