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论著

米诺环素对大鼠皮质神经元的毒性及*N*-甲基-*D*-天冬氨酸损伤的保护作用

王一奇，魏尔清*

（浙江大学医学院药理学教研室，浙江 杭州 310031）

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摘要 目的 更全面地了解米诺环素对中枢神经系统的作用。方法 神经元与不同浓度米诺环素和(或)*N*-甲基-*D*-天冬氨酸(NMDA)作不同时间处理后，观察细胞形态，并以MTT试验评价细胞活性。结果 米诺环素135 μmol•L^{-1}处理24 h明显降低体外培养4，7，10 d神经元的活性（*P*<0.01），13.5 μmol•L^{-1}以下则无明显影响；45，135 μmol•L^{-1}米诺环素处理3 h对体外培养10 d神经元活性没有影响，处理24 h则活性明显下降（*P*<0.01）。米诺环素45，135 μmol•L^{-1}可保护50 μmol•L^{-1} NMDA损伤3 h后的神经元活性，但对15 μmol•L^{-1} NMDA损伤24 h后无效；15 μmol•L^{-1}米诺环素则仅对15 μmol•L^{-1} NMDA损伤24 h后有效。结论 米诺环素对大鼠原代皮质神经元有双重作用，高浓度长时间处理有毒性作用，但高浓度能保护神经元NMDA急性损伤，低浓度能保护延缓性损伤。

关键词 米诺环素 神经元 毒性

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Neurotoxicity of minocycline and its protective effect on *N*-methyl-*D*-aspartate-induced damage in rat cortical neurons

WANG Yi-Qi, WEI Er-Qing*

(Department of Pharmacology, Medical School, Zhejiang University, Hangzhou 310031, China)

Abstract

AIM For comprehensive understanding the action of minocycline on central nervous system. **METHODS** Cortical neurons were isolated from new-born rats, primarily cultured for different days, treated by minocycline and/or *N*-methyl-*D*-aspartate(NMDA) at different concentrations for different durations. After treatment, neurons were photographed, and their viability was evaluated by MTT assay. **RESULTS** Minocycline cultured at 135 μmol•L^{-1} for 24 h markedly reduced the viability of the neurons at 4, 7, 10 d *in vitro* (*P*<0.01), but had no effect at 13.5 μmol•L^{-1} or less. Minocycline at 45 and 135 μmol•L^{-1} for 3 h did not reduce the viability of the neurons at 10 d in vitro, but reduced the viability when treated for 24 h. On the other hand, minocycline at 45 and 135 μmol•L^{-1} protected the neurons against the damage induced by 50 μmol•L^{-1} NMDA for 3 h, but had no effect on the damage induced by 15 μmol•L^{-1} NMDA for 24 h. However, a lower concentration of minocycline (15 μmol•L^{-1}) could protect against the damage induced by 15 μmol•L^{-1} NMDA for 24 h. **CONCLUSION** Minocycline possesses both toxic and neuroprotective effects on rat primary cortical neurons. It can damage the neurons under longer exposure at higher concentrations, but protect the neurons from acute damage at higher concentrations and delay the damage at lower concentrations.

Key words minocycline neurons toxicity N-methyl-D-aspartate

DOI:

通讯作者 魏尔清 weieq2001@yahoo.com