



Susan G. Komen

Research Grants – Fiscal Year 2015

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MR imaging phenotypes of breast cancer

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Lead Organization: University of California, San Francisco

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Public Abstract:

MRI is an information-rich imaging modality that produces clear anatomic representation of soft tissue and also reflects underlying tissue biology. The MRI signal can be sensitized to tissue properties including water/lipid content, vessel density and blood flow, water diffusion and cellularity. These properties can be characterized three-dimensionally over the entire breast. The standard method for performing MRI of the breast uses a contrast-enhanced technique to highlight areas of tissue with increased vascularity, a hallmark of malignancy. Contrast-enhanced MRI, using an injected gadolinium-based contrast agent, has shown greater sensitivity for breast cancer detection and better ability to demonstrate the extent of cancer in the breast than mammography and ultrasound. However, the low specificity of contrast-enhanced MRI of the breast limits its diagnostic utility. While most research is focused on improving the diagnostic specificity of dynamic contrast enhanced (DCE) MRI for cancer detection, there is considerable additional information contained in MR images that we do not currently exploit. The goal of this project is to develop high-resolution non-contrast enhanced methods for characterizing breast tissue, and to use these methods in conjunction with standard DCE-MRI to study the relationship between imaging phenotypes and clinical, molecular and genomic factors associated with breast cancer and breast cancer risk. We



hypothesize that functional MR imaging approaches will improve the ability to characterize breast tissue heterogeneity leading to non-invasive methods for both breast cancer diagnosis and risk assessment. This project will develop high resolution approaches for evaluating breast tissue T2 (intrinsic relaxation parameter), diffusion and perfusion, and these techniques will be used in combination with standard DCE-MRI to explore the biologic heterogeneity of breast tumors and surrounding stromal tissue.

