Natural products: a hope for glioblastoma patients.

Vengoji R, Macha MA, Batra SK, Shonka NA.

1 Department of Biochemistry and Molecular Biology, University of Nebraska Medical Center, Omaha, NE, 68198, USA.
2 Department of Otolaryngology/Head and Neck Surgery, University of Nebraska Medical Center, Omaha, NE, 68198, USA.
3 Eppley Institute for Research in Cancer and Allied Diseases and Buffett Cancer Center, University of Nebraska Medical Center, Omaha, NE, 68198, USA.
4 Department of Internal Medicine, Division of Oncology and Hematology, University of Nebraska Medical Center, Omaha, NE, 68198, USA.

Glioblastoma (GBM) is one of the most aggressive malignant tumors with an overall dismal survival averaging one year despite multimodality therapeutic interventions including surgery, radiotherapy and concomitant and adjuvant chemotherapy. Few drugs are FDA approved for GBM, and the addition of temozolomide (TMZ) to standard therapy increases the median survival by only 2.5 months. Targeted therapy appeared promising in in vitro monolayer cultures, but disappointed in preclinical and clinical trials, partly due to the poor penetration of drugs through the blood brain barrier (BBB). Cancer stem cells (CSCs) have intrinsic resistance to initial chemoradiation therapy (CRT) and acquire further resistance via deregulation of many signaling pathways. Due to the failure of classical chemotherapies and targeted drugs, research efforts focusing on the use of less toxic agents have increased. Interestingly, multiple natural compounds have shown antitumor and apoptotic effects in TMZ resistant and p53 mutant GBM cell lines and also displayed synergistic effects with TMZ. In this review, we have summarized the current literature on natural products or product analogs used to modulate the BBB permeability, induce cell death, eradicate CSCs and sensitize GBM to CRT.

KEYWORDS: blood brain barrier and chemotherapeutic drugs; glioblastoma; temozolomide

PMID: 29774132  PMCID: PMC5955138  DOI: 10.18632/oncotarget.25175

Free PMC Article