circ_0000075

Extracellular vesicle (EV)-encapsulated circRNAs have the potential role in affecting brain disorders. However, the role of circ_0000075 in ischemic stroke remains unclear. Liu et al. tried to investigate the mechanism of bone marrow mesenchymal stem cell (BMSC)-derived EVs carrying circ_0000075 in the control of cerebral ischemic injury. Initially, a mouse model with cerebral ischemic injury was induced by middle cerebral artery occlusion (MCAO), followed by the determination of circ_0000075 expression. Then, neurons were isolated and subjected to oxygen-glucose deprivation/reperfusion. BMSCs were isolated for extraction of EVs. The correlation among circ_0000075, microRNA (miR)-218-5p, and Smad ubiquitination regulatory factor 2 (SMURF2) was detected with their roles in cerebral ischemic injury analyzed in vivo and in vitro. circ_0000075 was down-regulated in MCAO mice and engineered RVG-EVs were internalized by neurons to up-regulate circ_0000075 expression. Treatment of RVG-circ_0000075-EVs reduced brain tissue damage, increased neuronal count, and significantly curtailed apoptosis rate, suppressing cerebral ischemic injury in vitro and in vivo. miR-218-5p was targeted by circ_0000075 in neurons, which promoted SMURF2 expression. A negative correlation between SMURF2 and transcriptional regulator Yin Yang 1 (YY1) was identified. In vitro experiments further proved that circ_ 00,000 75 could down-regulate the expression of YY1 through SMURF2, and finally relieving cerebral ischemic injury. Collectively, engineered EVs delivered circ_0000075 into brain tissues and increased circ_0000075 expression, which down-regulated miR-218-5p and up-regulated SMURF2, thus alleviating cerebral ischemic injury [1].

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Liu Y, Li YP, Xiao LM, Chen LK, Zheng SY, Zeng EM, Xu CH. Extracellular Vesicles Derived from Bone Mesenchymal Stem Cells Carrying circ_0000075 Relieves Cerebral Ischemic Injury by Competitively Inhibiting miR-218-5p and Up-regulating E3 Ubiquitin Ligase SMURF2. Mol Neurobiol. 2023 Feb 3. doi: 10.1007/s12035-022-03192-9. Epub ahead of print. PMID: 36732429.