

A Novel Hybrid Imaging System to Aid in Surgical Decision Making

Background:

Breast cancer accounts for 25% of all cancer cases among women. In breast-conserving surgery, a common treatment, the tumour is excised with a healthy tissue margin. However, detection of the margin can be difficult. Current techniques to guide excision are often insufficient, and re-excision can occur up to 25% of the time.

Methods:

Photoacoustic imaging (PAI) is a hybrid imaging modality that combines the advantages of optical imaging and ultrasound while using safe non-ionizing light. This project involves the development of a novel imaging system with a new scanner design to overcome common limitations and provide images to aid in surgical decision making.

Results:

A new imaging system has been developed and tested with imaging phantoms.

Discussion & Conclusion:

Results obtained with imaging phantoms are promising; high resolution images with good contrast have been shown. Further research using surgical excised tumour specimens will be conducted as a pilot study.

Interdisciplinary Reflection:

Various imaging methods are combined and applied to medical needs. In addition, this imaging system is incredibly versatile and can be used for many areas of research including animal studies, human studies, and from macroscopic imaging to microscopy.