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Guanjian Zhao, Qin Huang, Feng Wang, Xiang Zhang, Jiangang Hu, Ying Tan, Ning Huang, Zhigang Wang, Zhibiao Wang, Yuan Cheng

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Targeted shRNA-loaded liposome complex combined with focused ultrasound for blood brain barrier disruption and suppressing glioma growth

Guanjian Zhao[1,a,b], Qin Huang[1,a], Feng Wang[a], Xiang Zhang[a,b], Jiangang Hu[a,b], Ying Tan[a], Ning Huang[a], Zhigang Wang[b], Zhibiao Wang[c], Yuan Cheng[a*]

1 These authors contributed equally to this work and should be considered co-first authors

a Department of Neurosurgery, The Second Affiliated Hospital of Chongqing Medical University, Chongqing, 400010,China

b Institute of Ultrasound Imaging, The Second Affiliated Hospital of Chongqing Medical University, Chongqing, 400016,China

c Laboratory of Ultrasound Engineering in Medicine Co-Founded by Chongqing and the Ministry of Science and Technology, Chongqing, 400016, China

Correspondence: Yuan Cheng[a*], email: 646872221@qq.com

Abstract

Our previous studies have demonstrated that focused ultrasound (FUS) combined with DNA-loaded microbubbles (MBs) can induce noninvasive, reversible, local disruption of the blood brain barrier (BBB) and enable targeted exogenous gene transfer into the central nervous system. However, due to low gene loading or the absence of positive targeting, to date, there has been no therapeutic effect of MBs combined with FUS in tumor treatment. In the current study, we adopted a phospholipid complex that exhibited sufficient gene loading and peptide-mediated targeting to delay glioma growth. First, we bound MBs to shBirc5-lipo-NGR, which performed the dual function of tumor cell targeting and effective gene loading. Next, we demonstrated that FUS-aided MB-shBirc5-lipo-NGR exhibited a higher