PROJECT FACTS

Coordinator:
Prof. Turgut Durduran
ICFO – The Institute of Photonic Sciences
Duration:
64 months
February 1, 2016 - May 31, 2021
Total EU Funding:
€3,628,845.75

CONSORTIUM

ICFO - Institute of Photonic Sciences (ES)
Politecnico di Milano (IT)
Institut d’Investigacions Biomèdiques August Pi i Sunyer (ES)
Hemophotonics (ES)
VERMON (FR)
IMV Imaging (FR)
University of Birmingham (UK)
European Institute for Biomedical Imaging Research (AT)

Funded by

@LUCA_H2020
http://www.luca-project.eu/
EXPECTED IMPACT OF LUCA

• Improved specificity of the thyroid screening process and corresponding earlier and faster diagnosis for effective treatment.

• Reduction of the number of unnecessary surgeries and associated co-morbidities, thus improving patients’ quality of life.

• Reduction of the socio-economic cost related to thyroid cancer and saving of hundreds of millions euro every year.

• Potential use in the diagnosis of other cancers e.g. in the breast, head and neck cancer, abdominal cancer screening and therapy monitoring, cerebrovascular accidents (ictus) or even for COVID19.

CLINICAL VALIDATION

The LUCA device incorporates two different diffuse optical spectroscopy technologies in parallel to ultrasound:

- Time Resolved Spectroscopy (TRS)
- Diffuse Correlation Spectroscopy (DCS)

PHANTOMS

The LUCA device has been validated by using tissue simulating phantoms:

- Solid phantoms: to simulate tissues with different light absorption and scattering
- Liquid phantoms: to simulate tissues with different blood flow

Tests - successful

IN VIVO CHARACTERIZATION

The LUCA device has been tested on healthy subjects. Measurements obtained several times a day, several days a week during several weeks

Tests - successful - Evaluation of the precision in determining the hemodynamic parameters of the thyroid

PRECLINICAL TESTS

Preclinical testing on 18 healthy volunteers & 47 patients, diagnosed with thyroid nodules - The combination of ultrasound and hemodynamic related parameters improves nodule diagnosis.

Tests: 13 benign & 4 malignant nodules identified with a sensitivity of 100% and specificity of 77%, only those with uncertain ultrasound result.