

SYNTHETIC PRE-METASTATIC NICHES FOR DETECTION AND ANALYSIS OF EARLY METASTATIC CELLS

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Systems and strategies for promoting tissue growth provide enabling technologies for either enhancing regeneration for diseased or injured tissues, or to investigate abnormal tissue formation such as cancer. Breast cancer is known to metastasize to specific sites (e.g., lung, liver), and we have developed implants that mimic key aspects of the pre-metastatic niche, with the objective of capturing metastatic cells for the early detection of metastatic disease. These implants reduce the burden of disease in solid organs and provide a survival advantage when combined with early interventions. Additionally, we have applied systems biology approaches to analyze cancer cell and immune cell phenotypes at primary and metastatic sites, and as a tool to investigate the development of resistance to therapies that are unfortunately all too common for many patients. The analysis of a metastatic site complements existing approaches based on a liquid biopsy, which provides distinct information about disease progression and may ultimately enable a molecular staging of metastatic disease.