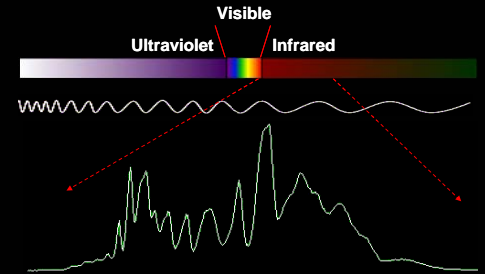


CANCER DIAGNOSTICS USING INFRARED SPECTROSCOPY

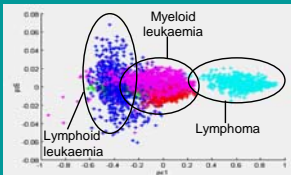
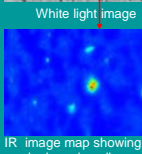
- Infrared (IR) Spectroscopy uses the infrared region of the electromagnetic spectrum that interacts with a sample.
- The amount of light absorbed by a vibrating bond of functional groups has a linear relationship to concentration, with the IR spectrum of a sample being a direct indicator of its chemical composition.
- The spectral changes in the IR spectrum result from structural changes in the molecular configuration of functional groups in a cell or tissue, which are key factors that differentiate abnormal from normal.



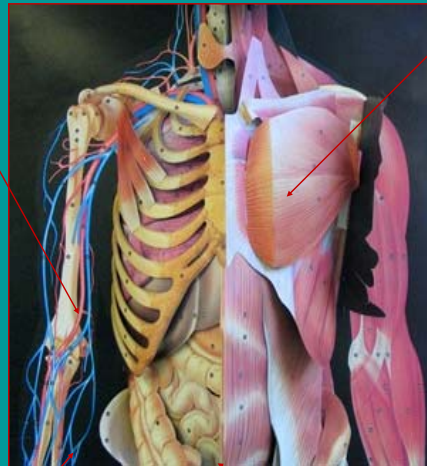
LEUKAEMIA AND LYMPHOMA

Jaspreet Babrah

- Leukaemia and lymphoma combined represent 5% of all cancers in the UK.
- Infrared imaging combined with multivariate-statistical analysis (PCA) provides a potential insight into disease process.
- The spectral differences may indicate different pathological subgroups of leukaemia and lymphoma cells due to variations in cellular contents.



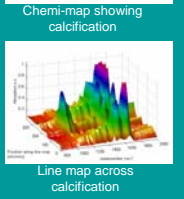
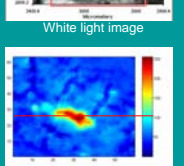
AREAS OF RESEARCH



CALCIFICATIONS IN BREAST TISSUE

Rebecca Baker

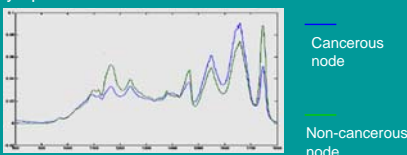
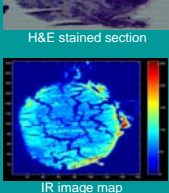
- IR can be used to analyse calcifications within breast tissue which is important for the diagnosis of early breast cancer.
- Construction of a chemi-map allows complete spectral visualisation of the calcified area.
- Principal component analysis shows variations within the spectral map. A 3D map can be constructed, representing spectra across the line, showing bands representative of calcifications.



LYMPH NODE METASTASIS

Martin Isabelle

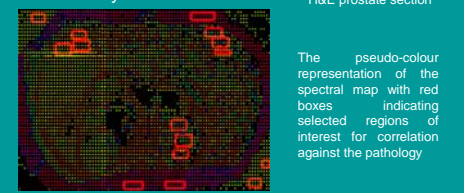
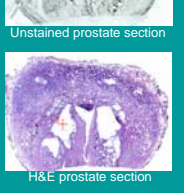
- Infrared maps demonstrates distinction of different tissue types and structural domains within the lymph node.
- Infrared spectra shows biochemical changes taking place in carcinogenesis and metastasis within tissue.
- As a potential diagnostic tool able to differentiate between involved (cancerous) and non-involved (non-cancerous) lymph nodes



PROSTATE CANCER

Jon Aning

- Prostate cancer is the most common cancer in men in the UK.
- Current histological analysis of prostate tissue is limited, subjective and in need of improvement.
- FTIR is able to discriminate between prostate pathologies objectively and provide biochemical and structural information about the tissue under analysis.



ADVANTAGES OF IR SPECTROSCOPY



Requires small sample volume

Non-invasive

Highly sensitive to minor biochemical changes

Little or no sample preparation

Collaborators :

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Cranfield Health: K. Rogers, C. Bessant

