Meningioma cell line

Findings demonstrate the relevance of meningioma cell lines as a model system, especially as tools to investigate the signaling pathways of, and subsequent resistance to, therapeutics currently in clinical trials [1)]

CH-157MN

Ben-Men-1

IOMM-Lee

Püttmann et al. developed a meningioma cell line by retroviral transduction of primary cells derived from a human World Health Organization grade 1 meningioma (meningothelial meningioma) with the human telomerase reverse transcriptase (hTERT) gene, which enables bypassing cellular senescence. Five clones have been cultured for more than 21 months so far, while corresponding nontransfected cells ceased proliferation within 3 months. Quantitative RT-PCR and a telomeric repeat amplification protocol (TRAP) assay revealed high hTERT mRNA levels and high telomerase activity in all transduced populations, while nontransduced cells were negative. The average telomere size of transduced cells was considerably longer than that of parental cells and the biopsy specimen. One clone, designated Ben-Men-1, was characterized in more detail, and exhibited typical cytological, immunocytochemical, ultrastructural and genetical features of meningioma, including whorl formation, expression of epithelial membrane antigen, desmosomes and interdigitating cell processes, as well as -22q. Following subdural transplantation into nude mice, tumor tissue with typical histological features of meningothelial meningioma was found. They conclude that Ben-Men-1 represents an immortalized yet differentiated cell line useful for biological and therapeutical studies on meningioma [2)].

Meningioma cell lines transplanted into flanks of nude mice exhibit microscopic, immunohistochemical, and ultrastructural features of meningiomas. The ease of monitoring tumor growth in the subcutaneous mouse flank model is its primary advantage, although an intracranial location is more biologically desirable [3)].

Like most tumors, meningiomas prefer anaerobic glycolysis for energy production (Warburg effect). This leads to an increased synthesis of the metabolite methylglyoxal (MGO). This metabolite is known to react with amino groups of proteins. This reaction is called glycation, thereby building advanced glycation endproducts (AGEs). In a study, Selke et al investigated the influence of glycation on two meningioma cell lines, representing the WHO grade I (BEN-MEN-1) and the WHO grade III (IOMM-Lee). Increasing MGO concentrations led to the formation of AGEs and decreased growth in both cell lines. When analyzing the influence of glycation on adhesion, chemotaxis and invasion, they could show that the glycation of meningioma cells resulted in increased invasive potential of the benign

meningioma cell line, whereas the invasive potential of the malignant cell line was reduced. In addition, glycation increased the E-cadherin- and decreased the N-cadherin-expression in BEN-MEN-1 cells, but did not affect the cadherin-expression in IOMM-Lee cells [4].

1)
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