

Maastricht, 1 March 2019

New European research project:

The influence of endocrine disruptors on the thyroid gland

The new European collaborative project SCREENED aims to develop three-dimensional (3D) cell-based in vitro tests to better characterize the effects of endocrine disruptors on thyroid functions. This method will overcome the limitations of existing tests, being more sensitive, also at low doses of exposure to chemicals, and enabling the prediction of their toxicity on human health in a sex-specific manner.

Endocrine disruptors (EDs) are a class of chemicals used to produce materials commonly found in everyday life, such as some plastics, tin cans, electrical and household appliances, cosmetics, pesticides, etc. EDs are however not without danger: these molecules interfere with the endocrine system, disrupting the physiological production and the target effects of hormones. In particular, EDs have proven effects on the reproductive system and an incidence on the occurrence of obesity, type 2 diabetes and cardiovascular diseases during aging.

There is also growing evidence that EDs strongly interfere with the functioning of the thyroid. EDs cause changes in thyroid hormone concentrations, the peripheral metabolism of these hormones and the signalling of their receptors. The mechanism by which they act on the thyroid axis is however still far from being elucidated: the tests currently available are strongly limited by the availability of adequate quantities of human thyroid tissue and by the inability to predict the effects of EDs after low dose exposure.

The new European collaborative project SCREENED aims to develop new 3D *in vitro* tests to overcome these limitations. Based on 3D constructions of rodent and human thyroid cells, these tests will for the first time mimic the structure and function of the native thyroid gland and, thus, its vascular and morphogenetic anatomical characteristics. Professor Lorenzo Moroni, the Coordinator of the SCREENED project, explains: *“These new 3D in vitro thyromorphic models will make it possible to predict with more sensitivity and specificity the effects of EDs on thyroid function, compared to conventional molecular and 2D in vitro assays. These tests will also allow to selectively identify female and male responses to the exposure to EDs and to test simultaneous action of different EDs on thyroid function.”*

The SCREENED project is part of a bigger cluster of eight research projects, all funded by the European Commission, and each focusing on a different aspect of new testing and screening methods to identify EDs. SCREENED brings together nine European universities and companies. The Department of Toxicogenomics, as a part of Maastricht University and represented in SCREENED by dr. Florian Caiment, is in charge of generating and interpreting the transcriptomics profiles of the new *in vitro* models challenged to EDs.

The ambition of the SCREENED project is that these new 3D *in vitro* tests, as well as the increased knowledge about adverse reactions after exposure to EDs, will be used for regulatory purposes, ultimately to improve human health.

Partner organisations:

- Universiteit Maastricht (Netherlands)
- Università degli studi di Parma (Italy)
- Université libre de Bruxelles (Belgium)
- Consiglio Nazionale Delle Ricerche (Italy)
- Presens Precision Sensing GmbH (Germany)
- University College Dublin, National University Of Ireland (Ireland)
- Atturos Limited (Ireland)
- ARTTIC SAS (France)
- Cyprotex Discovery Limited (United Kingdom)

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