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体外磁标记骨髓基质细胞移植治疗大鼠创伤性脑损伤的在体MRI观察

MR observation of labeling bone marrow mesenchymal stem cells in vitro and transplantation for treating brain injury in rats

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英文关键词: [Superparamagnetic iron oxide](#) [Bone marrow stromal cells](#) [Brain injuries](#) [Magnetic resonance imaging](#)

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中文摘要:

目的 采用高场MR在体监测超顺磁性氧化铁颗粒(SPIO)标记大鼠骨髓基质细胞(BMSCs)在脑损伤模型大鼠脑内的分布与迁移。方法 首先进行BMSCs体外培养,然后采用SPIO标记BMSCs;采用Feeney法制作创伤性脑损伤模型(TBI)。脑损伤24 h后于损伤区周围立体定向移植BMSCs,并于移植后1、3天及1、3周行MR检查。结果 倒置相差显微镜下观察,标记BMSCs的细胞内含有棕黄色铁颗粒,普鲁士蓝染色呈阳性;电镜下胞浆内可见散在分布的铁颗粒。细胞移植后MRI可见移植部位在MR各序列上均呈点状低信号,尤以磁敏感加权成像(SWI)上显示明确。结论 高场MRI能够在活体内连续示踪观察SPIO标记的BMSCs的分布与迁移,且SWI序列最为敏感。

英文摘要:

Objective To label rat bone marrow mesenchymal stem cells (BMSCs) with superparamagnetic iron oxide in vitro, and to monitor the survivorship and location of the labeled BMSCs in rat models of traumatic brain injury (TBI) with high field MR. **Methods** BMSCs were cultivated in vitro, and were labeled with SPIO. TBI models were built in the left hemisphere of the rats with Feeney's method. Then SPIO-labeled BMSCs were grafted stereotactically into the region nearby the contusion site 24 h later. The rats underwent MR examination 1 day, 3 days, 1 week and 3 weeks after implantation. **Results** Brown iron particles could be demonstrated in the SPIO-labeled BMSCs under inverted phase contrast microscope. Numerous intracytoplasmic iron particles were stained with Prussian blue, and diffused distribution of iron particles could be seen in the intracytoplasm under electron microscope. At implanted sites low signal intensity could be observed on every sequence of MR examination, among which T2*WI and SWI were better than other sequences, and SWI was the best. **Conclusion** MR is sensitive of tracking the survivorship and location of the labeled BMSCs, and SWI is the most sensitive sequence to detect the labeled cells.

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