

## Gene Profiling for Accurate Diagnosis of Thyroid Cancer Nodules

### Technology Summary

This technology describes a method for improved diagnosis of thyroid nodules through gene profiling with microarray analysis.

### Technology Overview

Thyroid cancer typically presents as a thyroid nodule, with 5 – 15% of all thyroid nodules proving to be malignant. Microscopic examination of a thyroid biopsy sample, typically obtained by the fine needle aspiration (FNA) procedure, has been the gold standard in preoperative diagnosis of thyroid nodules. However, this procedure remains subjective, and does not always provide a definitive answer on the tumor malignancy. Of note, the method often struggles to differentiate follicular variant papillary thyroid carcinomas (FVPTCs) from benign follicular adenomas. Up to 10% of surgically excised thyroid nodules receive a definitive classification upon histopathologic review by pathologists.

This technology is diagnostic method for streamlined classification of thyroid nodules using gene profiling with microarray analysis. The inventors identified a group of 73 genes that discriminate between benign and malignant tumors, in addition to a new class called FACA (follicular adenoma with cytologic atypia) that may be pre-malignant tumors. These tumors, not previously classified, have a distinct molecular profile and may represent an early stage in the progression of benign nodules to FVPTC. The technology is applicable to both FNA tissue samples and histopathology after surgery. Since current methods cannot accurately discriminate thyroid tumors, this technology may aid in further classification and prevent overtreatment.

### Potential Applications

- Accurate early diagnosis of suspicious and indeterminate thyroid nodules
- Results can be used to devise strategies for patient and therapeutic management

### Advantages

- Differentiates between benign, pre-malignant and malignant tumors
- Objective diagnosis of thyroid nodules
- Precludes the need for surgical removal of thyroid tissue

### Publications

- [Arora et al.](#) "Identification of borderline thyroid tumors by gene expression array analysis." *Cancer*. 2019.
- US Patent: [9,587,279](#). "Thyroid tumors identified." Issued Mar 7, 2017.
- US Patent: [10,889,865](#). "Thyroid tumors identified." Issued Jan 12, 2021.

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Granted

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D-4416