There have been significant advances in vibrational biomedical spectroscopy in recent years. Diagnostic and prognostic tools based on the new technologies have the potential to revolutionize our clinical systems leading to improved patient outcome, more efficient public services and significant economic savings for healthcare society.

In particular, the advantages as well as limitations of Raman spectroscopy in biomedical samples analysis are presented. Several examples of application of confocal Raman imaging to study in vitro endothelial cells, and ex vivo tissue of various mice models (e.g. atherosclerosis, diabetes, fatty liver) is demonstrated, including a novel approach to investigate primary cells isolated from the liver and heart. A general overview on other Raman spectroscopy techniques, e.g. Coherent anti-Stokes Raman Spectroscopy (CARS), Surface Enhanced Raman Spectroscopy (SERS), Tip Enhanced Raman Spectroscopy (TERS), Stimulated Raman Spectroscopy (SRS), in the medical samples studies is also shown. Perspectives of the translation of Raman spectroscopy into the clinical environment for the general benefit of patients are discussed.

**Keywords:** Raman spectroscopy; imaging; CARS; SERS; TERS; SRS

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**References**

