



## Breast Cancer PhD Research Projects

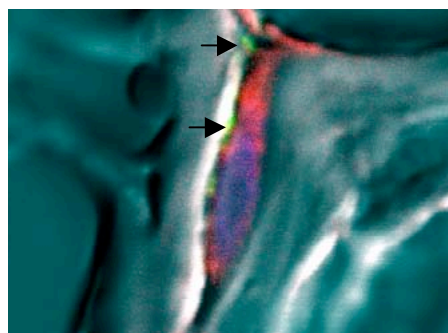
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### **Project 1: Identifying risk factors in breast cancer.**

High mammographic density (HMD) imposes up to a six-fold increase in the risk of developing breast cancer but the pathophysiologic causes are not well understood.

**Aim:** This project aims to investigate the expression of metastatic markers in HMD samples from cancer patients; these markers have been identified from in vitro studies performed in Dr Soon's lab that showed upregulated in expression in cells invading into dense matrices. Immunological and biomolecular imaging techniques will be applied. This project has great potential in the derivation of marker genes that can be used in future diagnosis of cancer risks associated with HMD as well as in developing appropriate therapeutics.

*Fig. 1. A Tumour cell invading into HMD tissue expresses proteases (Green staining and arrows) at the invasive front.*



### **Project 2: Molecular mechanisms of cancer cell invasion**

We have discovered a novel migration mode, based on cancer cell invasion into highly dense matrices that mimic the higher range of breast tumour matrix densities. The cell protrusions for example, form by a unique process that involves membrane ruffling and the formation of curved filopodia. The function of the protrusions is to generate traction during cell migration by forming a stronghold over collagen fibres.

**Aim:** This project aims to uncover new regulatory pathways involved in cell invasion. The data will alter current paradigms on the invasion process, influencing the discriminate use of therapeutics in breast cancer treatment.