



## DELIVERABLE REPORT

**Grant Agreement number:** 688303

**Project acronym:** LUCA

**Project title:** Laser and Ultrasound Co-Analyzer for thyroid nodules

**Funding Scheme:** H2020-ICT-28-2015

**Deliverable reported:** D5.6 Preliminary Data analysis of subjects with thyroid nodules

**Due date:** 31.10.2019

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**Project website address:** [www.luca-project.eu](http://www.luca-project.eu)



## 1) Scope of the document

Scope of this document is to report the description of the measurements performed on subjects with thyroid nodules and their results as a short summary. A more detailed version is available upon request.

## 2) Summary

In this document, we report the preliminary results from twelve patients (11 female, aged 39-66 years with a mean of 42.2). Three subjects had multinodular goiter, six benignant nodules, and three suspected papillary thyroid carcinoma. An accurate classification of the nodules related to these subjects will be available after the surgeries and the anatomic-pathological exams.

### Protocol

The measurement protocol is described in associated deliverable 5.5. In addition to the standard LUCA protocol (four locations of the neck), in patients with multiple nodules well distinguishable by the US images, each different nodule has been measured twice, independently from its location.

### Data analysis

For the data analysis procedure and comments we refer to Deliverable 5.5. For this preliminary stage of data analysis of patients, we have considered, for classifying the results, a generic “healthy thyroid lobe” when considering a thyroid lobe without nodules, and “thyroid lobe with nodule/s” when considering the thyroid lobe with nodule/s of a patient. No distinctions between healthy thyroid region and nodule region of the same thyroid lobe have been considered. At this stage, statistical analysis has not been performed to distinguish between different typologies of nodules since final outcome measures are still being generated in the clinic.

### *In vivo* preliminary results

Here below we report a summary of the results obtained with the preliminary data analysis. We present the average values over all the patients of the principal physiological parameters, as blood flow index (BFi), oxygen saturation (StO<sub>2</sub>, oxy-hemoglobin divided by total hemoglobin), total hemoglobin concentration (THC, sum of oxy- and deoxy-hemoglobin concentrations), water concentration (H<sub>2</sub>O), collagen concentration and lipid concentration, measured in the different locations considered by the LUCA measurement protocol.

### Tissue anatomy, i.e. depth:

	Depth All (mm)	Depth Males (mm)	Depth Females (mm)
<b>Healthy thyroid lobe</b>	8.9 ± 2.7	11.6 ± 1.3	8.3 ± 2.6
<b>Thyroid lobe with nodule</b>	7.9 ± 2.5	8.9 ± 1.7	7.8 ± 2.5
<b>Muscle right</b>	4.2 ± 1.1	5.0 ± 1.9	4.1 ± 1.1
<b>Muscle left</b>	4.5 ± 1.4	4.6 ± 1.2	4.5 ± 1.4

**Physiological parameters:**

SD=2.55 cm	BFI ( $10^{-9} \text{ cm}^2/\text{s}$ )	StO2 (%)	THC ( $\mu\text{M}$ )	H2O ( $\text{mg}/\text{cm}^3$ )	Collagen ( $\text{mg}/\text{cm}^3$ )	Lipid ( $\text{mg}/\text{cm}^3$ )
"Healthy" thyroid lobe	$9.9 \pm 4.9$	$79 \pm 9$	$85 \pm 39$	$431 \pm 158$	$451 \pm 188$	$399 \pm 416$
Thyroid lobe with nodule	$8.1 \pm 5.1$	$81 \pm 11$	$79 \pm 37$	$351 \pm 175$	$429 \pm 180$	$456 \pm 446$
Muscle right	$4.9 \pm 1.9$	$76 \pm 9$	$76 \pm 33$	$412 \pm 169$	$414 \pm 177$	$266 \pm 358$
Muscle left	$4.3 \pm 1.8$	$74 \pm 10$	$77 \pm 32$	$365 \pm 144$	$401 \pm 181$	$230 \pm 316$

**3) Conclusions**

We have reported a preliminary data analysis of the first twelve patients measured with the LUCA device. The data acquired resulted of a good quality, in spite of the high absorption of the thyroid tissue, which tends to reduce the signal-