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Current State of state of molecular cytology in thyroid nodules: Platforms and their diagnostic and theranostic utility**Zeina C. Hannoush***University of Miami, USA*

The high prevalence of thyroid nodules and increased availability of neck ultrasound have led to an increased incidence of diagnostic thyroid fine needle aspirations, with approximately 20% yielding indeterminate results. The recent availability of molecular tests has helped guide the clinical management of these cases. This paper aims to review and compare three main commercially available molecular cytology platforms in the U.S.—Afirma GSC, Thyroseq GC, and ThyGeNEXT+ThyraMIR. Sequential improvements of the Afirma GSC and Thyroseq GC tests have increased positive and negative predictive values, sensitivity, and specificity. Comparative studies revealed similar diagnostic performance between these tests, with considerations for factors such as cost and processing time. Thyroseq GC provides detailed genomic information and specific management recommendations. ThyGeNEXT+ThyraMIR, though less studied, presents promising results, particularly in miRNA analysis for weak driver mutations. Challenges in interpreting results include variations in reporting and the evolving nature of testing platforms. Questions persist regarding cost-effectiveness and the utility of ultrasound characteristics in selecting candidates for molecular testing. While molecular testing has primarily served diagnostic purposes, advancements in understanding genetic alterations now offer therapeutic implications. FDA-approved options target specific genetic alterations, signaling a promising future for tailored treatments.

Biography

Zeina Carolina Hannoush is an Association Professor of Clinical at Miller School of Medicine, Medical Campus, University of Miami. She obtained her medical degree from Universidad Central de Venezuela and later completed her residency in Internal Medicine as well as her endocrinology fellowship at the University of Miami/ Jackson Memorial Hospital, where she obtained the Professionalism and Outstanding Fellow awards. She joined the faculty of the University of Miami in 2017 where she rapidly built a busy clinical practice focused on neuroendocrine disorders, thyroid diseases, and thyroid cancer, and served as co-chair of the Thyroid and Adrenal Tumor Board. Dr. Hannoush also has a special interest in medical education. She served as the endocrinology course director for medical students from 2017 to 2023. In 2022 she assumed the co-director role for the undergraduate Medicine as a Profession course and has served as Associate Program Director for the Endocrinology fellowship since 2023. She developed a novel standardized training course for endocrinology fellows to perform thyroid fine needle aspirations and received the 2019 Endocrinology Fellowship Excellence in Teaching Award. Dr. Hannoush has published multiple articles reporting novel mutations found to cause endocrine-related diseases, online book chapters, review articles, and case reports. Her work and the work of her mentees has been presented at national and international academic society meetings. She is an active member of over a dozen regional and international academic society committees and has served as a reviewer for different medical journals.