DOI:10.16016/j.1000-5404.1994.01.019

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(收稿: 1993-08-27, 修回: 1993-12-11)

Study of the effects of cerebral contusion on cellular and mitochondrial calcium level of different regions of the brain in rats

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Abstract The cellular and mitochondrial level of calcium, the total phosphorus in brain tissue and mitochondrial phosphorus in different regions of the brain were determined with absorption spectroscopy and chromometry in rats 8 hours after they were inflicted with cerebral contusion. It was found that primary cerebral contusion could induce Ca^{++} influx of the cells in most of the brain regions and the intensity of Ca^{++} influx was correlated with the severity of local brain damage. Most of the influx Ca^{++} existed in the cytoplasm in bound forms to maintain a stable level of intracellular calcium ions, and protein was the main substance to bind with Ca^{++}. Massive Ca^{++} influx could lead to sequestration of Ca^{++} in the mitochondria and disturbed intracellular calcium level, which in turn brought about secondary damages on the tissue cells and a decrease of tissue phosphorus.

Key words brain injuries; calcium; mitochondria; phosphorus

小鼠白细胞介素-3 cDNA 逆转录病毒载体的构建及其转化细胞对小鼠造血功能的影响

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为研究供细胞因子基因治疗的可能性，构建了载有小鼠IL-3 cDNA的逆转录病毒载体 pSNIL$_3$。将此载体和作为对照的空载体用电穿孔法和磷酸钙DNA共沉淀法分别导入病毒包装细胞PA317，用G418筛选，获得稳定的转染子。经检测，这些细胞的培养上清中含有重组病毒。用此重组病毒感染、转化NIH/3T3细胞，经G418筛选，获得了稳定的转化细胞"3T3-IL$_3$"和"3T3-SN"。它们分别是用重组载体和空载体重组病毒转化的。用小鼠骨髓有核细胞增殖和CFU-GM的方法检测转化细胞培养上清的CSF活性，发现3T3-IL$_3$细胞培养上清有很强的CSF活性，用抗小鼠IL-3的单克隆抗体8F8可以中和这种活性，说明3T3-IL$_3$细胞分泌的CSF是IL-3。3T3-IL$_3$细胞分泌IL-3的性状在去掉选择压力6个月，传代约60代时仍无明显改变。将此分泌IL-3的3T3细胞用细胞胶原混合液的方式，注射到BALB/c小鼠腹部皮下，发现小鼠的造血功能受到了明显的刺激，出现了白细胞数目增加，肝、脾肿大，肝脏内出现了灶性分布的造血细胞，脾脏内各种分化阶段的造血细胞数目增加等现象。在放射损伤小鼠这些现象表现得尤其明显，并在其血清中检测出IL-3的活性。这些结果表明：类似IL-3这样的细胞因子，有可能通过采用基因治疗的技术在体内表达，达到治疗疾病的目的。

关键词 基因疗法；白细胞介素-3；逆转录病毒科
中图法分类号 R392.12

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