Introducing the new handheld, non-invasive Fast-Raster Scan Optoacoustic Mesoscopy (F-RSOM) device for therapy monitoring of cardiovascular diseases, diabetes and inflammatory skin conditions

Outcomes

F-RSOM for market introduction

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Novel ultrasound transducer for F-RSOM

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Quality control mechanisms for good quality data

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Portfolio of Therapy Monitoring Capabilities

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4 peer reviewed publications

RSOM Explorer C50

Impact

Tremendous potential benefits for patients with systemic diseases through earlier diagnosis and personalized treatment planning.

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Strong growth within the European optoacoustic imaging market, with multiple lines of IP.

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Continued strong European partnership between consortium members, from previous EU Horizon 2020 project INNODERM (Grant No. 687866).

Impressum

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PHOTONICS 21
PHOTONICS PUBLIC PRIVATE PARTNERSHIP

Fast optoacoustic mesoscopy, using the skin as a **WIN**dow for **THER**apeutic monitoring of local and systemic disease

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Coordinator: Professor Vasilis Ntziachristos (TUM)

Start Date: January 2021 • **End Date:** December 2024

SONAXIS · HUMANITAS RESEARCH HOSPITAL · RAYFOS · iTheraMedical Listening to Molecules

About WINTHER

Our **VISION** was to develop the next-generation Fast-Raster Scan Optoacoustic Mesoscopy (F-RSOM) device with an encapsulated, handheld, lightweight design and capable of operating at faster speeds than its processor. The improved visualization capabilities of our low-cost device permits monitoring of progression and therapy of cardiovascular diseases, diabetes and inflammatory skin conditions.

The F-RSOM sends short light pulses to the skin, which in turn generates ultrasound waves in response to light absorption by skin molecules and structures, resulting in markedly superior contrast and specificity compared with other methods on the market. 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, facilitating accurate and precise diagnoses, early detection, accurate and individualized treatment plans, and improved disease monitoring.

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 (3 *mm*), label-free imaging

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High-contrast imaging of micro-vasculature

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Quantification of tissue oxygenation and inflammation

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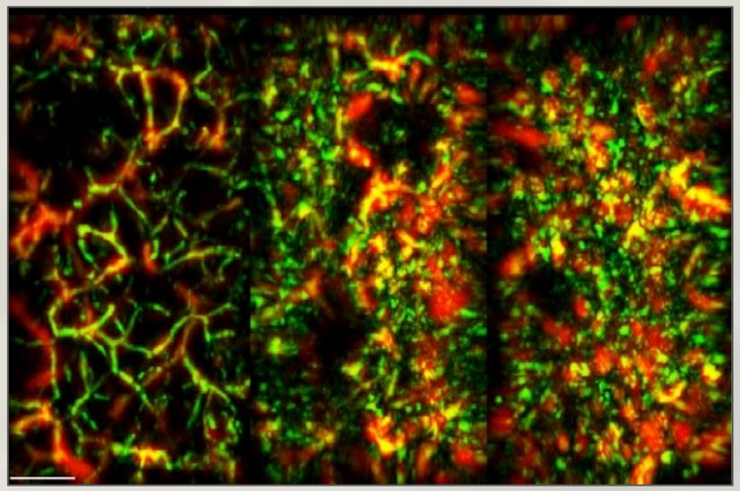
Imaging of micro-vessel blood flow rate in response to stimuli (endothelial function)



F-RSOM image of a melanoma
(see He et al., 2022, Nature Communications)

Clinical Need

Quantification of micro-vasculature metrics for **inflammatory skin diseases**

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Treatment monitoring by topical and systemic drugs around skin wounds

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Quantify **diabetes progression** from microvascular structure

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Quantify **endothelial function to monitor CVD conditions** like atherosclerosis and heart failure.