Reviewer's report

Title: A Three-Dimensional Multivariate Image Processing Technique for the Analysis of FTIR Spectroscopic Images of Multiple Tissue Sections

Version: 1 Date: 31 July 2006
Reviewer: Peter Gardner

Reviewer's report:

General
This paper presents a method by which Fourier Transform Infrared (FTIR) spectra from tissue sections can be analysed using multivariate techniques and the results displayed in three dimensions. Importantly a single analysis is performed on all four sections in order to ensure compatibility in the third dimension. (In principle the four tissue sections could be analysed separately and stacked together but this would not necessarily give the same result). The results demonstrate the feasibility of the method and thus represent a significant step forward in using FTIR spectroscopy for diagnosis. Over all this is an excellent paper which makes an important contribution to the field. It will be of interest to a number of groups who are working in FTIR guided diagnosis and who have an interest in bringing this techniques into the clinical environment.

The paper is clearly written, and the data well presented. I also found the additional material (the 3-D video) useful in gaining a better understanding of the importance of the 3-D analysis and subsequent visualisation. I am happy to recommend publication after the authors have considered the minor discretionary revision below.

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Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)
None
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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)
None
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Discretionary Revisions (which the author can choose to ignore)

It has recently been suggested that the identification and characterisation of tissue samples by multivariate analysis of FTIR data can be improved using high spatial resolution. In this paper the FTIR data could be recorded using a nominal pixel resolution of 5.5 microns but is degraded to 22 microns using 16 pixel aggregates. This is presumably necessary to save time in data processing.

It would be valuable to know how long it takes to process the data once it has been recorded. Although I appreciate that this work is a demonstration of the analysis method, one of the advantages of FTIR is that it is potentially a rapid diagnostic technique. If the data processing takes considerably longer than the measurement time then, some of this advantage is lost. Although data analysis can always be speeded up with more computing power there is then a cost implication.

What next?: Accept after discretionary revisions

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No

Declaration of competing interests:
'I declare that I have no competing interests'