First lab-grown mini-thyroids use patients' own tissue

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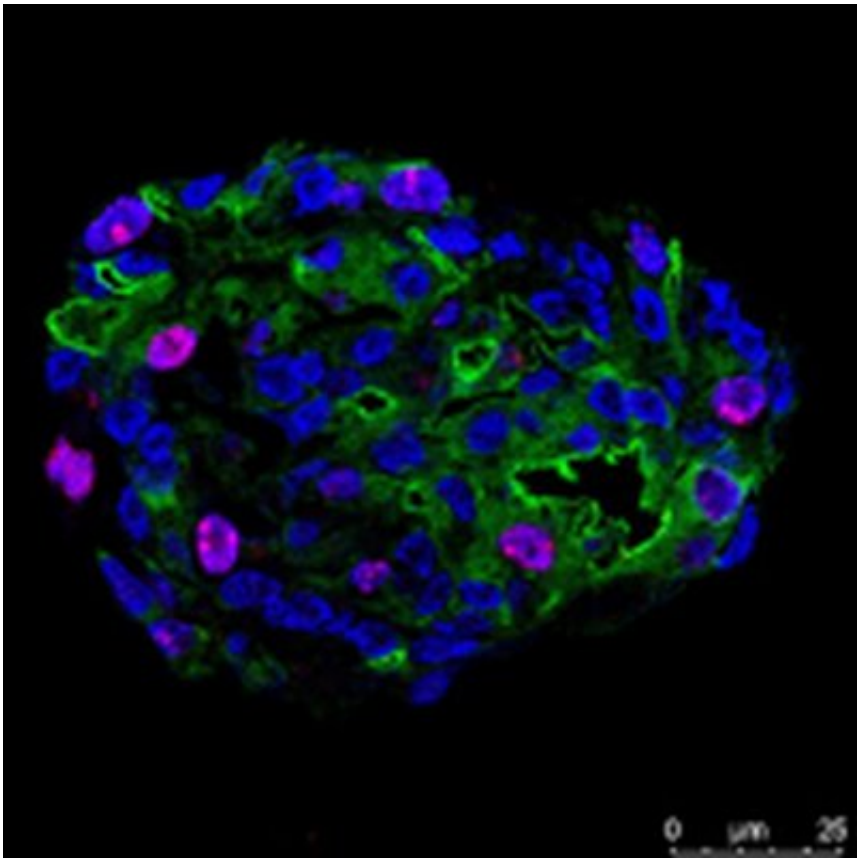

Human thyroid organoid displaying functionality through thyroglobulin (green) production and proliferative capacity by Ki67 (red). Credit: Vivian ML Ogundipe

Hormones produced by the thyroid gland are essential regulators of organ function. The absence of these hormones either through thyroid

dysfunction due to, for example, irradiation, thyroid cancer or autoimmune disease or thyroidectomy leads to symptoms like fatigue, feeling cold, constipation, and weight gain.

Hypothyroidism is estimated to affect up to 11% of the global population. Although hypothyroidism can be treated by hormone replacement therapy, some patients have persistent symptoms and/or experience side effects. To investigate potential alternative treatment strategies for these patients, researchers have now for the first time succeeded in generating thyroid mini-organs in the lab.

In a new study published in *Stem Cell Reports*, Robert Coppes and colleagues from the University of Groningen, the Netherlands, used healthy thyroid tissue from patients undergoing surgical removal of the thyroid to grow mini-thyroid organs in a lab which resembled thyroid glands in their structure and protein content.

The thyroid mini-organs contained stem cells which re-grew and formed new mini-organs when the structures were dissociated, providing a potentially unlimited source of lab-grown thyroid tissue. Importantly, the thyroid mini-organs could be matured and produced thyroid hormones in the cultures. Preliminary proof that these structures could potentially replace thyroid tissue came from experiments in mice with hypothyroidism, where transplantation of the mini-organs increased serum levels of thyroid hormones and extended the lifespan of the animals compared to un-transplanted mice.

Further studies are required, however the study lays the foundation for generating thyroid mini-organs from surgically removed tissue and may potentially lead to a new therapy for hypothyroidism in the future.

More information: Generation and Differentiation of Adult Tissue-Derived Human Thyroid Organoids, *Stem Cell Reports* (2021). DOI:

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