Peiminine

Peiminine, a natural bioactive compound extracted from the traditional Chinese medicine Fritillaria thunbergii, has many pharmacological effects, especially anticancer activities. However, its anticancer effects on GBM and the underlying mechanism have not been demonstrated.

Zhao et al. conducted a study to investigate the potential antitumour effects of peiminine in human GBM cells and to explore the related molecular signalling mechanisms in vitro and in vivo Methods: Cell viability and proliferation were detected with MTT and colony formation assays. Morphological changes associated with autophagy were assessed by transmission electron microscopy (TEM). The cell cycle rate was measured by flow cytometry. To detect changes in related genes and signalling pathways in vitro and in vivo, RNA-seq, Western blotting and immunohistochemical analyses were employed.

Peiminine significantly inhibited the proliferation and colony formation of GBM cells and resulted in changes in many tumour-related genes and transcriptional products. The potential anti-GBM role of peiminine might involve cell cycle arrest and autophagic flux blocking via changes in expression of the cyclin D1/CDK network, p62 and LC3. Changes in flow cytometry results and TEM findings were also observed. Molecular alterations included downregulation of the expression of not only phospho-Akt and phospho-GSK3β but also phospho-AMPK and phospho-ULK1. Furthermore, overexpression of AKT and inhibition of AKT reversed and augmented peiminine-induced cell cycle arrest in GBM cells, respectively. The cellular activation of AMPK reversed the changes in the levels of protein markers of autophagic flux. These results demonstrated that peiminine mediates cell cycle arrest by suppressing AktGSk3β signalling and blocks autophagic flux by depressing AMPK-ULK1 signalling in GBM cells. Finally, peiminine inhibited the growth of U251 gliomas in vivo.

Peiminine inhibits glioblastoma in vitro and in vivo via arresting the cell cycle and blocking autophagic flux, suggesting new avenues for GBM therapy ¹⁾.

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Zhao B, Shen C, Zheng Z, Wang X, Zhao W, Chen X, Peng F, Xue L, Shu M, Hou X, Wang K, Zhong C, Sun J, Wan J, Zhao S. Peiminine Inhibits Glioblastoma in Vitro and in Vivo Through Cell Cycle Arrest and Autophagic Flux Blocking. Cell Physiol Biochem. 2018 Nov 29;51(4):1566-1583. doi: 10.1159/000495646. [Epub ahead of print] PubMed PMID: 30497066.

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