

We designed and prototyped a new handheld, portable, scalable, label-free Raster Scan Optoacoustic Mesoscopy (RSOM) device for point-of care dermatology

OUTCOMES

Three validated RSOM devices for clinical and preclinical research have been developed and are available through SME partner iThera Medical

• Development of novel ultrasound detector by partner Sonaxis SA

• 22 peer-reviewed publications in 16 journals

• 3 patents pending



IMPACT

Validated imagery suggests tremendous potential benefits for patients through earlier diagnoses and personalized follow-up and treatment possibilities.

• Strong growth within the European optoacoustic imaging market, with multiple IP/patent creations.

• Development of a strong partnership between consortium members, with follow-on funding obtained through EU Horizon 2020 project WINTHER (Grant No. 871763).

IMPRESSUM

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PHOTONICS PUBLIC PRIVATE PARTNERSHIP



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INNOvative DERMatology
Healthcare based on Label-Free Spectral
Optoacoustic Mesoscopy



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Coordinator: Professor Vasilis Ntziachristos (TUM)

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ABOUT INNODERM

Our **VISION** was to develop a new, portable (handheld), lightweight and low cost instrument for early diagnosis of skin conditions facilitating earlier detection, more accurate and individualized treatment follow-up, and improved disease monitoring.

The **CONCEPT** was to use Raster Scan Optoacoustic Mesoscopy (RSOM), which can visualize features of healthy and morbid skin with markedly superior contrast and specificity compared with other methods on the market. The RSOM sends short light pulses to the skin, which in turn generates ultrasound waves in response to light absorption by skin molecules and structures. Tomographic analysis of the ultrasound waves reveals unprecedented volumetric views of the skin and disease manifestations. By using light pulses of different wavelengths, accurate spectroscopic information is obtained for morphological and biochemical features of skin, permitting accurate and precise diagnoses.

OUR CONSORTIUM

Technical University of Munich –GERMANY

Sonaxis SA – FRANCE

Rayfos LTD – UNITED KINGDOM

iThera Medical GmbH – GERMANY

Humanitas University – ITALY

TECHNOLOGY BREAKTHROUGHS

High-resolution (7-30 μm), deep (5 mm) optical imaging



Unique label-free *optical absorption* contrast mechanisms



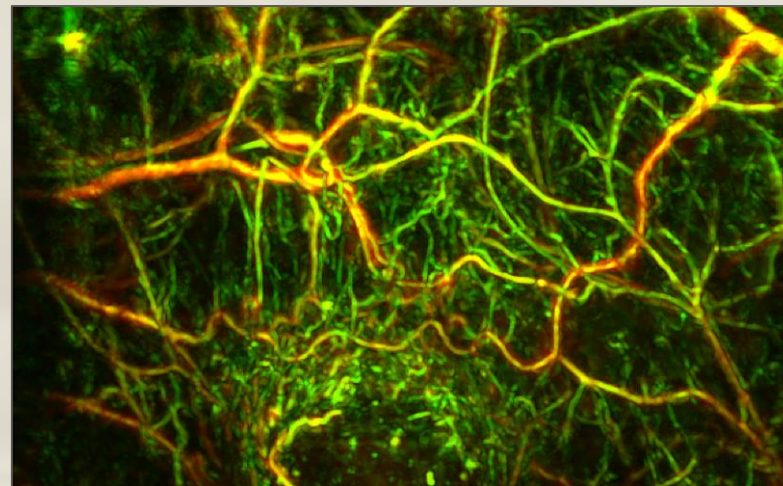
High-contrast imaging of vascularization/angiogenesis



Quantification of oxygenation status of tissues, lesions and individual blood vessels



Single cell resolution images



RSOM image of tumor vasculature in a mouse model.

CLINICAL NEED

Distinguish between benign nevi and melanoma ('black cancer')



Reliable cutoff for tumor borders and depth (clinical decisions are currently based on tumor penetration depth)



Distinguish between **allergic and irritated skin** (assessment is currently only performed visually)



Precision severity assessment of psoriasis and eczema



Early and fast analysis of different malignant manifestations (current diagnoses often made in late stages of disease progression)