

Biography

I am a molecular oncology translational scientist with experience in fundamental and translational cancer research, focusing on the biological determinants of tumor progression, metastasis, and therapeutic response. My work centers on breast cancer and combines mechanistic biology with the development of clinically relevant preclinical models to identify vulnerabilities that can inform precision oncology.

A major focus of my research has been invasive lobular carcinoma (ILC), the most common special histological subtype of breast cancer and a predominantly estrogen receptor-positive disease with distinct biological and clinical characteristics. I have contributed to addressing the longstanding scarcity of clinically relevant ER-positive and lobular breast cancer models through the development and optimization of intraductal xenograft approaches that reproduce important features of human disease, including hormone responsiveness, tissue architecture, invasion, metastatic behavior, and extracellular matrix interactions.

The underlying intraductal ER-positive modeling strategy has been described in the scientific literature as a potential “game-changer” for preclinical breast cancer research and has subsequently enabled mechanistic and translational investigation of hormone response, metastasis, microenvironmental dependencies, therapeutic vulnerabilities, dormancy and adjuvant therapies.

My current research expands this work into breast cancer radiotherapy and precision medicine, with particular emphasis on tumor heterogeneity and differential treatment responses. I am interested in understanding how inter- and intratumoral heterogeneity, cellular plasticity, the tumor microenvironment, and DNA-damage and repair mechanisms influence sensitivity or resistance to ionizing radiation and multimodal therapy. My goal is to identify biological determinants and predictive biomarkers of treatment response and to use physiologically relevant experimental models to support patient stratification and more individualized therapeutic strategies. The emerging evidence that ILC may possess distinctive radiation-response biology makes this an especially important area for mechanistic investigation.

My broader interests encompass preclinical cancer models, breast cancer metastasis, invasive lobular carcinoma, endocrine resistance, preclinical radiotherapy, precision oncology, treatment-response heterogeneity, tumor plasticity, tumor microenvironment, extracellular matrix biology, tissue architecture, drug discovery, patient-derived models, organoids, tumor explants, and advanced 2D, 3D, and in vivo experimental systems.