miR-210/VMP1信号传导通路在脑胶质瘤中作用的研究进展

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Title: The research progress of microRNA-210/VMP1 signal transduction pathway in glioma

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摘要: 脑胶质瘤是目前临床上最常见的中枢神经系统恶性肿瘤之一，全球发病率约为每年7/10万。在我国胶质瘤的发病率占据颅内肿瘤第一位。临床上胶质瘤的治疗手段主要为手术切除，但是术后复发率高、生存期短，通常只有15～19个月。因此对于胶质瘤寻找有效的治疗靶点，在临床上就显得尤为重要。有研究表明胶质瘤患者脑组织中miR-210水平明显高于正常脑组织，且表达越高患者预后越差。空泡膜蛋白1(vacuole membrane protein 1,VMP1)为大分子跨膜蛋白,研究发现VMP1在蛋白分泌、细胞器形成及多细胞发育过程中起重要作用,另外在人体许多肿瘤组织中如乳腺癌、肾癌、肝癌等均有表达,且在原发与转移性肿瘤中表达不一致,被预测其可能是一个肿瘤相关蛋白，但其在胶质瘤中的机制目前仍未涉及到。故本文简要综述当前miR-210/VMP1信号传导通路在胶质瘤中作用机制的研究进展。

Abstract: Glioma is one of the most common malignant tumors of the central system.The global incidence rate is about 7/100 000 per year.In China,the incidence of glioma occupies the first place among intracranial tumors.Surgical resection is the main treatment for glioma,but the recurrence rate is high and the survival time is short,usually only 15 to 19 months.Therefore,it is particularly important to find effective therapeutic targets for glioma.Some studies have shown that miR-210 levels in glioma patients are significantly higher than those in normal brain tissue,and the higher the expression,the worse the prognosis of glioma patients.It was found that VMP1 plays an important role in protein secretion,organelle formation and multicellular development.Additionally,it is expressed in many tumor tissues of human body such as breast cancer,kidney cancer,liver cancer,etc.The expression of VMP1 in primary and metastatic tumors is inconsistent.It is predicted that VMP1 may be a tumor-related protein,but its mechanism in glioma has not yet been involved.Therefore,this paper briefly reviews the current research progress of miR-210/VMP1 signaling pathway in glioma.

参考文献/REFERENCES

[1] Schwartzbaum JA,Fislier JL,Aldape KD.Epidemiology and molecular pathology of glioma [J] .Nat Clin Pract Neurol,2006 (2) :494-503.
[2] Li Feng,Yun Xie,Hao Zhang,et al.miR-107 targets cyclin-dependent kinase 6 expression,induces cell cycle G1 arrest and inhibits invasion in gastric cancer cells [J] .Medical Oncology,2012,29(2):856-863.
[3] Waghmare I,Roebke A,Minata M,et al.Intercellular cooperation and competition in brain cancers:Lessons from Drosophila and human studies [J] .Stem Cells Transl Med,2014 (3) :1262-1268.
[4] Li R,Li X,Ning S,et al.Identification of a core miR-pathway regulatory network in glioma by therapeutically targeting miR-181d,miR-21,miR-23b,β-Catenin,CBP,and STAT3 [J] .PLoS One,2014,9(7):e101903.
[5] AO Y,ZHOU LF.Guidelines for the diagnosis and treatment of central nervous system gliomas in China (2015) [J] .Natl Med J China,2016,96(7):485-509. [毛颖,周良辅.中国中枢神经系统胶质瘤诊断与治疗指南(2015) [J] .中国医学杂志,2016,96(7):485-509.]
[6] Zhang S, Lai NS, Liao KM,et al.MicroRNA-210 regulates cell proliferation and apoptosis by targeting

regulator of differentiation 1 in glioblastoma cells [J] .Folia Neuropathol,2015,53(3):236-244.
[7] He Dan,Wang Ping,Li Yachun,et al.The study of miRNA-210 regulation in multidrug resistance of laryngeal cancer through targeted NUPR1 gene [J] .Chinese Journal of Laboratory Diagnosis,2019,3(23):511-515.
[8] Jonas S,Lzaurralde L.Towards a molecular understanding of microRNA-mediated gene silencing [J] .Nat Rev Genet,2015,16(7):421-433.
[9] Igaz I,Igaz P.Tumor surveillance by circulating microRNAs:A hypothesis [J] .Cell Mol Life Sci,2014,71(21):4081-4087.
[10] Stein RA.MicroRNAs rise from trash to treasure [J] .Genet Eng Biotechnol News,2016,36(2):412-420.
[11] Visone R,Croce CM.MiRNAs and cancer [J] .Am J Pathol,2009,174(4):1131-1138.
[12] Lawrie CH,Gal S,Dunlop HM,et al.Detection of elevated levels of tumour-associated microRNAs in serum of patients with diffuse large B-cell lymphoma [J] .British Journal of Haematology,2008,141(5):672-675.
[13] Kosaka N,Yoshioka Y,Fujita Y,et al.Versatile roles of extracellular vesicles in cancer [J] .J Clin lnvest,2016(126):1163-1172.
[14] Fujiwara T,Uotani K，Yoshida A,et al.Clinical significance of circulating miR-25-3p as a novel diagnostic and prognostic biomarker in osteosarcoma [J] .Oncotarget,2017,8(20):33375-33392.
[15] Sita-Lumsden AR,Leach D,Givi A,et al.A circulating miRNA signature to help prognosticate at prostate cancer diagnosis [J] .J Clin Onco1,2017(35):108.
[16] Yokoi A,Yoshioka Y,Hirakawa A,et al.A combination of circulating miRNAs for the early detection of ovarian Cancer [J] .Oncotarget,2017(8):89811-89823.
[17] Yoshida K,Toden S,Han HY,et al.Identification of a circulating mirna diagnostic signaturein pancreatic ductal adenocarcinoma [J] .Gastroenterology,2017,152(5):S273.
[18] Li S,Yang XF,Hu T,et al.Analysis of circulating microRNA-1268 in plasma of lung cancer and its clinical significance [J] .J Hunan Normal Univarsity,2017(14):16-19.
[19] Yun L,Li W,Qingfeng C,et al.Correlation analysis between miR-210 expression and molecular typing in breast cancer [J] .Journal of Clinical Medical,2017,4(26):4968-4970.
[20] Sheng Ju,Zhipan Liang,Chang Li,et al.The effect and mechanism of miR-210 in down-regulating the autophagy of lung cancer cells [J] .Pathology-Research and Practice,2019,215(3):453-458.
[21] Hirofumi Yoshino,Masaya Yonemori,Kazutaka Miyamoto,et al.MicroRNA-210-3p depletion by CRISPR/Cas9 promoted tumorigenesis through revival of TWIST1 in renal cell carcinoma [J] .Oncotarget,2017(13):20881-20894.
[22] Yan W,Zhang W,Sun L,et al.Identification of MMP-9 specific microRNA expression profile as potential targets of anti-invasion therapy in glioblastoma multiforme [J] .Brain Res,2011(1411):108-115.
[23] Ruofei Li,Li Zhongbao,Wei Hu,et al.Expression of miR-210 mediated by adeno-associated virus performed neuroprotective effects on a rat model of acute spinal cord injury [J] .Tissue and Cell,2019(57):22-33.
[24] Huang X,Zuo J.Emerging,roles of miR-210 and other noncoding RNAs in the hypoxic response [J] .Acta Biochim Biophys Sin (Shanghai),2014(46):220-232.
[25] Zhang S,Lai N,Liao K,et al.MicroRNA-210 regulates cell proliferation and apoptosis by targeting regulator of differentiation 1 in glioblastoma cells [J] .Folia Neuropathol,2015(53):236-244.
[26] Favaro E,Ramachandran A,McCormick R,et al.MicroRNA-210 regulates mitochondrial free radical response to hypoxia and krebs cycle in cancer cells by targeting iron sulfur cluster protein ISCU [J] .PLoS One,2010,5(4):e10345.
[27] Dusetti NJ，Jiang Y，Vaccaro MI,et al.Cloning and expression of the rat vacuole membrane protein 1 (VMP1)，a new gene activated in pancreas with acute pancreatitis，which promotes vacuole formation [J] .Biochemical and Biophysical Research Communications,2002,290(2):641-649.
[28] Yan Zhao,Yong Chen,Guangyan Miao,et al.The ER-localized transmembrane protein EPG-3/VMP1 regulates SERCA activity to control ER-isolation membrane contacts for autophagosome formation [J] .Molecular Cell,2017(67):974-989.
[29] Luis-Carlos Tábara,Juan-Jesús Vicente,Joanna Biazik,et al.Vacuole membrane protein 1 marks endoplasmic reticulum subdomains enriched in phospholipid synthesizing enzymes and is required for phosphoinositide distribution [J] .Traffic,2018(19):624-638.
[30] Guo L,Yang LY,Fan C,et al.Novel roles of Vmp1:Inhibition metastasis and proliferation of hepatocellular carcinoma [J] .Cancer Sci,2012,103(12):2110-2119.
[31] Zhou SQ,Zhou JH,Deng T,et al.Expression and prognostic value of vacuole membrane protein 1 in non-small-cell lung cancer [J] .Chinese Medical Journal,2011，91 (40):2828-2831.
[32] Sauermann M,Sahin O,Sultmann H,et al.Reduced expression of vacuole membrane protein 1 affects the invasion capacity of tumor cells [J] .Oncogene,2008,27 (9):1320-1326.
[33] Qian Q,Zhou H,Chen Y,et al.VMP1 related autophagy and apoptosis in colorectal cancer cells:VMP1 regulates cell death [J] .Biochem Biophys Res Commun，2014,443(3):1041-1047.
[34] Ying Q,Liang L,Guo W,et al.Hypoxia-inducible microRNA-210 augments the metastatic potential of tumor cells by targeting vacuole membrane protein 1 in hepatocellular carcinoma [J] .Hepatology,2011,54(6):2064-2075.
[35] CHEN SP,ZUO XK,XIA Y,et al.Advances in treatment of brain glioma [J] .Chin J Neurotrauma Surg(Electronic Edition),2017,3(2):105-108. [陈圣攀,左晓坤,夏鹰,等.脑胶质瘤的治疗进展 [J] .中华神经创伤外科电子杂志，2017,3(2):105-108.]
[36] Wesseling P,van den Bent M,Perry A.Oligodendroglioma:Pathology,molecular mechanisms and markers [J] .Acta Neuropathol,2015,129(6):809-827.

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