

- impairment in adult mice [J]. *Exp Neurol*, 2008, 210 (2): 585 – 591.
- [20] FU X, ZHANG J, GUO L, et al. Protective role of luteolin against cognitive dysfunction induced by chronic cerebral hypoperfusion in rats [J]. *Pharmacol Biochem Behav*, 2014 (126): 122 – 130.
- [21] LEE C H, PARK J H, AHN J H, et al. Effects of melatonin on cognitive impairment and hippocampal neuronal damage in a rat model of chronic cerebral hypoperfusion [J]. *Exp Ther Med*, 2016, 11 (6): 2240 – 2246.
- [22] LEE K M, BANG J H, HAN J S, et al. Cardiotonic pill attenuates white matter and hippocampal damage via inhibiting microglial activation and downregulating ERK and p38 MAPK signaling in chronic cerebral hypoperfused rat [J]. *BMC Complement Altern Med*, 2013 (13): 334.
- [23] HOU X, LIANG X, CHEN J F, et al. Ecto-5' - nucleotidase (CD73) is involved in chronic cerebral hypoperfusion - induced white matter lesions and cognitive impairment by regulating glial cell activation and pro - inflammatory cytokines [J]. *Neuroscience*, 2015 (297): 118 – 126.
- [24] SPARACIO S M, ZHANG Y, VILCEK J, et al. Cytokine regulation of interleukin - 6 gene expression in astrocytes involves activation of an NF-kappa B - like nuclear protein [J]. *J Neuroimmunol*, 1992, 39 (3): 231 – 242.
- [25] KHAN M B, HODA M N, VAIBHAV K, et al. Remote ischemic postconditioning: harnessing endogenous protection in a murine model of vascular cognitive impairment [J]. *Transl Stroke Res*, 2015, 6 (1): 69 – 77.
- [26] BJERKE M, ZETTERBERG H, EDMAN Å, et al. Cerebrospinal fluid matrix metalloproteinases and tissue inhibitor of metalloproteinases in combination with subcortical and cortical biomarkers in vascular dementia and Alzheimer's disease [J]. *J Alzheimers Dis*, 2011, 27 (3): 665 – 676.
- [27] CAI Z Y, YAN Y, CHEN R. Minocycline reduces astrocytic reactivation and neuroinflammation in the hippocampus of a vascular cognitive impairment rat model [J]. *Neurosci Bull*, 2010, 26 (1): 28 – 36.
- [28] WON J S, KIM J, ANNAMALAI B, et al. Protective role of S - nitrosoglutathione (GSNO) against cognitive impairment in rat model of chronic cerebral hypoperfusion [J]. *J Alzheimers Dis*, 2013, 34 (3): 621 – 635.
- [29] 宋志宇, 卢宏, 翟锴华, 等. 血管性痴呆大鼠海马区核因子-κB、环氧合酶-2 的表达变化 [J]. *中国实用神经疾病杂志*, 2007, 25 (3): 88 – 89.
- [30] TOMIMOTO H, AKIGUCHI I, WAKITA H, et al. Cyclooxygenase - 2 is induced in microglia during chronic cerebral ischemia in humans [J]. *Acta Neuropathol*. 2000, 99 (1): 26 – 30.
- [31] 李文涛, 张博爱, 刘艳茹, 等. 慢性脑缺血对信号转导和转录激活因子 - 1 的表达 [J]. *中国实用神经疾病杂志*, 2007, 10 (3): 82 – 83.
- [32] REIMER M M, MCQUEEN J, SEARCY L, et al. Rapid disruption of axon - glial integrity in response to mild cerebral hypoperfusion [J]. *J Neurosci*, 2011, 31 (49): 18185 – 18194.
- [33] LEE K M, BANG J, KIM B Y, et al. Fructus mume alleviates chronic cerebral hypoperfusion - induced white matter and hippocampal damage via inhibition of inflammation and downregulation of TLR4 and p38 MAPK signaling [J]. *BMC Complement Altern Med*, 2015 (15): 125.
- [34] KIM M S, BANG J H, LEE J, et al. Salvia miltiorrhiza extract protects white matter and the hippocampus from damage induced by chronic cerebral hypoperfusion in rats [J]. *BMC Complement Altern Med*, 2015 (15): 415.
- [35] CASO J R, PRADILLO J M, HURTADO O, et al. Toll - like receptor 4 is involved in brain damage and inflammation after experimental stroke [J]. *Circulation*, 2007, 115 (12): 1599 – 1608.
- [36] JEON W K, MA J, CHOI B R, et al. Effects of Fructus mume Extract on MAPK and NF-κB Signaling and the Resultant Improvement in the Cognitive Deficits Induced by Chronic Cerebral Hypoperfusion [J]. *Evid Based Complement Alternat Med*, 2012 (2012): 450838.
- [37] JUNG H W, SON H Y, MINH C V, et al. Methanol extract of Ficus leaf inhibits the production of nitric oxide and proinflammatory cytokines in LPS - stimulated microglia via the MAPK pathway [J]. *Phytother Res*, 2008, 22 (8): 1064 – 1069.
- [38] KIM M S, BANG J H, LEE J, et al. Fructus mume Ethanol Extract Prevents Inflammation and Normalizes the Septohippocampal Cholinergic System in a Rat Model of Chronic Cerebral Hypoperfusion [J]. *J Med Food*, 2016, 19 (2): 196 – 204.
- [39] FARKAS E, LUITEN P G, BARI F. Permanent, bilateral common carotid artery occlusion in the rat: a model for chronic cerebral hypoperfusion - related neurodegenerative diseases [J]. *Brain Res Rev*, 2007, 54 (1): 162 – 180.
- [40] SHICHITA T, SAKAGUCHI R, SUZUKI M, et al. Post - ischemic inflammation in the brain [J]. *Frontiers in Immunology*, 2012, 3 (3): 132.
- [41] CHOI B R, KIM D H, BACK D B, et al. Characterization of White Matter Injury in a Rat Model of Chronic Cerebral Hypoperfusion [J]. *Stroke*, 2016, 47 (2): 542 – 547.
- [42] CHAPARRO - HUERTA V, RIVERA - CERVANTES M C, FLORES - SOTO M E, et al. Proinflammatory cytokines and apoptosis following glutamate - induced excitotoxicity mediated by p38 MAPK in the hippocampus of neonatal rats [J]. *J Neuroimmunol*, 2005, 165 (1/2): 53 – 62.
- [43] HIMAYA S W, RYU B, QIAN Z J, et al. Paeonol from Hippocampus kuda Bleeler suppressed the neuro - inflammatory responses in vitro via NF-κB and MAPK signaling pathways [J]. *Toxicol In Vitro*, 2012, 26 (6): 878 – 887.

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