

论文

银杏叶提取物对低氧复氧、H₂O₂和谷氨酸损伤时谷氨酸引起的大鼠星形胶质细胞 [Ca²⁺]_i变化的影响

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摘要:

目的研究银杏叶提取物对低氧复氧、H₂O₂和L-谷氨酸损伤时谷氨酸升高大鼠星形胶质细胞 [Ca²⁺]_i的影响。方法钙荧光探针Fluo-3/AM标记胞浆内游离钙离子, 激光扫描共聚焦显微镜测定 [Ca²⁺]_i的变化。结果在低氧复氧、H₂O₂以及高浓度的L-谷氨酸损伤后, 外源性谷氨酸 (27 μmol·L⁻¹) 均不能引起培养乳大鼠星形胶质细胞正常的 [Ca²⁺]_i升高, 反而使 [Ca²⁺]_i分别降低(3.3±1.6)%, (81±11)%和(81±7)%; 损伤前预先给予GbE (10 mg·L⁻¹) 不能明显改善星形胶质细胞的谷氨酸反应, 但预先给予GbE (100 mg·L⁻¹) 后, 27 μmol·L⁻¹谷氨酸可使损伤的星形胶质细胞 [Ca²⁺]_i分别升高(135±98)%, (117±93)%和(89±36)%。结论低氧复氧、H₂O₂以及高浓度的L-谷氨酸均能损伤星形胶质细胞的谷氨酸反应, 影响神经细胞与胶质细胞的双向交流。GbE能明显逆转不同损伤后谷氨酸诱导星形胶质细胞 [Ca²⁺]_i的异常变化, 使星形胶质细胞在不同损伤时能维持正常功能, 该作用可能与GbE的脑保护作用有关。

关键词: 银杏叶提取物 星形胶质细胞 [Ca²⁺]_i 低氧复氧 谷氨酸 H₂O₂

Effects of *Gingko biloba* extract on glutamate-induced [Ca²⁺]_i changes in cultured cortical astrocytes after hypoxia/reoxygenation, H₂O₂ or L-glutamate injury

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Abstract:

AimTo investigate glutamate-induced [Ca²⁺]_i changes in cultured rat neonatal cortical astrocytes after hypoxia/reoxygenation, H₂O₂ or high concentration of L-glutamate injury. In the meantime, the effects of *Gingko biloba* extract (GbE) were examined. Methods [Ca²⁺]_i changes in astrocytes were monitored by laser scanning confocal microscopy with the Ca²⁺ sensitive fluorescent probe fluo-3. ResultsAfter astrocytes were impaired by hypoxia/reoxygenation, H₂O₂ (50 μmol·L⁻¹) or L-glutamate (0.25 mmol·L⁻¹), the exogenous glutamate (27 μmol·L⁻¹) could not induce increase of [Ca²⁺]_i, but decrease by (3.3±1.6)%, (81±11)% and (81±7)%, respectively. Pretreatment with Gb<, i>E (10 mg·L⁻¹) could not improve injured astrocytic glutamate response. But after pretreatment with Gb<, i>E (100 mg·L⁻¹), glutamate-induced [Ca²⁺]_i elevation of astrocytes after hypoxia/reoxygenation, H₂O₂ or high concentration of L-glutamate injury were (135±98)%, (117±93)% and (89±36)%, respectively.

Nimodipine (1.6 mg·L⁻¹) could also reverse the abnormal response of astrocytes after different injury. ConclusionHypoxia/reoxygenation, H₂O₂ and high concentration of L-glutamate impaired astrocytes' response to exogenous L-glutamate, and then bidirectional communication between astrocytes and neurons could not take place. Gb<, i>E could improve the abnormal responses and maintain the normal function of astrogical network. These effects support that GbE has potential beneficial actions against brain injury.

Keywords: astrocyte [Ca²⁺]_i hypoxia/reoxygenation glutamate H₂O₂ *Gingko biloba* extract

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- ▶ [Ca²⁺]_i
- ▶ 低氧复氧
- ▶ 谷氨酸
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