High-mobility group AT-hook protein 2 (HMGA2)

Is an architectural transcription factor associated with malignancy, invasiveness, and poor prognosis in a variety of human neoplasms.

HMGA2 allows expressions of FOXM1 and PLAU to maintain GIC propagation, gliomagenesis and aggressiveness both in vitro and in vivo. Therefore, suppressing HMGA2-mediated GIC self-renewal and invasiveness might be a promising means to treat GBMs [1)].

The genetic variations of the miRNAs genes related with HMGA2 and AIP genes were not seen in a study of . Although there is no relationship between HMGA2-rs1351394 polymorphism and acromegaly disease, T allele was associated with some clinical features related to adenoma in patients with acromegaly [2)].

Jia et al. aimed to explore the function of verbascoside (VB) in GBM and its effects on GBM cell biological processes via let-7g-5p and HMGA2. Differentially expressed GBM-related microRNAs (miRNAs) were initially screened. Different concentrations of VB were applied to U87 and U251 GBM cells, and 50 μmol/L of VB was selected for subsequent experiments. Cells were transfected with let-7g-5p inhibitor or mimic, and overexpression of HMGA2 or siRNA against HMGA2 was induced, followed by treatment with VB. The regulatory relationships between VB, let-7g-5p, HMGA2 and Wnt/β-catenin signalling pathway were determined. The results showed that HMGA2 was a direct target gene of let-7g-5p. VB treatment or let-7g-5p overexpression inhibited HMGA2 expression and the activation of Wnt/β-catenin signalling pathway, which further inhibited cell viability, invasion, migration, tumour growth and promoted GBM cell apoptosis and autophagy. On the contrary, HMGA2 overexpression promoted cell viability, invasion, migration, tumour growth while inhibiting GBM cell apoptosis and autophagy. We demonstrated that VB inhibits cell viability and promotes cell autophagy in GBM cells by up-regulating let-7g-5p and down-regulating HMGA2 via Wnt/β-catenin signalling blockade [3)].

Expression of HMGA2 in 78 human gliomas and 7 human normal brain samples was studied using immunohistochemistry, and 29 gliomas were randomly selected and studied along with the normal brain by real-time quantitative polymerase chain reaction and Western blot analysis. Expression of HMGA2 protein was significantly higher in glioblastoma multiforme (World Health Organization [WHO] grade IV; $P = .007$) and anaplastic astrocytoma (WHO grade III; $P = .037$) than in diffuse astrocytoma (WHO grade II). Expression of HMGA2 correlated significantly with expression of Ki-67 ($r = 0.415$, $P < .01$) and matrix metalloproteinase-2 ($r = 0.363$, $P < .01$), but not with patient sex and age. The real-time quantitative polymerase chain reaction and Western blot analysis revealed similar results. Patients with tumors expressing HMGA2 at a higher level had a significantly shorter progression-free survival time (11.2months versus 18.8months; $P = .021$). Expression of HMGA2 significantly correlates with tumor cell proliferation, invasion, and survival in gliomas. The results suggest that HMGA2 has an important role in the treatment and prognosis of these cancers [4)].

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1)

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