

基础研究

沉默视黄酸核受体 $\alpha$ 损伤大鼠原代海马神经元的钙兴奋性

江伟<sup>1,2,3</sup>, 喻琴<sup>1,2</sup>, 龚敏<sup>1,2</sup>, 毕扬<sup>1,2</sup>, 张赟<sup>1,2</sup>, 陈立<sup>1,2</sup>, 瞿平<sup>1,2</sup>, 魏小平<sup>1,2</sup>, 刘友学<sup>1,2</sup>, 陈洁<sup>1,2</sup>, 李廷玉<sup>1,2</sup>

(1. 重庆医科大学附属儿童医院儿童营养中心|重庆400014; 2.重庆医科大学 儿童发育疾病省部共建教育部重点实验室|重庆400014; 3.重庆医科大学附属儿童医院康复中心|重庆400014)

摘要:

目的: 了解视黄酸核受体 $\alpha$  (RAR $\alpha$ )对大鼠神经元功能的必要性。方法: 采用组织消化原代贴壁法分离培养大鼠原代海马神经元, 利用腺病毒载体特异沉默RAR $\alpha$ ; 利用Real-Time PCR分析沉默RAR $\alpha$ 对神经元视黄酸(RA)信号各受体以及神经细胞标志物的影响; 利用活细胞钙影像分析沉默RAR $\alpha$ 对神经元钙兴奋性的影响。结果: 免疫荧光显示, 分离培养的细胞90%表达神经元标志物神经特异性烯醇化酶(NSE), 腺病毒转染效率可达80%。PCR结果显示, RAR $\alpha$ 沉默后RAR $\alpha$ 表达降低75%( $P<0.01$ ), 其他受体均显著降低( $P<0.01$ ), 但RAR $\beta$ 显著上调( $P<0.05$ )。活细胞钙影像显示, 沉默组钙兴奋性显著降低( $P<0.05$ ), 全反式视黄酸(ATRA)预处理24 h能显著增强钙兴奋性( $P<0.01$ )。结论: RAR $\alpha$ 的缺失能显著降低原代海马神经元的神经元标志物NSE的表达, 并显著损伤神经元的钙兴奋性。

关键词: 原代海马神经元; 视黄酸; 视黄酸核受体 $\alpha$ ; 钙兴奋性; 基因沉默

Calcium excitability of rat primary hippocampal neuron damaged by silenced retinoic acid receptor  $\alpha$

JIANG Wei<sup>1,2,3</sup>, YU Qin<sup>1,2</sup>, GONG Min<sup>1,2</sup>, BI Yang<sup>1,2</sup>, ZHANG Zan<sup>1,2</sup>, CHEN Li<sup>1,2</sup>, QU Ping<sup>1,2</sup>, WEI Xiao-Ping<sup>1,2</sup>, LIU You-Xue<sup>1,2</sup>, CHEN Ji<sup>1,2</sup>, LI Ting-Yu<sup>1,2</sup>

(1. Children Nutrition Center, Children's Hospital, Chongqing Medical University, Chongqing 400014, China; 2. Key Laboratory of Developmental Diseases in Childhood, Ministry of Education, Chongqing Medical University, Chongqing 400014, China; 3. Rehabilitation Center, Children's Hospital, Chongqing Medical University, Chongqing 400014 | China)

Abstract:

Objective

To study the necessary of retinoic acid receptor  $\alpha$  (RAR $\alpha$ ) for rat neuron function. Methods Tissue digestion was used to isolate and cultivate the rat primary hippocampal neurons, and the adenovirus vector was used to specifically silence the RAR $\alpha$ ; Real-Time PCR was used to analyze the influence of silenced RAR $\alpha$  in retinoic acid(RA) receptors and the markers of nerve cells; live cell imaging analysis was performed to analyze the influence of the calcium excitability of neurons silenced RAR $\alpha$ . Results The immunofluorescence results showed that 90% of the isolated cells expressed the neuron marker neuron-specific enolase (NSE), the adenoviral transfection efficiency was up to 80%. The PCR results showed the expression of RAR $\alpha$  in silenced RAR $\alpha$  neuron was decreased by 75% ( $P<0.01$ ), the other receptors were significantly decreased ( $P<0.01$ ), but RAR $\beta$  was significantly increased ( $P<0.05$ ). The live cell calcium imaging results showed the calcium excitability in silent group was significantly reduced ( $P<0.05$ ), however all-trans retinoic acid (ATRA) pretreatment for 24 h could significantly enhance the calcium excitability ( $P<0.01$ ). Conclusion The absence of RAR $\alpha$  can significantly reduce the neuron marker NSE expression of the primary hippocampal neurons, and significantly damage the neuronal calcium excitability.

Keywords: primary hippocampal neurons; retinoic acid; retinoic acid receptor  $\alpha$ ; calcium excitability; gene silence

收稿日期 2011-06-29 修回日期 网络版发布日期 2011-11-28

DOI:

基金项目:

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(OKB)
- ▶ [HTML全文]
- ▶ 参考文献[PDF]
- ▶ 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
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- ▶ 原代海马神经元; 视黄酸; 视黄酸核受体 $\alpha$ ; 钙兴奋性; 基因沉默

本文作者相关文章

- ▶ 江伟
- ▶ 喻琴
- ▶ 龚敏
- ▶ 毕扬
- ▶ 张赟
- ▶ 陈立
- ▶ 瞿平
- ▶ 魏小平
- ▶ 刘友学
- ▶ 陈洁
- ▶ 李廷玉

PubMed

- ▶ Article by Jiang, W.
- ▶ Article by Yu, Q.
- ▶ Article by Gong, M.
- ▶ Article by Bi, Y.
- ▶ Article by Zhang, Z.
- ▶ Article by Chen, L.
- ▶ Article by Qu, P.
- ▶ Article by Wei, X. P.
- ▶ Article by Liu, Y. X.
- ▶ Article by Chen, J.
- ▶ Article by Li, T. Y.

通讯作者: 李廷玉

作者简介: 江 伟 (1981-) |男|四川省达州市人|医学博士|医师|主要从事脑损伤及神经发育研究。

作者Email: (Tel: 023-63623604, E-mail: tyli@top.sina.com)

### 参考文献:

### 本刊中的类似文章

1. 梁冰, 刘晓冬, 刘欣, 贾立立, 孔德娟, 徐慧英, 贺梦子, 宋志恒, 刘明博, 马淑梅. 分割剂量电离辐射对卵巢癌耐药细胞自噬性死亡的影响[J]. 吉林大学学报(医学版), 2011,37(6): 971-975

### 文章评论

反馈人	<input type="text"/>	邮箱地址	<input type="text"/>
反馈标题	<input type="text"/>	验证码	<input type="text"/> 3326