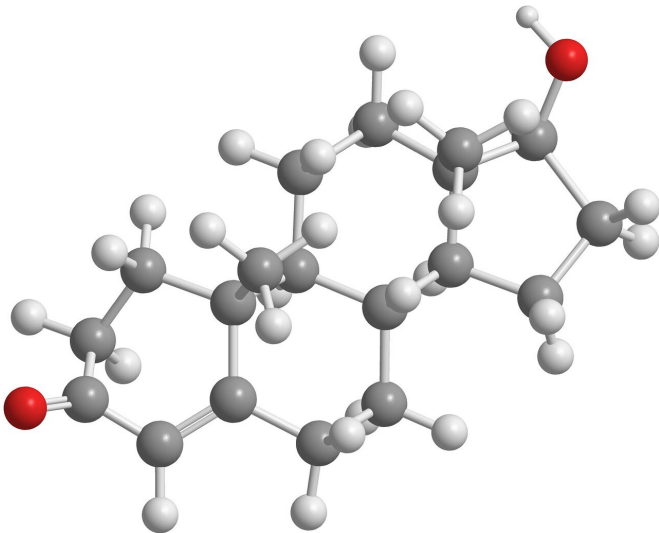


New method allows more targeted measurement of thyroid hormone action in tissue

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Credit: Pixabay/CC0 Public Domain

Patients with thyroid dysfunction are routinely treated with drugs to regulate the hormone imbalance. The effect of these drugs is clinically evaluated by means of blood tests. A team led by Michael Krebs from MedUni Vienna's Division of Endocrinology and Metabolism has now conducted a study to test the use of magnetic resonance spectroscopy (NMRS) to measure the effect in body tissue as well. They were able to identify certain phosphorus-containing compounds that are visible in NMRS as markers for thyroid hormone action in tissue. The study has been published in the *Journal of Clinical Endocrinology and Metabolism*.

Thyroid dysfunction affects up to 10% of the Western population, an [underactive thyroid](#) (hypothyroidism) being the most prevalent form. Patients are routinely treated with thyroxine and the success of the treatment is monitored by

means of blood tests. However, it has been found that approximately 10 to 15% of all those treated continue to experience problems such as lethargy and tiredness.

It has been known from the [animal model](#) that, although animals that have been treated with hormones to combat thyroid insufficiency display normal blood concentrations, a hypofunction is nonetheless detected in their tissue. An increasing number of studies have subsequently shown that the effect of many hormones is not only dependent upon the blood concentration but also upon complex regulation mechanisms in the cells, which are controlled in the short term.

Working in close collaboration with the Center of Excellence for High-Field MR, a team of researchers led by Michael Krebs from the Division of Endocrinology and Metabolism of the Department of Medicine III at MedUni Vienna has now developed a [non-invasive method](#) for measuring thyroid hormone action not only in blood but also in tissue. They were able to identify certain phosphorus-containing compounds that are visible in NMRS as markers for thyroid hormone action in tissue. This allows hormone action to be determined in different areas of the body, such as in muscles or in the liver, like in a "virtual tissue section."

Says Krebs: "The regulation of hormone action not only via the blood concentration but also via local control in the tissues has long been underestimated. If we are able to develop methods for visualizing this phenomenon in practice, we are opening up completely new worlds." As a next step, studies are planned to try out the new method in clinical practice, with the aim of providing better care for patients.

More information: Hannes Beiglböck et al. Effects of Thyroid Function on Phosphodiester Concentrations in Skeletal Muscle and Liver: An In Vivo NMRS Study, *The Journal of Clinical Endocrinology & Metabolism* (2020). DOI: [10.1210/clinem/dgaa663](https://doi.org/10.1210/clinem/dgaa663)

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