

论著

丹参酮IIA对A β 25-35引起的Meynert核团神经元钙电流变化的影响

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摘要:

目的:探讨丹参酮IIA(TanIIA)和 β 淀粉样蛋白25-35(A β 25-35)对Meynert核团(nbM)神经元电压依赖钙电流的影响。方法:运用细胞急性分离和单细胞膜片钳技术,采用全细胞记录方式,检测SD大鼠nbM神经元电压依赖钙电流、TanIIA对nbM神经元钙电流的影响、加入亚毒性剂量A β 25-35后钙电流的变化以及TanIIA对其引起钙电流变化的作用。结果:通过灌流分别给予含有不同浓度TanIIA的细胞外液,记录到的峰值电流与正常峰值电流基本一致,在0 mV时对峰值电流密度进行比较,差异没有统计学意义(P>0.05);给予亚毒性剂量A β 25-35的细胞外液灌流,峰值电流明显增大,与对照组比较差异有统计学意义(P<0.05);不同浓度TanIIA与200 nmol/L A β 25-35同时加入细胞外液灌流,其电压依赖钙电流与对照组比较,差异均无统计学意义(P>0.05)。结论:在体外,TanIIA能抑制A β 引起的nbM神经元细胞膜上钙电流放大,减少钙内流,以保护神经元。

关键词: 丹参酮IIA A β 25-35 Meynert核团 电压依赖钙电流

Effect of tanshinone IIA on the change of calcium current induced by β -amyloid protein 25-35 in neurons of nucleus basalis of Meynert

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Abstract:

Objective To explore the effect of tanshinone IIA (TanIIA) on calcium current induced by β -amyloid protein 25-35 (A β 25-35) in neurons of nucleus basalis of Meynert (nbM). Methods Cell acute dissociated technique and the whole-cell recording model of patch-clamp technique of single-cell were used. The voltage-dependent calcium current in neurons of nbM was recorded in SD rats first. Then the effect of TanIIA on the voltage-dependent calcium current in the neurons was assayed. The change of calcium current induced by A β 25-35 as well as the effect of TanIIA on the change of calcium current induced by A β 25-35 in neurons of nbM were analyzed. Results Extracellular fluid containing different concentrations of TanIIA was irrigated, respectively. The peak current did not change obviously. There was no difference in current density between the TanIIA group and the control group at 0 mV (P>0.05). Extracellular fluid containing 200 nmol/L A β 25-35 was irrigated after the normal calcium current recorded under whole patch clamp, and the peak current changed obviously. There was distinct difference in the current density between the A β group and the control group at 0 mV (P<0.05). Extracellular fluid containing A β 25-35 and different concentrations of TanIIA were irrigated after the normal calcium current was recorded under whole patch clamp, respectively, and the peak current did not change. There was no difference in current density between the TanIIA +A β group and the control group at 0 mV (P>0.05). Conclusion In vitro, TanIIA could inhibit the calcium current amplification induced by A β 25-35 in neurons of nbM. TanIIA may protect neurons against the toxicity of A β and decrease the inward flow of Ca²⁺.

Keywords: tanshinone IIA; β -amyloid protein 25-35; nucleus basalis of Meynert; voltage-dependent calcium current

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参考文献:

- [1] 崔德芝,张恭新,朱振铎.老年性痴呆的中医理论探讨 [J]. 山东中医杂志, 2006, 25(10): 655-657.
CUI Dezhi, ZHANG Gongxin, ZHU Zhenduo. Discussion on pathogenesis of senile dementia from the point of Zangfu-organs theory [J]. Shandong Journal of Traditional Chinese Medicine, 2006, 25(10): 655-657.
- [2] 卢昕,芦霜,陈民. 用“补肾祛痰化瘀”法辨证施护老年痴呆的研究 [J]. 中华中医药学刊, 2009, 25(5): 1015-1016.
LU Xin, LU Shuang, CHEN Min. Research of dialectically careing old dementia with the method of invigorating kidney and removing phlegm and blood stasis [J]. Chinese Archives of Traditional Chinese Medicine, 2009, 25(5): 1015-1016.
- [3] 王庆伟, 杨频, 张立伟. 丹参酮的有效分离 [J]. 山西大学学报: 自然科学版, 1994, 17(3): 294-298.
WANG Qinwei, YANG Pin, ZHANG Liwei. The effective isolation of tanshinone [J]. Journal of Shanxi University. Natural Science Edition, 1994, 17(3): 294-298.
- [4] 魏巍. 丹参酮的临床应用进展 [J]. 天津药学, 2007, 19(4): 63-65.
WEI Wei. The procession of clinical application on tanshinone [J]. Tianjin Pharmacy, 2007, 9(4): 63-65.
- [5] Xia W J, Yang M, Fok T F, et al. Partial neuroprotective effect of pretreatment with tanshinone IIA on neonatal hypoxia-ischemia brain damage [J]. Pediatr Res, 2005, 58(4): 784-790.
- [6] 陈连剑, 李婷, 李成. 丹参酮IIA抗大鼠肝星状细胞氧应激脂质过氧化作用的研究 [J]. 中药材, 2003, 7(26): 504-507.
CHEN Lianjian, LI Ting, LI Cheng. The study of effects of tanshinone IIA on oxidative stress lipid peroxidation of hepatic stellate cells in rat [J]. Journal of Chinese Medicinal Materials, 2003, 7(26): 504-507.
- [7] 李龙宣, 许志恩, 赵斌, 等. 丹参酮对阿尔茨海默病样大鼠海马内白介素1 β 和白介素6mRNA表达的影响 [J]. 中国组织化学与细胞化学杂志, 2004, 13(2): 168-173.
LI Longxuan, XU Zhi'en, ZHAO Bin, et al. Effect of tanshinone on IL-1 and IL-6 mRNA expressions in the hippocampus of rats with Alzheimer disease [J]. Chinese Journal of Histochemistry and Cytochemistry, 2004, 13(2): 168-173.
- [8] 朱淑娟, 钱亦华, 韩学哲, 等. 急性分离Meynert核团神经元方法及其应用 [J]. 中国老年学杂志, 2006, 26(6): 811-813.
ZHU Shujuan, QIAN Yihua, HAN Xuezhe, et al. The method for dissociating acutely neurons of Meynert nucleus and its application [J]. Chinese Journal of Gerontology, 2006, 26(6): 811-813.
- [9] Braidy N, Guillemin G, Grant R. Promotion of cellular NAD(+) anabolism: therapeutic potential for oxidative stress in ageing and Alzheimer's disease [J]. Neurotox Res, 2008, 13(3/4): 173-184.
- [10] 钱亦华, 王晓玲, 朱淑娟, 等. β -淀粉样蛋白增加基底前脑神经元对谷氨酸易感性研究 [J]. 西安交通大学学报: 医学版, 2005, 26(6): 536-540.
QIAN Yihua, WANG Xiaoling, ZHU Shujuan, et al. Study on beta amyloid protein enhancing the sensibility of primary cultured basal forebrain neuron to glutamic acid [J]. Journal of Xi'an Jiaotong University. Medical Sciences, 2005, 26(6): 536-540.
- [11] Li Y, Liu L, Barger S W. Interleukin-1 mediates pathological effects of microglia on tau phosphorylation and on synaptophysin synthesis in cortical neurons through a p38-MAPK pathway [J]. J Neurosci, 2003, 23(5): 1605-1608.
- [12] Khachaturian Z S. Calcium hypothesis of Alzheimer's disease and brain aging [J]. Ann N Y Acad Sci, 1994, 747: 1-11.
- [13] Qian Y, Ren H, Hu H, et al. Effect of the total saponin of dipsacus asper on intracellular free calcium concentration in the cellular model of Alzheimer's disease-the technique of scanning confocal microscopy [J]. Journal of Xi'an Medical University, 2001, 13(2): 159-163.
- [14] Gray C W, Petal A J. Neurodegeneration mediated by glutamate and beta-amyloid peptide: a comparison and possible interaction [J]. Brain Res, 1995, 691(1/2): 169-179.
- [15] Qian Y H, Liu Y, Hu H T, et al. The effects of the total saponin of Dipsacus asperoides on the damage of cultured neurons induced by β -amyloid protein 25-35 [J]. Anatom Sci Int, 2002, 77(3): 196-200.
- [16] Qian Y H, Han H, Hu X D, et al. Protective effect of ginsenoside Rb1 on amyloid protein(1-42)-induced neurotoxicity in cortical neurons [J]. Neurol Res, 2009, 31(7): 663-667.
- [17] Meng X F, Zou X J, Peng B, et al. Inhibition of ethanol-induced toxicity by tanshinone IIA in PC12 cells [J]. Acta Pharmacol Sinica, 2006, 27(6): 659-664.
- [18] 林奕斌, 赵同军, 展永. N-甲基-D-天氨酸受体的分子结构与生理功能 [J]. 生物学杂志, 2007, 24(1):

LIN Yibin, ZHAO Tongjun, ZHAN Yong. Molecular structure and physiological function of N-methyl-D-aspartic acid receptor [J]. Journal of Biology, 2007,24(1): 1-4.

[19] Madden D R. The structure and function of glutamate receptor ion channels [J]. Nat Rev Neurosci, 2002, 3(2): 91-101.

[20] Popescu G. Principles of N-methyl-D-aspartate receptor allosteric modulation [J]. Mol Pharmacol, 2005, 68(4): 1148-1155.

[21] Sonkusare S K, Kaul C L, Ramarao P. Dementia of Alzheimer's disease and other neurodegenerative disorders-memantine, a new hope [J]. Pharmacol Res, 2005, 51(1): 1-17.

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1. 李婷^{1,2}, 周建华¹, 邓征浩¹, 傅春燕¹, 蒋海鹰¹, 高振芹¹, 王金胜², 任宏政¹, 王鹏¹. FGF-2和osteopontin在非小细胞肺癌中的表达及其相关性[J]. 中南大学学报(医学版), 2009,34(11): 1114-1119
2. 谭倩¹, 唐华容¹, 刘荣荣², 王光平¹, 杨晓苏³, 陈方平¹. FVII活化蛋白酶基因的Marburg I型多态性与脑梗死发病的相关性[J]. 中南大学学报(医学版), 2009,34(12): 1171-1175
3. 谭洪毅, 潘频华, 赵然然, 覃庆武, 王慧, 胡成平. 呼吸道合胞病毒感染大鼠脊髓背根节信号转录因子的研究[J]. 中南大学学报(医学版), 2009,34(12): 1189-1195
4. 袁平, 王万春. 膝关节三维有限元模型的建立及生物力学分析[J]. 中南大学学报(医学版), 2010,35(1): 85-89
5. 王微微^{1, 2}, 张明¹, 王渊¹, 金晨望¹, 闫斌¹, 麻少辉¹. 脑内5-HT参与S I及S II脑区痛觉调控的功能磁共振成像研究[J]. 中南大学学报(医学版), 2010,35(3): 185-193
6. 卿春华, 陈平, 向旭东. 茶多酚对低剂量烟草悬凝物诱导人支气管上皮细胞氧化损伤及凋亡的影响[J]. 中南大学学报(医学版), 2010,35(2): 123-
7. 吕梁¹, 霍继荣¹, 刘佳², 武捷², 王捷². APC不同功能区域对结肠癌细胞株HT-29中 β -连环蛋白表达的影响[J]. 中南大学学报(医学版), 2010,35(2): 140-
8. 杨乐平, 谭兴国, 杨竹林, 李清龙, 苗雄鹰. 胰腺癌大鼠RAD51和MAX的表达[J]. 中南大学学报(医学版), 2010,35(2): 146-
9. 王敏¹, 李先平¹, 王庆林², 汤兰桂². 用抗HCV多抗从随机12肽库中筛选抗原表位[J]. 中南大学学报(医学版), 2010,35(3): 236-240
10. 樊敏¹, 刘伏友², 杨宇¹, 叶云¹, 黄谷香¹. 糖原合成酶激酶-3 β 磷酸化促进人腹膜间皮细胞转分化的实验研究[J]. 中南大学学报(医学版), 2010,35(4): 329-
11. 王文欢¹, 伍仁毅¹, 孙国瑛², 李新华¹, 袁伟建¹, 唐丽安¹. VEGF-C和VEGF-D在胃癌组织中的表达与淋巴结转移的关系[J]. 中南大学学报(医学版), 2010,35(4): 335-
12. 谷娟¹, 严谨², 吴卫华^{3, 4}, 黄琪³, 欧阳冬生¹. 醛糖还原酶的研究进展[J]. 中南大学学报(医学版), 2010,35(4): 395-
13. 刘虹, 彭佑铭, 李娟, 刘映红, 成梅初, 袁芳, 刘伏友. 3547例慢性肾脏疾病患者分期及相关因素分析[J]. 中南大学学报(医学版), 2010,35(5): 499-
14. 陶立坚^{1, *}, 张军¹, 胡高云², 陈卓², 龚娟². 1-(3-氟苯基)-5-甲基-2-(1H)吡啶酮对鼠肾成纤维细胞的影响[J]. 中南大学学报(医学版), 2004,29(2): 139-141
15. 陈名久, 吴显宁, 尹邦良, 等. 可吸收线分层缝合法在颈部食管胃吻合术中的应用[J]. 中南大学学报(医学版), 2011,36(3): 265-