Quantifying Molecular Crosstalk During Breast Cancer Progression Using 3D Cell Culture Models with Nano-microstructured Detail

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Objective

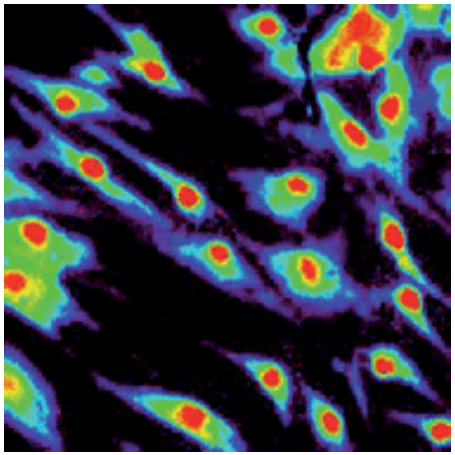
To develop label-free and multiplexed labeled methods to record molecular cross-talk between epithelial cells and fibroblasts during early breast cancer progression. Novel three-dimensional cell co-culture models and nanoprobes will be used to understand the dynamics of paracrine signaling events that lead to lethal tumors.

Research Highlights

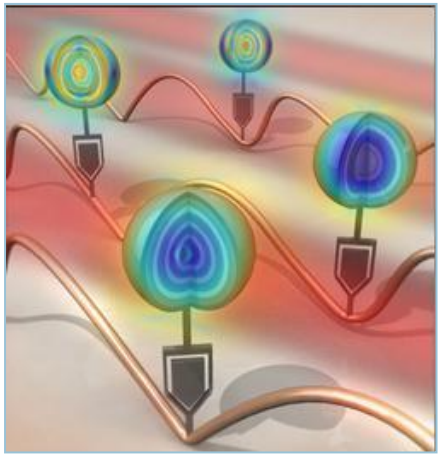
- Developed a three-dimensional cell co-culture model for breast cancer progression
- Analysis of co-culture model using chemical imaging
- Using chemical imaging and gene expression analysis to determine the effects of estrogen and tamoxifen on epithelial cells grown in 3D culture
- Determine appropriate targets for nanoparticle conjugation

Future Research

- Integrating nano-LAMPs into molecular profiling of stromal-epithelial crosstalk in 3D co-culture models
- Collaborate with physicians at Mills Breast Cancer Institute to detect biomarkers of disease in human samples using nanoprobes



ATR FT-IR was used to determine chemical changes in cancer-associated fibroblasts



nanoLAMPs will be able to detect and enhance chemical signals from analytes occurring at very low concentrations