Six1 Gene

The protein encoded by this gene is a homeobox protein that is similar to the Drosophila 'sine oculis' gene product. This gene is found in a cluster of related genes on chromosome 14 and is thought to be involved in limb development. Defects in this gene are a cause of autosomal dominant deafness type 23 (DFNA23) and branchiootic syndrome type 3 (BOS3).

The prognosis of glioma is generally poor and is the cause of primary malignancy in the brain. The role of microRNAs has been implicated in tumour inhibition or activation. In several cancers, the Six1 signalling pathway has been found to be aberrant and also relates to the formation of tumours.

Chen et al. analysed the database for expression profiles and clinical specimens of various grades of glioma to assess microRNA-155-3p (miR 155-3p) expression. The role of miR-155-3p in glioblastoma, cell cycle, cell proliferation, apoptosis and resistance to temozolomide was assessed in vitro through flow cytometry and cell proliferation assays. Bioinformatics analyses, and assays using luciferase reporter, and immunoblotting revealed that miR-155-3p targets Six1 and that the relationship between glioma and healthy brain tissues was significantly inverse. In rescue experiments, overexpressed Six1 revoked the changes in cell cycle distribution, proliferation and resistance to temozolomide estimated by apoptosis induced by overexpressed miR-155-3p. MiR-155-3p inhibition reduced glioma cell growth and proliferation in the brain of a mouse model and increased the survival of mice with gliomas. Thus, miR-155-3p modulates Six1 expression and facilitates the progression of glioblastoma and resistance to temozolomide and may act as a novel diagnostic biomarker and a target for glioma treatment [1)].

1)
Chen G, Chen Z, Zhao H. MicroRNA-155-3p promotes glioma progression and temozolomide resistance by targeting Six1. J Cell Mol Med. 2020 Mar 27. doi: 10.1111/jcmm.15192. [Epub ahead of print] PubMed PMID: 32220051.

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