

论著

## 脑出血后神经细胞凋亡的时相变化及果糖二磷酸钠镁对其的抑制作用

ZENG Fan-Xin<sup>1\*</sup>, CHEN You-Xiang<sup>2</sup>, DONG Zhi<sup>2</sup>

(1. 重庆医药工业研究院药理毒理学室, 重庆 400061; 2. 重庆医科大学药理学教研室, 重庆 400016)

收稿日期 2002-10-30 修回日期 网络版发布日期 2008-12-11 接受日期 2003-2-19

**摘要** 目的 研究脑出血(ICH)后细胞凋亡的规律及果糖二磷酸钠镁(SMFD)的作用。方法 尾状核注射胶原酶诱导大鼠ICH模型,用TUNEL染色法观察ICH后神经细胞凋亡的发生及其随时间变化的规律以及SMFD的作用。结果 ICH触发了神经细胞凋亡,造模后6 h即出现凋亡细胞,高峰时间在出血后24~72 h,7 d时仍有凋亡细胞存在。凋亡细胞主要分布在海马及大脑皮质;SMFD可明显减少ICH后神经细胞凋亡数目,其作用强于相似剂量的1,6-二磷酸果糖或硫酸镁。结论 ICH可触发神经细胞凋亡,24~72 h细胞凋亡数目达高峰;SMFD对ICH后神经细胞凋亡有显著的抑制作用。

**关键词** [脑出血](#) [凋亡](#) [果糖二磷酸类](#) [硫酸镁](#)

分类号 [R971](#)

## The time course of neuronal apoptosis induced by intracerebral hemorrhage and the inhibitory effect of sodium magnesium fructose diphosphate

曾凡新<sup>1\*</sup>, 陈有香<sup>2</sup>, 董志<sup>2</sup>

(1. Department of Pharmacology and Toxicology, Chongqing Pharmaceutical Research Institute, Chongqing 400061, China; 2. Department of Pharmacology, Chongqing University of Medical Sciences, Chongqing 400016, China)

### Abstract

**AIM** To study neuronal apoptosis and its time course of rat brain subjected to intracerebral hemorrhage(ICH), as well as the inhibitory effect of sodium magnesium fructose diphosphate(SMFD) on it. **METHODS** ICH was induced in adult rats by stereotaxical injection of bacterial collagenase into left caudate nucleus, the time course of neuronal apoptosis and the effects of SMFD on it were determined by counting the number of positive cells after stained with TUNEL method. **RESULTS** ICH triggered neuronal apoptosis, which occurred at 6 h after the onset of ICH, peaked at 24—72 h, then descended and lasted for 7 d. Apoptotic cells mostly distributed in hippocampus and cortex; SMFD decreased the number of apoptotic cells and its effect was more potent than that of similar dose of 1,6-diphosphate fructose or magnesium sulfate. **CONCLUSION** ICH triggered neuronal apoptosis, the peak of it was at 24—72 h after the onset of ICH, and SMFD significantly inhibited neuronal apoptosis.

**Key words** [cerebral hemorrhage](#) [apoptosis](#) [fructose diphosphate](#) [magnesium sulfate](#)

DOI:

通讯作者 曾凡新 [zfx2806@sina.com](mailto:zfx2806@sina.com)

### 扩展功能

#### 本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(901KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [参考文献](#)

#### 服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

#### 相关信息

- ▶ 本刊中 [包含“脑出血”的相关文章](#)
- ▶ 本文作者相关文章

- [ZENG Fan-Xin](#)
- [CHEN You-Xiang](#)
- [DONG Zhi](#)