Susan G. Komen
Research Grants – Fiscal Year 2014

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Global cell characterization of the BRCA1 interactome using the NEDDylator

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Lead Organization: University of California, San Francisco
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Public Abstract:
Mutations in the breast cancer type 1 susceptibility (BRCA1) gene are reported to account for up to 80% of tumors in hereditary breast cancer patients. This has personally and recently had a dramatic impact on my family. Given the significance, it is imperative that the scientific community better understand the role of the BRCA1 protein as a master hub for maintaining cellular DNA stability and tumor suppression. Here we propose a research project using novel molecular biology technology, called the NEDDylator, to elucidate BRCA1 interactions in breast cells in significantly greater detail than ever before. The NEDDylator enables the labelling and identification of interacting partners of proteins in cells better than any existing techniques. A BRCA1 NEDDylator will offer unique scientific insight into the BRCA1 cellular interactome under the context of normal conditions or with clinical mutations, and under states of induced genome stress. It will significantly broaden our current view of the highly complex protein network and multifunctional nature of mutated BRCA1 that is ultimately responsible for driving tumor formation. The results hold potential to have a long-term impact within the next decade, offering new therapeutically relevant BRCA1 interactions as drug targets to treat and prevent breast cancer.