Transcriptome profiling of primary glioma cell cultures

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Transcriptome profiling is important for cancer research. We consider problem of detection of genes responsible for glioma progression in cell cultures. The primary cell culture samples from normal brain and secondary glioblastoma were processed for RNA extraction. This was followed by RNA-sequencing and filtration of reads. For assessment of gene expression level and finding differently expressed genes we used Cufflinks. Set of computer tools were used for sequencing data processing [1]. We revealed set of differently expressed gene in normal brain and glioma cell cultures. Using ANDvisio system the associative genes networks of the differentially expressed genes with molecular interaction were reconstructed. We found set of hormone transporter genes overexpressed in the glioblastoma cell culture. SLCO1C1 mediates the Na^+-independent high affinity transport of organic anions such as the thyroid hormones thyroxine (T4) and rT3. Other potential substrates, such as triiodothyronine (T3), 17-beta-glucuronosyl estradiol, estrone-3-sulfate and sulfobromophthalein are transported with much lower efficiency. It may play a significant role in regulating T4 flux into and out of the brain. SLCO2A1 may mediate the release of newly synthesized prostaglandins from cells, the transepithelial transport of prostaglandins, and the clearance of prostaglandins from the circulation. Transports PGD2, as well as PGE1, PGE2 and PGF2A. SLCO3A1 mediates the Na^+-independent transport of organic anions such as estrone-3-sulfate [2]. It mediates transport of prostaglandins (PG) E1 and E2, thyroxine (T4), deltorphin II, BQ-123 and vasopressin, but not DPDPE (a derivative

of enkephalin lacking an N-terminal tyrosine residue), estrone-3-sulfate, taurocholate, digoxin nor DHEAS [3]. SLCO4A1 mediates the Na^+-independent transport of organic anions such as the thyroid hormones T3 (triiodo-L-thyronine), T4 (thyroxine) and rT3, and of estrone-3-sulfate and taurocholate.

The RNA-seq analysis of the cells cultures of normal brain and glioma confirmed association of these genes with tumor progression. The results provide an experimental basis for the observation that hypothyroidism induction by administration of propylthiouracil is associated with improved survival in glioblastoma patients. Hypothyroidism may improve survival in animal models of cancer and recent clinical studies of tyrosine kinase inhibitor (TKI) treatment of renal cell carcinoma patients have suggested that the side effect of hypothyroidism induced by the TKIs contributes to improved outcomes [4]. Though sequencing technologies (RNA-seq) provide new data on gene expression presented in the databases, large collection of human clinical data keep importance of microarray data analysis, especially in many tissues and organs, including brain (such as BioGPS). We continue integration of data on glioma genes using available databases.

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