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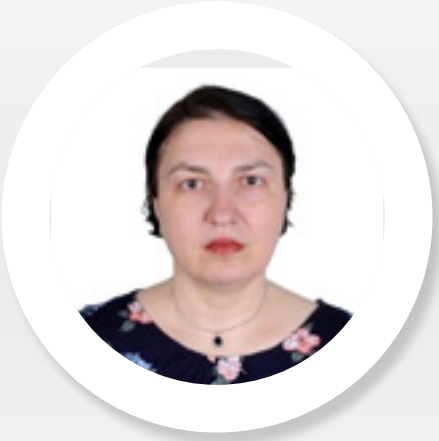
# Assessment of malignant cancer and benign tumors using non destructive vibrational spectroscopy



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Breast cancer is diagnosed by histopathological examination of breast biopsy material but this is subjective and relies on morphological changes in the tissue. Vibrational spectroscopy imaging techniques such as FTIR and FT-Raman imaging have been proposed to be a possibly effective assistant to current histopathological procedures in different types of breast tissues: a) healthy control (areas taken from site else than the tumor), b) benign tumors such as fibro-adenoma and ductal papilloma, c) cases with increased risk of malignancy such as usual ductal hyperplasia and d) malignant such as infiltrative ductal carcinoma. FTIR and FT-Raman imaging spectroscopy were applied in order to investigate the breast tissue cells and tissue structures that constitute a vital part of breast malignancy. Vibrational spectroscopy uses incident radiation to induce vibrations in the molecules of a sample and the scattered radiation can be used to characterize the sample. This technique is rapid and non-destructive and is sensitive to subtle biochemical changes occurring at the molecular level. This allows spectral variations corresponding to disease onset to be detected. The aim of this work was to use FT-IR and FT-Raman spectroscopy to discriminate between benign lesions and cancer using formalin fixed paraffin preserved (FFPP) tissue. Haematoxylin and Eosin stained sections from the patient biopsies were marked by a pathologist. FT-IR and FT-Raman maps were recorded from parallel unstained tissue sections. Immunohistochemical staining for estrogen receptor (ER) and human epidermal growth factor receptor 2 (HER2/Neu) was performed on a further set of parallel sections. Both benign and cancer cases were positive for ER while only the cancer cases were positive for HER2. Significant spectral differences were observed between the benign and cancer cases and the benign cases could be differentiated from the cancer cases with good sensitivity and specificity. This study has shown the potential of vibrational spectroscopy as an aid to histopathological diagnosis of breast cancer, in particular in the discrimination between benign and malignant tumors

## Biography

Carmen Ali has completed her graduation (Bachelor of Veterinary and Biological Science) from University of Sydney. Currently is pursuing her Master's (Clinical Studies in Animal Practice) at Murdoch University. She is specialized in Bio-spectroscopy and has several publications and presented many posters in different international conferences.

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