

## Korea uses machine learning to detect thyroid cancer

12 July 2021 | News

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A joint research team in Korea, at Pohang University of Science and Technology (POSTECH), has proposed a new non-invasive method to distinguish thyroid nodules from cancer by combining photoacoustic (PA) and ultrasound image technology with artificial intelligence (AI).

Currently, the diagnosis of a thyroid nodule is performed using a fine-needle aspiration biopsy (FNAB) using an ultrasound image. But about 20% of FNABs are inaccurate which leads to repetitive and unnecessary biopsies.

To overcome this problem, the joint research team explored the use of PA imaging to obtain an ultrasonic signal generated by light. When light (laser) is irradiated on the patient's thyroid nodule, an ultrasound signal called a PA signal is generated from the thyroid gland and the nodule.

By acquiring and processing this signal, PA images of both the gland and the nodule are collected. At this time, if multispectral PA signals are obtained, oxygen saturation information of the thyroid gland and thyroid nodule can be calculated.

The researchers focused on the fact that the oxygen saturation of malignant nodules is lower than that of normal nodules, and acquired PA images of patients with malignant thyroid nodules and those with benign nodules.

This study is significant in that it is the first to acquire photoacoustic images of thyroid nodules and classify malignant nodules using machine learning," remarked Professor Chulhong Kim of POSTECH. "In addition to minimizing unnecessary biopsies in thyroid cancer patients, this technique can also be applied to a variety of other cancers, including breast cancer."