

NIH COMMON FUND HIGH-RISK HIGH-REWARD RESEARCH SYMPOSIUM

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POSTER ABSTRACTS – SESSION 1 (DEC. 15, 2014)

An *in vivo* sensor for detection of cancer metastasis

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Awardees Institution: Northwestern University

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Breast cancer is a leading cause of death for women, with mortality resulting from metastasis. Currently, metastases are often detected once tumor cells affect the function of one or more solid organs, with a high disease burden limiting effective treatment. Herein we report a method for early detection of metastatic cells using a biomaterial scaffold implant to recruit and capture metastatic cells *in vivo*, which achieved high cell densities within the scaffold and a reduced tumor burden within solid organs. Recruitment to the scaffold was mediated, in part, by the local immune cells. The presence of metastatic cells in the scaffold was identified through a label-free detection system using inverse-spectroscopic optical coherence tomography (IS-OCT), which identifies changes to nanoscale tissue architecture associated with the presence of tumor cells. If applied at the time of tumor resection or completion of primary therapy for patients at risk for the recurrence of malignancy, this technology has the potential to identify metastatic disease at the earliest stage. This early identification could then enable initiation of life-preserving therapies while the disease burden is low, favorably impacting disease course.

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