药学学报 2002, 37(12) 918-921 DOI: ISSN: CN:

论文

一氧化氮对一叶萩碱诱导的突触传递长时程增强的作用

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摘要:

目的研究一叶萩碱对麻醉大鼠突触可塑性形成中一氧化氮(nitric oxide,NO)的作用。方法以在体记录突触传递长时程增强(long-term potentiation,LTP)的电生理学方法,记录大鼠海马齿状回颗粒细胞层群峰电位(population spike,PS);以硝酸还原酶法测定NO含量。结果在侧脑室给予0.2 nmol·L^{-1}一叶萩碱(securinine,5 μL)前给予1 μmol·L^{-1} 7-硝基吲唑可抑制LTP的诱导。给药前ip *L*-精氨酸250 mg·kg^{-1}可逆转这种抑制作用。取脑进行NO含量测定,与一叶萩碱对照组相比,7-硝基吲唑+一叶萩碱给药组的NO含量明显下降。结论选择性一氧化氮合酶(nNOS)抑制剂7-硝基吲唑抑制一叶萩碱对LTP的诱导;由nNOS催化产生的NO参与了一叶萩碱诱导LTP的过程。

关键词: 突触传递长时程增强 一叶萩碱 一氧化氮 逆行性信使

EFFECT OF NO ON SECURININE-INDUCED LONG-TERM POTENTIATION IN DENTATE GYRUS OF THE HIPPOCAMPUS OF ANESTHETIZED RATS

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Abstract:

AIMTo study the effect of NO on securinine-induced long-term potentiation in the dentate gyrus of anesthetized rats. METHODSThe population spike (PS) was recorded by electrophysiological techniques. Then the rat brain was homogenized, of which the NO level was detected by spectrometry at 550 nm after the catalysis of nitric acid reductase. RESULTSPretreatment with 7-nitroindazole (1 μmol·L^{-1}, 5 μL icv) was shown to inhibit LTP induced by securinine (0.2 nmol·L^{-1}, 5 μL icv) in anesthetic rats. The percentage of PS amplitude was (100±23)%, (106±16)% and (124±20)% at 15, 30 and 60 min, respectively (N=6, P<0.01). Meanwhile, the NO level was obviously higher in securinine group compared with that in 7-nitroindazole group (P<0.01). Nevertheless, *L*-arginine (250 mg·kg^{-1}, ip) was found to reverse this inhibitory effect induced by 7-nitroindazole (P<0.05). CONCLUSION Selective nNOS inhibitor 7-nitroindazole inhibited the securinine-induced LTP in anesthetic rats, which demonstrated that NO was involved in securinine-induced LTP.

Keywords: securinine nitric oxide retrograde messenger long-term potentiation

收稿日期 2001-12-14 修回日期 网络版发布日期

DOI:

基金项目:

通讯作者: 张均田

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