Susan G. Komen for the Cure
Research Grants – Fiscal Year 2011

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Mechanisms of cell migration and invasion in aggressive breast cancer

Investigator(s): Morag Park, PhD
McGill University, PQ
Grant Mechanism: Post Doctoral Fellowship - Basic Research
Fellow: kossay zaoui, PhD
Awarded**:** $180,000.00
Research Focus: Biology

Public Abstract:
Metastatic breast cancer remains the biggest challenge to successfully manage this disease. Once breast cancer cells leave the primary site and spread to distant organs, the disease is largely incurable. The ability of cancer cells to undergo metastasis and establish new tumours at the metastatic site is dependent on their capacity to move and invade the surrounding tissue. Cell migration and invasion however, are also involved in many normal processes such as the immune response, wound healing and the development of new blood vessels. Importantly, the expression of a molecule called the Met receptor implicated in this pathway is elevated in human breast cancers that are associated with progression to metastatic disease and overall poor prognosis. We have identified a new and previously unsuspected pathway that regulates the migration and invasion of human breast cancer cells by the Met receptor. We show and will test in this application that this pathway and specifically a gene called GGA3 are required for cell migration and invasion in human breast cancer cells. I will determine the molecular mechanism(s) through which these molecules mediate cell invasion and determine if this is a key regulatory process for metastatic breast cancer. My research plan involves a large-scale screen to test how the individual loss of function different molecules can alter the ability of a breast cancer cells to form a metastasis. This screen will be performed using an automated microscope already available at my host institute, the Goodman Cancer Center. Candidate molecules identified in this screen will then be validated for their role in cell movement and ability to induce tumour cell metastasis in mice. Using a multidisciplinary approach to study cell movement will provide me with latest technical skills and knowledge to continue my own independent research in the field of breast cancer metastasis. Understanding this signal transduction pathway and how this impacts on cell migration is crucial to better understanding of its dysregulation in cancer formation facilitating the development of new therapeutic interventions for metastatic progression in breast cancer. Since small molecule inhibitors, as well as antibody based therapies targeting some of these molecules are currently in clinical trials this could lead to a rapid intervention in metastatic breast cancer. My current research on novel mechanisms of regulation of breast cancer cell migration and invasion is expected to greatly improve our understanding of basal breast cancer in particular, a subclass of breast cancer for which there are no targeted therapies.

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