Investigating Raman Spectroscopy for the Diagnosis of Brain Tumours from Serum

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In 2010, some 9,156 people were diagnosed with brain and other CNS tumours in the UK and just under half of these cases resulted in death [1]. The current gold standard method for the diagnosis of malignant brain tumours is surgical removal of the tumour, which then undergoes histological examination for grading. This method is invasive and subjective and for this reason it is important for the welfare and comfort of the patients to develop a new diagnostic technique.

Raman spectroscopy is an analytical technique based on the inelastic scattering of light and has been widely used in research of cancerous biological samples [2-3]. This is mainly due to the rapid operation, little sample preparation and in this case, being non-invasive for the patient. A previous study has shown the diagnostic potential of brain tumours using ATR-FTIR using serum samples with high sensitivity and specificity [4].

We report the use of Raman spectroscopy combined with pattern recognition algorithms as a diagnostic tool using high-grade, low-grade and normal (non-cancer) serum samples. A Raman spectroscopic diagnostic protocol using whole serum samples will be cost effective, relatively non-invasive and provide a regime in the rapid brain tumour diagnosis. We will also discuss the potential of data fusion between Raman and ATR-FTIR for serum diagnosis.

References:

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