

MPTflex

Flexible in-vivo Multiphoton tomography for optical biopsy

In vivo optical biopsies with subcellular spatial resolution based on near infrared femtosecond laser technology for:

- melanoma detection
- diagnostics of dermatological disorders
- tissue engineering
- cosmetic research, skin aging
- in situ drug monitoring
- animal research studies
- stem cell research
- detection of fluorescent proteins



Product description

The MPTflex is a CE- marked medical system based on femtosecond multiphoton excitation of biomolecules like NAD(P)H, flavins, porphyrins, elastin and melanin. The extracellular matrix element collagen can be identified by its second harmonic generation (SHG). Autofluorescence and SHG signals are recorded by fast highly sensitive PMT detectors with single photon sensitivity.

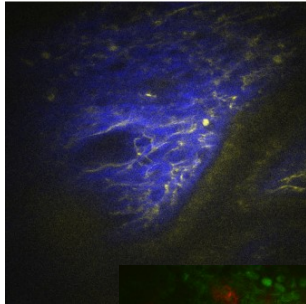
The system consists of a compact, turn-key tunable femtosecond near infrared (NIR) laser, an articulated arm with near infrared optics, beam- scanning module with galvoscaners and piezo -driven optics, a fast PMT detector module as well as a control unit including JenLab Image software for image processing. An additional module for two-photon in-vivo FLIM can be provided.

Applications

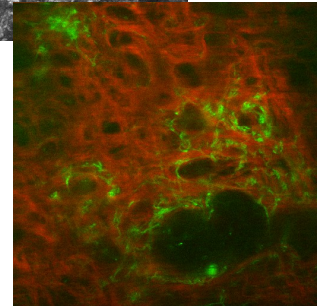
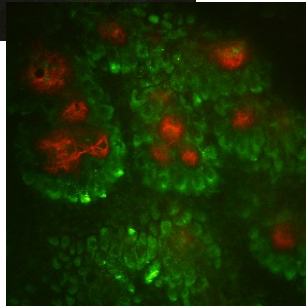
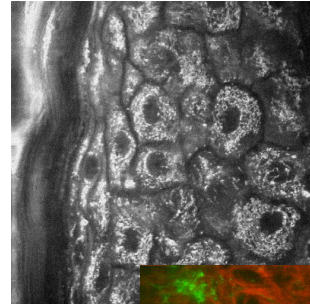
The major aim for the development of the MPTflex was skin cancer diagnosis. Using innovative non-invasive multiphoton technology the physician obtains detailed information on the living cells and tissue structures within their natural environment. Dermatological disorders and melanoma can now be detected with submicron spatial resolution. Having a short image acquisition time shorter than one minute, MPTflex revolutionizes conventional invasive and highly time consuming diagnostic procedures. The system is used in tissue engineering as well as in cosmetic and pharmaceutical research.

Anti-aging is an additional field of application of the system. The MPTflex developed with two-detector array in combination with single photon counting to measure auto-fluorescence and SHG simultaneously during the same scan. Of special interest is the ratio of elastin to collagen that can be used as the so called SAAID index. This index characterizes the skin age.





The optical sections from different locations within the arm of a male and female volunteer demonstrate the false-colored overlay structures of elastin (autofluorescence) and collagen (SHG-signal).



Technical data

- compact turn-key tunable Ti:Sapphire femtosecond laser
 - laser pulse width: < 100 fs
 - repetition frequency: 80 MHz
 - mean laser output: 0...1,5W (typical)
 - wavelength range: 710-920 nm (typical)
- full-frame scanning, region-of-interest (ROI) scanning, line scanning, single-point illumination (spot scan)
- typical scan range: 350 x 350 μm (horizontal); 200 μm (vertical)
- spatial resolution: < 1 μm (horizontal); < 2 μm (vertical)
- focusing optics: magnification 40x
NA 1.3
- control and image processing software (JenLab scan, JenLab Image)
- operating temperature 15-35°C
- relative humidity: 5-65 %
- power requirements: 230 VAC (50 Hz) or optional 115 VAC (60 Hz)
- CE certified class 1M /IIa medical product

System dimensions

- Workstation 1800 mm x 1000 mm x 700 mm 375 kg

The system requires an air-conditioned, non-vibrant room with reduced ambient light.

Notes: These specifications are subject to change without notice.

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