



## Label free cellular characterization by Micro-Raman spectroscopy

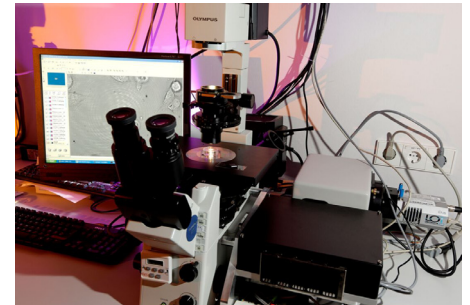
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### BACKGROUND and BASICS

Sterility testing and cellular characterization is essential for the production process of transplants in tissue engineering. Raman spectroscopy provides a label free and non-destructive approach to detect sterility, vitality and cellular characterization.

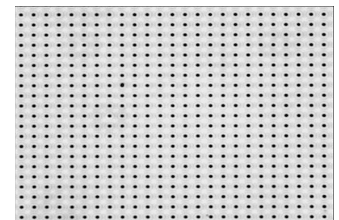
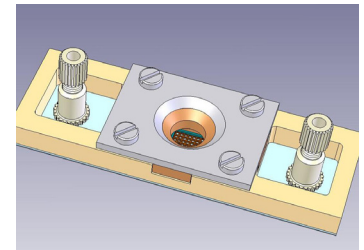
The **aim** of our work is to develop a system for automated measurement of biological samples for the purpose of sterility testing, vitality and cellular characterization, by means of cell type discrimination and cellular differentiation states.



### CONCEPT and SOLUTION

The **principle of operation** is first the sorting and positioning of particles, like cells on a planar surface in a micro-fluidic cell. The optical setup consists of a commercial microscope coupled with a Raman system, where image analysis and spectroscopy takes place.

The **advantage** of this setup is the possibility to perform a marker independent chemical analysis of a sample. No sample preparation is necessary before the measurement. The main disadvantage of the system is the limitation of measuring times from 60-100 s per spectrum and the low signal from single bacteria at the surface of the filter chip.

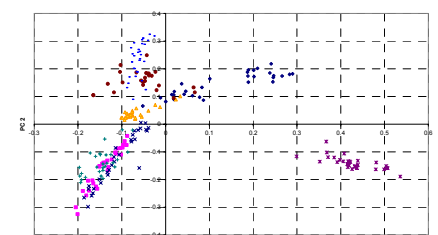


### STATUS and OUTLOOK

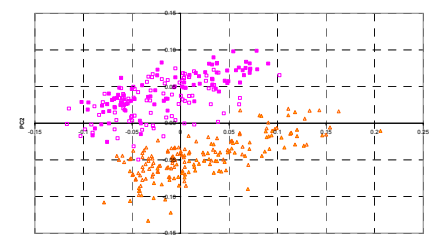
In the current R&D project we develop an automatized system for sterility testing and cell characterization and a micro-fluidic cell for cell positioning. Actually we can show the proof of principle for the feasibility of the system for the Raman based measurements on microorganisms and cells as well as the possibility to position particles, microorganisms and cells on a micro-fluidic chip.

**Further activities** deal with the testing of the whole set up, including Raman spectrometer, microscopy and the fluidic cell. Further the optimisation of the Raman set up and optimisation of the data interpretation will be implemented.

**We are looking for** partners for R&D and for acquiring public funding to expand the application of Raman spectroscopy in the biological field of research.



■ P. aeruginosa ■ C. albicans ■ E. coli ■ SAOS-2 ■ B. subtilis spores ■ B. subtilis ■ SW1353 ■ S. aureus



■ SAOS-2 vital ■ SAOS-2 nekrotisch ■ SW1353 vital ■ SW1353 nekrotisch

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