Identification of Genes in a Thyroid Cell Line Regulated by Thyroid-Stimulating Hormone (TSH)

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Differential display (DD) PCR (Liang and Pardee, 1992) is a recently described technique to identify genes whose expression has changed during a biological process. We used this method to detect genes thyroid stimulating hormone-dependently regulated in a rat thyroid cell line, because thyroid stimulating hormone (TSH) is the most important hormone for cell proliferation and differentiation including prehormonal proteins secretion in thyrocytes (Kim and Arvan, 1991; Kim and Arvan, 1993). Following DD-PCR experimentation, thyroid stimulating hormone -dependently regulated gene fragments of 15 species were obtained. The genes were used as molecular probes in Northern blot analysis and then sequenced. Two of the clones (#123 and #205) were up-regulated and two more (#107 and #111) were down-regulated thyroid stimulating hormone-dependently in the thyroid cells, as demonstrated by Northern blot analysis. Following partial sequencing, each of the clones #107, #111 and #205 were shown to be homologues of the apoptosis-related gene, aldolase A, and a-2 collagen (IV), respectively, while clone #123 showed no homology with known genes. These findings suggest that the four genes mentioned above may have an a important physiological function in the thyrocytes, which is thyroid stimulating hormone-dependently up-/down-regulated.