

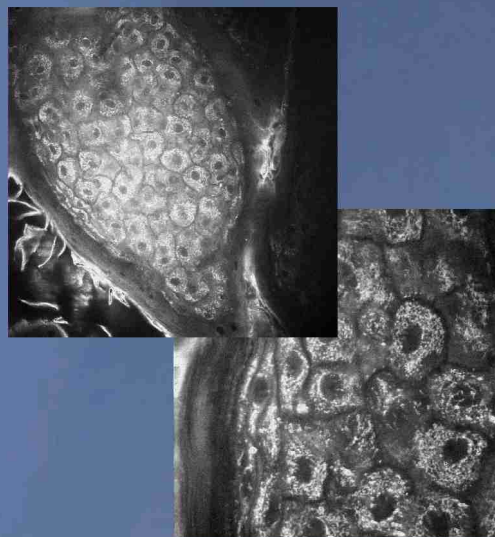
MPTflex™

Flexible in-vivo multiphoton tomography

PRISM
AWARDS
WINNER

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



JenLab GmbH

Multiphoton Tomography

Product description

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

The tomograph consists of a compact, turn-key tunable femtosecond near infrared (NIR) laser, an articulated arm with NIR optics, a beam-scanning module with galvoscaners and piezo-driven optics, a two-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 as well as two-photon microendoscopy can be provided.

Applications

The major application is early diagnosis of skin diseases such as malignant melanoma. Using innovative non-invasive multiphoton technology the physician obtains optical biopsies with detailed information on living cells and tissue structures within their physiological environment. Dermatological disorders can be detected with submicron spatial resolution. The image acquisition time is less than 20 seconds per frame.

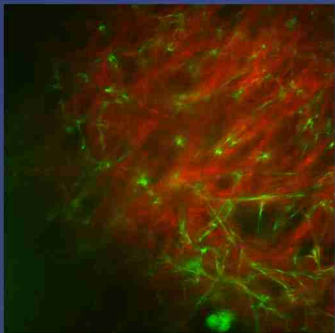
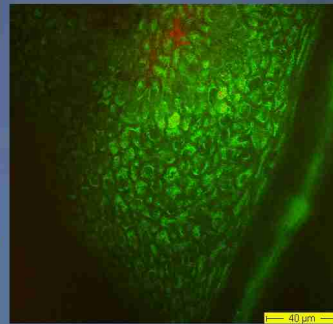
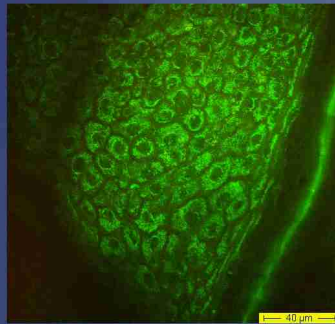
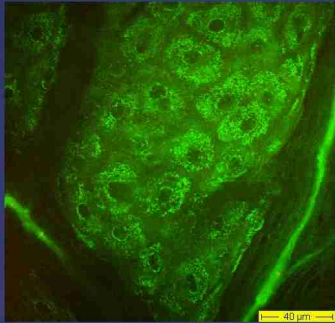
The novel tomograph MPTflex has the potential to revolutionize the conventional invasive time consuming diagnostic procedures. The multiphoton tomograph can also be used in tissue engineering and wound healing studies as well as in cosmetic and pharmaceutical research. The efficiency of anti-aging products as well as the biosafety of sunscreen nanoparticles can be tested in vivo. Furthermore, the skin age can be evaluated by measuring the ratio of elastin to collagen.



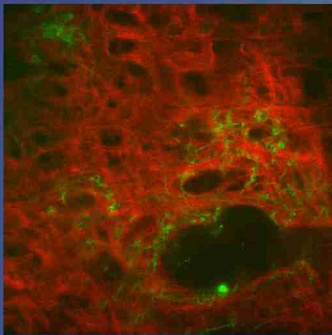
Multiphoton Tomography

Optical biopsies

Tomographic images of epidermal layers of a male volunteer arm at different depths. The false-colored overlay of two signals demonstrates morphological structures of cells (autofluorescence=green) and collagen (SHG-signal=red).



The false-colored overlay of two signals demonstrates morphological structures of dermal layers: autofluorescence of elastin and collagen crosslinks (green) and collagen SHG-signal (red).

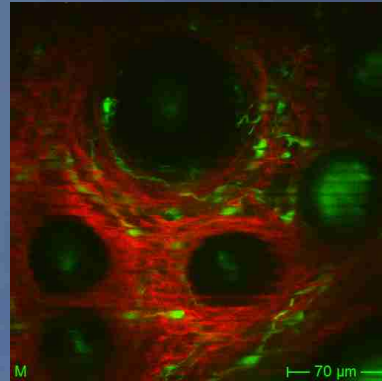


Technical data

- compact turn-key tunable Ti:Sapphire femtosecond laser
 - laser pulse width: 200 fs
 - repetition frequency: 80 MHz
 - in situ laser power: 2-50 mW
 - wavelength range: 710-920 nm
- full-frame scanning, region-of-interest (ROI) scanning, line scanning, single-point illumination (spot scan)
- typical scan range: 350 μm x 350 μm (horizontal); 200 μm (vertical)
- spatial resolution: < 0.5 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 115 VAC (60 Hz)
- CE certified class 1M /IIa medical product
- 710 mm x 960 mm x 1400 mm, 250 kg

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

Notes: These specifications are subject to change without notice.



Stem cell tracking in living transgenic mice



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