ABSTRACT

World Neurosurg. 2022 Mar 24:S1878-8750(22)00382-5. doi: 10.1016/j.wneu.2022.03.089. Online ahead of print.

Simvastatin Inhibits Tumor Growth and Migration by Mediating Caspase-1-dependent Pyroptosis in Glioblastoma Multiforme.

Yang S(1), Xie C(2), Guo T(3), Li H(4), Li N(2), Zhou S(2), Wang X(4), Xie C(5).

Author information:
(1)Department of Pediatric surgery, The Second Affiliated Hospital of Harbin Medical University.
(2)Department of Neurosurgery, The First Affiliated Hospital of Harbin Medical University, Harbin, 150001, China.
(3)Department of Histology and Embryology, Basic Medical Science College, Harbin Medical University, Harbin 150001, China.
(4)Department of Abdominal Ultrasound, The First Affiliated Hospital of Harbin Medical University, Harbin 150001, China.
(5)Department of Neurosurgery, The First Affiliated Hospital of Harbin Medical University, Harbin, 150001, China. Electronic address: xiechunchengHMU@hotmail.com.

Glioblastoma multiforme (GBM) is the most common and lethal central nervous system cancer and is associated with a poor prognosis. Simvastatin, a kind of widely used hypolipidemic agent, has been investigated for its beneficial effects on various types of cancers. The main purpose of this paper is to investigate the potential inhibitory effects of simvastatin on GBM and the underlying mechanism. Cell viability and cell cycle of simvastatin-treated U87 and U251 cells were determined by CCK8 Assay and flow cytometry, respectively. Additionally, we assessed cell migration and invasion abilities using a wound-healing assay and transwell assay. mRNA and protein expression patterns of caspase-1 and its markers nucleotide-binding oligomerization domain-like receptor pyrin domain containing 3 (NLRP3) and IL-1β in different conditions were detected by real-time PCR, immunofluorescence staining and western blot. Simvastatin decreased the viability of GBM cells and inhibited cell migration and invasion in a dose-dependent manner. Moreover, suppression of pyroptosis, as characterized by decreased expression of caspase-1, NLRP3 and IL-1β, was observed. However, use of a miR-214 inhibitor reversed the simvastatin suppressive effect on GBM cells. Simvastatin inhibits GBM progression by suppressing caspase-1 dependent pyroptosis, regulated by miR-214.

DOI: 10.1016/j.wneu.2022.03.089
PMID: 35342027