

基础医学

基质金属蛋白酶在脑白质疏松症血-脑脊液屏障机制中的实验研究

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摘要:

目的 分析基质金属蛋白酶(MMPs)及其抑制物(TIMPs)的mRNA在脑组织的表达, 探讨血-脑脊液屏障(BBB)损伤致脑白质疏松症(LA)发生的作用机制。方法 18只5月龄雄性自发性高血压(SH)大鼠为实验组, 同龄7只雄性Wistar大鼠为对照组。取大鼠脑组织, 应用HE染色及免疫组织化学染色, 观察其病理变化及髓鞘碱性蛋白(MBP)、神经中丝(NF)和胶质纤维酸性蛋白(GFAP)的表达。取大鼠脑白质组织, 使用Real-time PCR技术, 检测MMP-9、MMP-2和金属蛋白酶组织抑制物-1(TIMP-1)mRNA的表达水平。结果 HE染色显示, SH大鼠脑白质区神经元和少突胶质细胞数量减少, 星形胶质细胞反应性增生。实验组较对照组GFAP表达增加, 而MBP和NF表达减少。实验组大鼠脑白质区TIMP-1、MMP-9和MMP-2 mRNA表达水平升高。其中, TIMP-1与MMP-2 mRNA升高显著(P<0.05), 而MMP-9 mRNA表达两组无显著性差异(P>0.05)。结论 5月龄SH大鼠可作为脑白质疏松症的实验动物模型。MMPs导致的BBB破坏可能是脑白质疏松症的发病机制之一。

关键词: 脑白质疏松症; 血-脑脊液屏障; 基质金属蛋白酶; 基质金属蛋白酶组织抑制因子; 自发性高血压大鼠

Experimental study of matrix metalloproteinases in the blood-brain barrier mechanism of leukoaraiosis

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Abstract:

Objective To analyze mRNA expressions of matrix metalloproteinases(MMPs) and their inhibitors(TIMPs) in the brain tissue and to investigate the mechanism of leukoaraiosis(LA) caused by blood-brain barrier(BBB) damage. Methods Five-month-old male spontaneously hypertensive(SH) rats(n=18) were taken as experimental group, the same age male Wistar rats(n=7) were taken as control group. Rat brain tissues were collected for HE staining and immunohistochemical staining to observe pathological changes and expressions of MBP, NF and GFAP. mRNA expressions of MMP-9, MMP-2 and TIMP-1 in the white matter were detected by Real-time PCR. Results HE staining showed that the number of axons and oligodendrocytes decreased, and astrocytes proliferation in the white matter of SH rats. Comparing to the control group, GFAP expression was increased, while expressions of MBP and NF were decreased in the experimental group. TIMP-1, MMP-9 and MMP-2 mRNA expressions all rised in the white matters of SH rats, among which TIMP-1 and MMP-2 mRNA expressions increased significantly (P<0.05), while MMP-9 mRNA expression didn't show significant difference(P>0.05). Conclusion Five-month-old SH rats can be adopted as the animal model of LA, while BBB damage caused by MMPs may be one of pathological mechanisms of LA.

Keywords: Leukoaraiosis; Blood brain barrier; MMPs; TIMPs; Spontaneously hypertensive rats

收稿日期 2012-06-15 修回日期 网络版发布日期

DOI:

基金项目:

国家自然科学基金(30970991); 山东省自然科学基金(Y2007C043); 山东省“十一五”卫生科技发展计划项目(2007HW079)

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