

This work was part of collaboration between the Materials Dept. of IST and the Laboratory for Intensive Care Research and Optical Spectroscopy, Erasmus Medical Center, Rotterdam, Holland.

## Abstract

Vibrational spectroscopy can provide detailed information about molecular composition and molecular structure of tissues. Diseases are accompanied by changes in molecular composition and structure and, therefore, by changes in their vibrational spectra. Raman spectroscopy does not require sample preparation and is a non-destructive technique, so it is ideally suited for *in vivo* measurements and valuable information can be obtained in a matter of seconds. Therefore, Raman spectroscopy meets important prerequisites for the development of tools for *in vivo* real-time tissue analysis, during clinical procedures such as endoscopy, biopsy and surgery.

The work aimed the optimization of fiber optic instrumentation, measurement methodology and signal analysis for tissue characterisation by Raman spectroscopy, with possible applications in:

- detection and characterisation of atherosclerotic tissue;
- detection of tumour tissue;
- monitoring of water concentration in the brain.

## Publications

L.F. Santos, R. Wolthuis, S. Koljenovic, R.M. Almeida and G.J. Puppels *Optic Probes for in vivo Raman Spectroscopy in the high wavenumber region* Analytical Chemistry, Vol 77(20), 2005, 6747.

S. Koljenovic, T.C. Bakker Schut, R. Wolthuis, B. de Jong, L. Santos, P.J. Caspers, J.M. Kros and G.J. Puppels *Tissue characterization using high wavenumber Raman spectroscopy*, J. of Biomedical Optics 10(3) (2005) 031116.

A. Nijssen, K. Maquelin, L.F. Santos, P.J. Caspers, T.C. Bakker Schut, J.C. dan Hollander, H.A.M. Neumann, G.J. Puppels, "Discriminating basal cell carcinoma from perilesional skin using high wave number Raman spectroscopy". In preparation.

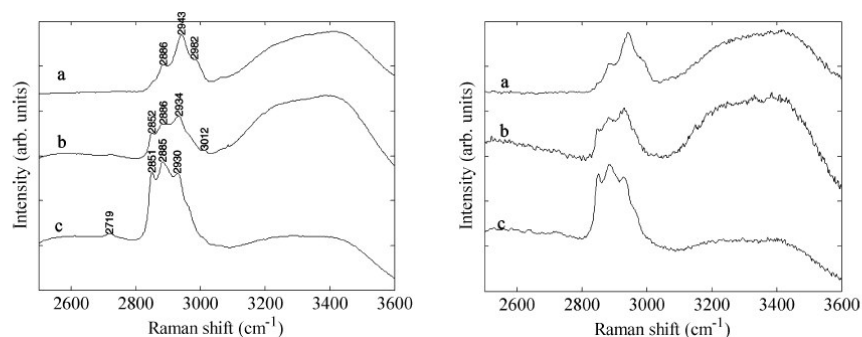


Figure – Single-fiber HWVN Raman spectra of porcine brain tissue. Measurements of (a), dura (b) gray matter, (c) white matter; obtained with signal collection times of 60 s (left panel) and 1 s (right panel).