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: 6 August 2006

Reviewer: Francis L Martin

Reviewer's report:

General The paper clearly outlines the aims and clear benefits of using IR as an imaging tool over conventional techniques e.g X-rays.

The paper adds a number of novel additions to IR imaging with the building of "3D images" possible which is nicely demonstrated with the mpgs (Supplemental). Images are built using a range of wavenumbers, rather than conventionally using on absorbance peak, which is a very useful idea and potentially a much better approach. The authors make much of an unusual pathological condition without drawing attention to the use of this tool in more typical conditions. The authors should refer to the possibility of using this tool to characterise stem cells (German et al, IOVS (2006)) or conformational changes in a particular tissue (German et al, Biophys J (2006)).

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Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached) It would be useful if they expanded on how long it would take to build up an image rather than "within a reasonable time frame", would it be feasible in routine screening for example?

The theory of IR mapping is very well explained but how this could be exploited. Again, the authors should point to other non-pathological applications of this technique ((German et al, IOVS (2006), (German et al, Biophys J (2006)).

The methods section is comprehensive, but due to the nature of the paper is quite difficult to fully understand without specialist knowledge. It does however cover in detail all relevant information.

The results clearly demonstrate that this is a valid approach which can distinguish between different tissue structures.

The discussion and conclusion are also good as they explain the implications of the IR mapping model working which is sufficiently backed up with the presented results.

Overall, I think it is a good paper as it introduces a really quite promising technique. There doesn't appear to be a huge amount of data though as only 4 tissue sections are used to build up a 3D map.

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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)

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Discretionary Revisions (which the author can choose to ignore)

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What next?: Accept after minor essential 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.