

论著

增强型绿色荧光蛋白转染对大鼠骨髓间充质干细胞体外神经元样细胞分化的影响

李亚伟, 王冰, 吕国华, 刘伟东, 李磊

中南大学湘雅二医院脊柱外科, 长沙 410011

摘要:

目的:利用质粒载体将增强型绿色荧光蛋白(enhanced green fluorescent protein, EGFP)转染大鼠骨髓间充质干细胞(rat mesenchymal stem cells, rMSC),研究EGFP对rMSC体外诱导分化神经元样细胞的影响。**方法:**以质粒为载体将EGFP基因转染rMSC,流式细胞仪检测转染后rMSC的表面标志物,并对转染EGFP的rMSC在体外向神经元方向诱导分化。**结果:**转染EGFP基因的rMSC与未转染的rMSC在细胞形态学和生长特性方面一致。转染EGFP基因的rMSC在细胞表面标志物上符合rMSC的特点,呈CD44(+),CD11b(-),CD45(-),经体外培养后可诱导分化神经元样细胞,并且2组诱导分化神经元样细胞阳性率差异无统计学意义($P>0.05$)。**结论:**转染EGFP基因对rMSC在体外诱导分化神经元样细胞无明显影响,EGFP可作为研究rMSC分化潜能机制的有效示踪标志。

关键词: 增强型绿色荧光蛋白 骨髓间充质干细胞 诱导分化 神经元样细胞

Effect of transfection of enhanced green fluorescent protein gene on neuron-like differentiation of rat mesenchymal stem cells

LI Yawei, WANG Bing, LV Guohua, LIU Weidong, LI Lei

Department of Spinal Surgery, Second Xiangya Hospital, Central South University, Changsha 410011, China

Abstract:

Objective To determine the effect of transfection of enhanced green fluorescent protein (EGFP) on neuron-like differentiation of rat mesenchymal stem cells (rMSC) with plasmid vector. **Methods** In vitro cultured rMSC was transfected with plasmid vector containing EGFP, and its surface marker and differentiation neuron-like cells were detected. **Results** There was no significant difference in the morphology and surface markers between the EGFP-rMSC and rMSC. The cell surface markers of EGFP-rMSC including expression of CD44(+), CD11b (-) and CD45(-) remained similar to those of rMSC. EGFP-rMSC presented the differentiated potential to neuron-like cells. There was no statistical difference in the positive ratio of neuron-like differentiation between the EGFP-rMSC and rMSC ($P>0.05$). **Conclusion** EGFP does not affect the neuron-like differentiation potential of rMSC, and can be used as the trace marker in the study of differentiation potential of rMSC.

Keywords: enhanced green fluorescent protein mesenchymal stem cell differentiation neuron-like cell

收稿日期 2011-04-01 修回日期 网络版发布日期

DOI: 10.3969/j.issn.1672-7347.2011.12.010

基金项目:

湖南省科技厅基金(2009SK3167)。

通讯作者: 王冰, E-mail: bingwang20021972@yahoo.com.cn

作者简介: 李亚伟, 博士研究生, 主要从事脊柱与脊髓损伤修复方面的研究。

作者Email: bingwang20021972@yahoo.com.cn

参考文献:

[1] McDonald J W, Liu X Z, Qu Y, et al. Transplanted embryonic stem cells survive, differentiate and promote recovery in injured rat spinal cord [J]. Nat Med, 1999, 5 (12): 1410-1412.

[2] Copray S, Balasubramanian V, Levenge J, et al. Olig2 overexpression induces the in vitro

扩展功能

本文信息

- Supporting info
- PDF(1495KB)
- [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

- 增强型绿色荧光蛋白
- 骨髓间充质干细胞
- 诱导分化
- 神经元样细胞

本文作者相关文章

PubMed

differentiation of neural stem cells into mature oligodendrocytes [J] . Stem Cells, 2006, 24(4): 1001-1010.

[3] Satake K, Lou J, Lenke L G. Migration of mesenchymal stem cells through cerebrospinal fluid into injured spinal cord tissue [J] . Spine, 2004, 29(18): 1971-1979.

[4] Phinney D G, Isakova I. Plasticity and therapeutic potential of mesenchymal stem cells in the nervous system [J] . Curr Pharm Des, 2005,11(10): 1255-1265.

[5] Phinney D G, Prockop D J. Concise review: mesenchymal stem/multipotent stromal cells: the state of transdifferentiation and modes of tissue repair-current views [J] . Stem Cells, 2007, 25(11):2896-2902.

[6] Siminiak T, Kurpisz M. Myocardial replacement therapy [J] . Circulation, 2003, 108(10):1167-1171.

[7] Chen A, Siow B, Blamire A M, et al. Transplantation of magnetically labeled mesenchymal stem cells in a model of perinatal brain injury [J] . Stem Cell Res, 2010, 5(3):255-266.

[8] Hokai M, Kuroda S, Shichinohe H, et al. Bone marrow stromal cells protect and repair damaged neurons through multiple mechanisms [J] . Neurosci Res,2008,86(5):1024-1035.

[9] Satake K, Lou J, Lenke L G. Migration of mesenchymal stem cells through cerebrospinal fluid into injured spinal cord tissue [J] . Spine (Phila Pa 1976), 2004, 29(18):1971-1979.

[10] Booth B W, Boulanger C A, Smith G H. Selective segregation of DNA strands persists in long-label-retaining mammary cells during pregnancy [J] . Breast Cancer Res, 2008,10(5): R90.

[11] Zhang S, He H, Lu W, et al. Tracking intrahepatically transplanted islets labeled with Feridex-polyethyleneimine complex using a clinical 3.0-T magnetic resonance imaging scanner [J] .Pancreas, 2009,38(3):293-302.

[12] Li W, Liu Z, Lin H, et al. Label-free colorimetric assay for methyltransferase activity based on a novel methylation-responsive DNAzyme strategy [J] . Anal Chem, 2010, 82(5):1935-1941.

[13] Mezey E, Chandross K J. Bone marrow: a possible alternative source of cells in the adult nervous system [J] . Eur J Pharmacol, 2000, 405(3): 297-302.

[14] Tomioka R. Expression of EGFP by adenovirus-mediated gene transfer in the central nervous system [J] . Methods Mol Biol. 2009, 515(6):97-106.

[15] Li H, Yu B, Zhang Y, et al. Jagged protein enhances the differentiation of mesenchymal stem cells into cardiomyocytes [J] . Biochem Biophys Res Commun, 2006, 341(2):320-325.

[16] Donsante A, Vogler C, Muzyczka N, et al. Observed incidence of tumorigenesis in long-term rodent studies of rAAV vectors [J] . Gene Ther, 2001, 8 (17): 1343-1346.

[17] Ahn W S, Bae S M, Chung J E, et al. Evaluation of adenoassociated virus 2 and human papilloma virus 16 and 18 infection in cervical cancer biopsies [J] . Gynecol Oncol, 2003,89 (1):105-111.

[18] Mothe A J, Kulbatski I, van Bendegem R L, et al. Analysis of green fluorescentprotein expression in transgenic rats for tracking transplanted neural stem/progenitor cells [J] . J Histochem Cytochem 2005,53(10):1215-1216.

[19] Tomita S, Shenoy A, Fukata Y, et al. Stargazin interacts functionally with the AMPA receptor glutamate-binding module [J] .Neuropharmacology, 2007,52(1):87-91.

[20] Anokhina E B, Buravkova L B. Heterogeneity of stromal precursor cells isolated from rat bone marrow [J] . Tsitologiya, 2007, 49(1):40-47.

[21] Jouhilahti E M, Peltonen S, Peltonen J. Class III beta-tubulin is a component of the mitotic spindle in multiple cell types. [J] . Histochem Cytochem, 2008, 56(12):1113-1119.

[22] Deng W, Obrocka M, Fischer I, et al. In vitro differentiation of human marrow stromal cells into

[23] Sanchez R J, Song S, Cardozo P F, et al. Adult bone marrow stromal cells differentiate into neural cells in vitro [J]. Exp Neuro, 2000, 164 (2): 247-256.

本刊中的类似文章

1. 杨进福, 屈文武, 唐滔, 胡建国, 喻杰峰, 杨一峰, 周新民, 胡冬煦. 人VEGF基因转染大鼠骨髓间充质干细胞的实验研究[J]. 中南大学学报(医学版), 2006, 31(03): 313-318
2. 龙剑虹, 刘芳芬, 祁敏. 体外诱导骨髓间充质干细胞分化为表皮干细胞[J]. 中南大学学报(医学版), 2006, 31(06): 866-871
3. 王亭忠^{1,2}, 马爱群^{1,2,*}, 徐正云^{1,2}, 蒋文慧^{1,2}, 杜媛^{1,2}. 心肌细胞对骨髓间充质干细胞分化为心肌细胞的影响[J]. 中南大学学报(医学版), 2005, 30(3): 270-275
4. 刘悦, 张湘生, 雷霆, 等. 兔骨髓间充质干细胞复合带部分松质骨的小牛皮质骨成骨实验研究[J]. 中南大学学报(医学版), 2011, 36(5): 417-
5. 罗宏武, 黄湘俊, 黄飞舟, 刘浔阳. 诱导人羊膜上皮细胞横向分化为肝细胞样细胞[J]. 中南大学学报(医学版), 2011, 36(6): 525-
6. 胡硕¹, 熊玲静¹, 余剑英¹, 雷萌¹, 赵敏¹, 张永学². 改良腺病毒AdF35-eGFP转染人及大鼠骨髓间充质干细胞的效率对比研究[J]. 中南大学学报(医学版), 2010, 35(9): 983-