A radiation-induced gene signature distinguishes post-chernobyl from sporadic papillary thyroid cancers.

Abstract:
Port, M., Boltze, C., Wang, Y., Röper, B., Meineke, V. and Abend, M. A Radiation-Induced Gene Signature Distinguishes Post-Chernobyl from Sporadic Papillary Thyroid Cancers. Radiat. Res. 168, 639-649 (2007). We investigated selected gene targets to differentiate radiation-induced papillary thyroid cancers (PTCs) from other etiologies. Total RNA was isolated from 11 post-Chernobyl PTCs and 41 sporadic PTCs characterized by a more aggressive tumor type and lacking a radiation exposure history. RNA from 10 tumor samples from both groups was pooled and hybridized separately on a whole genome microarray for screening. Then 92 selected gene targets were examined quantitatively on each tumor sample using an RTQ-PCR-based low-density array (LDA). Screening for more than fivefold differences in gene expression between the groups by microarray detected 646 up-regulated and 677 down-regulated genes. Categorization of these genes revealed a significant (P< 0.0006) over-representation of the number of up-regulated genes coding for oxidoreductases, G-proteins and growth factors, while the number of genes coding for immunoglobulin appeared to be significantly down-regulated. With the LDA, seven genes (SFRP1, MMP1, ESM1, KRTAP2-1, COL13A1, BAALC and PAGE1) made a complete differentiation between the groups possible. Gene expression patterns known to be associated with a more aggressive tumor type in older patients...
appeared to be more pronounced in post-Chernobyl PTC, thus underlining the known aggressiveness of radiation-induced PTC. Seven genes were found that completely distinguished post-Chernobyl (PTC) from sporadic PTC.