

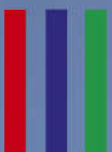
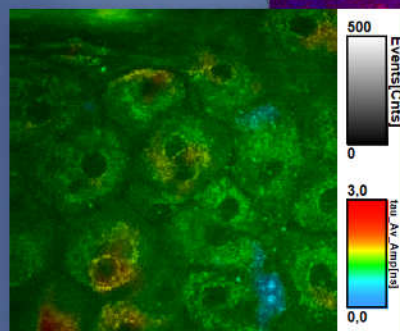
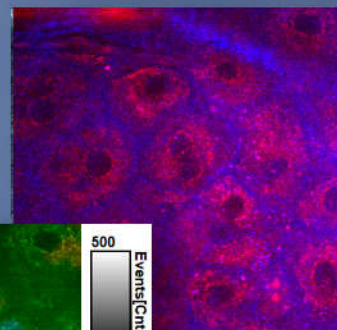


MPTcompact

Compact *in-vivo* multiphoton tomograph

Multiphoton tomography (MPT) provides *in-vivo* optical biopsies with subcellular spatial resolution based on near infrared femtosecond laser technology for:

- melanoma/skin cancer detection
- diagnostics of dermatological disorders
- cosmetic research
- skin aging index SAAID determination
- *in situ* drug monitoring
- detection of elastin and collagen network
- fluorescence lifetime imaging (FLIM)



Product description

The *MPTcompact* is a multiphoton tomograph based on femtosecond laser technology. The autofluorescence (AF) of biomolecules such as NAD(P)H, flavins, porphyrins, elastin, and melanin is imaged with submicron resolution. Furthermore, the extracellular matrix protein collagen can be identified by its second harmonic generation (SHG). AF and SHG signals are recorded by fast PMT detectors with single photon sensitivity.

The tomograph consists of a compact femtosecond NIR fiber laser and a mechanical arm with 360° measurement head including a fast beam scanning unit and a detector module for AF imaging, SHG imaging, fluorescence lifetime imaging (FLIM) / optical metabolic imaging (OMI), confocal reflection microscopy and digital dermoscopy.

Label-free optical sections with subcellular resolution and information on cell metabolism can be generated within seconds.



Applications

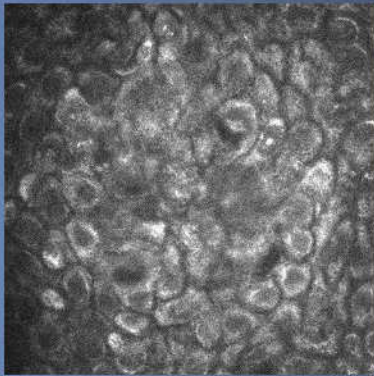
The major application is early diagnosis of skin diseases such as malignant melanoma and inflammation. Melanocytes, macrophages and even single intratissue mitochondria and single extracellular matrix (ECM) fibers can be imaged due to the superior submicron spatial resolution. Using innovative non-invasive label-free multiphoton technology, the physician obtains optical biopsies with detailed information on living cells and tissue structures within their physiological environment. The image acquisition time is less than 10 seconds per optical section.

The novel tomograph *MPTcompact* 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.

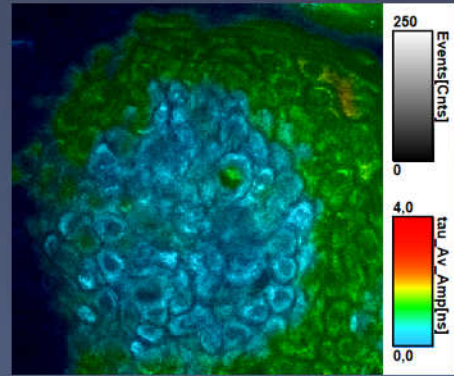
Optical Biopsies

Multiphoton Tomography (MPT) provides high resolution optical biopsies for rapid *in-vivo* histology. The compact portable tomograph MPTcompact enables multimodal optical sectioning within seconds. Optical skin biopsies can be obtained from the epidermis and upper dermis with subcellular spatial resolution and picosecond temporal resolution.

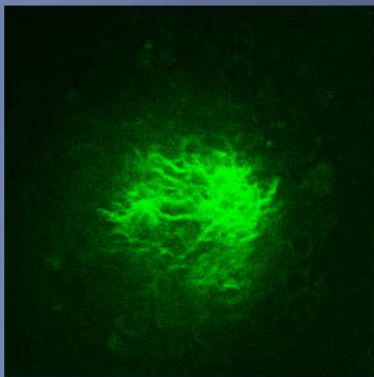
Autofluorescence (AF) and Fluorescence Lifetime Imaging (FLIM)



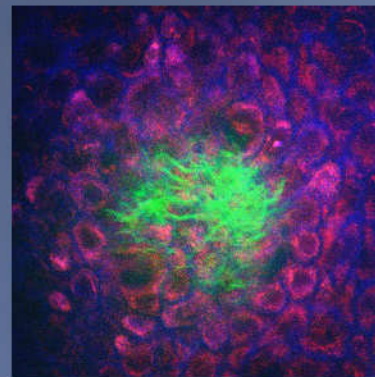
optical AF sectioning of the epidermal-dermal junction



Second Harmonic Generation (SHG)

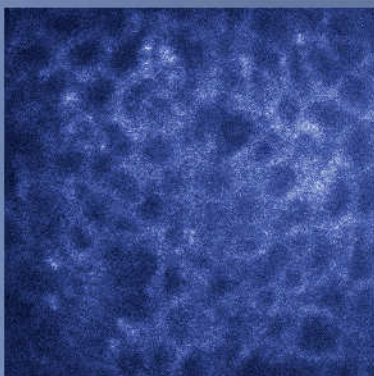


collagen provides SHG signals



overlay AF and SHG

Reflection Laser Scanning Microscopy (RLSM) and Digital Dermoscopy



confocal reflection sectioning



wide field white light image

Technical Data

• System dimensions:	750 mm x 900 mm x 1600 mm
• Weight:	123 kg +/- 1 kg
• Operating temperature:	17 °C – 25 °C
• Relative humidity:	20 % – 65 %
• Altitude:	< 2000 m above sea level
• Power requirements:	220 - 230 V / 50Hz
• Medical device class:	Ila
• Power consumption:	< 500 VA
• Laser class (DIN EN 60825-1):	1M
• Laser:	Compact fiber laser
• Laser output pulse width:	< 90 fs
• Laser pulse width (<i>in situ</i> on target):	150 fs - 250 fs
• Repetition rate:	50 MHz +/- 1 MHz
• Wavelength:	780 nm +/- 5 nm
• Laser average power (<i>in situ</i>):	1 mW - 50 mW (adjustable)
• Focusing optics:	40x NA 1.3 oil
• Working distance:	200 µm
• Typical scan range:	max. 350 µm x 350 µm
• Spatial resolution:	< 0.5 µm (horizontal); < 2 µm vertical



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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 726666 (LASER-HISTO).

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