CLINICAL THYROIDOLOGY **FOR THE PUBLIC**

A publication of the American Thyroid Association

AMERICAN THYROID ASSOCIATION
FOUNDED 1923
www.thyroid.org

THYROID CANCER

Analysis of microRNAs in papillary thyroid cancer

BACKGROUND

Many cancers are thought to arise from genetic mutations in cancer-associated genes. Mutations in several of these cancer-associated genes have been shown to be present in certain types of thyroid cancer. Molecular markers based on these genes can be used in thyroid biopsy specimens to either to diagnose cancer or to determine that the nodule is benign. MicroRNAs are small molecules that have specific actions within a cell to affect the expression of certain genes. Some microRNAs are associated with some cancers. The main goal of this study was to examine microRNA expression in tissue samples of papillary thyroid cancer to determine if this could be used as a molecular marker. A second goal of this study was to examine for relationships between microRNA expression and clinical outcomes of thyroid cancer patients.

THE FULL ARTICLE TITLE

Dettmer M et al. Comprehensive microRNA expression profiling identifies novel markers in follicular variant of papillary thyroid carcinoma. Thyroid 2013 Nov;23(11):1383-9.

SUMMARY OF THE STUDY

The authors of this study examined microRNA expression in 17 tissue samples of follicular variant of papillary thyroid cancer and compared the results to those of 27 samples of classic variant of papillary thyroid cancer and 8 samples of normal thyroid tissue. The clinical outcomes of thyroid cancer patients in the study were determined a review of patient records and by review of cancer registry data. The tissue in the study was obtained from the University Hospital in Zurich, Switzerland and surrounding institutions performing pathology reviews. The molecular analyses were performed at the study University of Pittsburgh.

The authors reported that the levels of some microRNAs were similar between samples of follicular variant and classic variant papillary thyroid cancer, but some of the microRNAs expressed were different between the two tumor subtypes. Two newly discovered microRNAs (miR-375 and MiR-551b) were more highly expressed in follicular variant and classic variant papillary thyroid cancer than in normal tissue. The increased expression of two separate microRNAs (miR-181a-2-3p, miR-99b-3p) was associated with a decreased risk of thyroid cancer recurrence for follicular variant of papillary cancer.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study suggests that there are differences in microRNA expression between normal thyroid tissue and papillary cancer and between follicular and classic variants of papillary thyroid cancer. Further, the expression of some microRNAs appear to be associated with a better outcome in papillary thyroid cancer. Further studies are required to confirm these findings and to determine if microRNAs will be an important molecular marker to help diagnose and manage the treatment of thyroid cancer in the future.

— Anna Sawka, MD

ATA THYROID BROCHURE LINKS

Thyroid cancer: http://www.thyroid.org/cancer-of-the-thyroid-gland

ABBREVIATIONS & DEFINITIONS

Genes: a molecular unit of heredity of a living organism. Living beings depend on genes, as they code for all proteins and RNA chains that have functions in a cell. Genes hold the information to build and maintain an organism's cells and pass genetic traits to offspring.

Mutation: a permanent change in one of the genes.

Cancer-associated genes: these are genes that are normally expressed in cells. Cancer cells frequently have mutations in these genes. It is unclear whether mutations in these genes cause the cancer or are just associated with the cancer cells. The cancer-associated genes important in thyroid cancer are BRAF, RET/PTC and RAS.

THYROID CANCER, continued

microRNA: a short RNA molecule that has specific actions within a cell to affect the expression of certain genes.

Molecular markers: genes and microRNAs that are expressed in benign or cancerous cells. Molecular markers can be used in thyroid biopsy specimens to either to diagnose cancer or to determine that the nodule is benign.

Papillary thyroid cancer: the most common type of thyroid cancer.

Follicular variant of papillary thyroid cancer: a subtype of papillary cancer that may have a worse prognosis as compared to the classic variant.

Cancer recurrence: this occurs when the cancer comes back after an initial treatment that was successful in destroying all detectable cancer at some point.