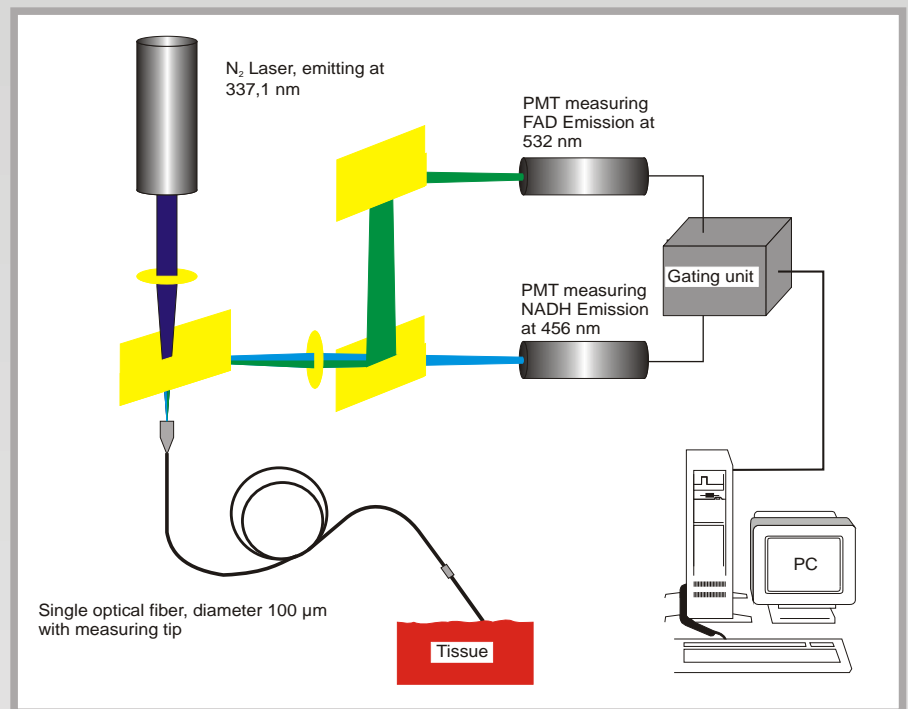


Tissue Identification for minimal invasive surgery using the fluorescence of NADH and FAD

The identification and discrimination of tissues during surgery or for diagnostic purposes is an important task in medicine. The specific fluorescence of the tissue can be used to identify different tissues or changes due to cancer. The combination of a small optical fibre with a needle for biopsy opens the door for the so called optical biopsy.

Tissue fluorescence arises from the superposition of the fluorescence of a number of molecules in the tissue. In the frame of the project we have picked the fluorescence of the two coenzymes NADH at 460nm and FAD at 550nm. The ratio of the fluorescence of the two coenzymes is specific for individual tissues. To improve the signal to noise ratio of the fluorescence measurement, the detectors for the emitted light are gated. The figure besides shows the measurement set-up used for the experiments.



The figure on the right shows the measured fluorescence intensity on a meniscus of five different pigs. The measurement points were arbitrary distributed over the surface of the meniscus. The intensity of the fluorescence of the individual coenzyme varies dramatically over the measurement points. The variation of the ratio of the intensities is much less and might therefore be used to discriminate the tissues.

