

神经干细胞体外增殖分化的钙成像研究

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神经干细胞具有广阔的应用前景,但我们对于其增殖和分化的内源机制、外部环境信号还并不甚了解。研究表明,钙信号很可能在其中起到了调控作用。利用钙离子成像技术,观察神经干细胞的单细胞体外增殖和分化过程,记录了在细胞分裂过程中钙信号变化的曲线。细胞增殖和分化过程中都会产生钙火花,但在细胞分裂后期两者钙信号的模式却存在差别。实验结果提示,胞内钙水平的波动只是细胞增殖的伴随产物,但却是细胞分化的必要条件。由此,我们提出钙信号对神经干细胞分化调控机制的假设,并指出其对今后研究的意义。

Calcium imaging of in-vitro proliferation and differentiation of neural stem cells

Neural stem cells(NSCs), for their multipotency, have become a promising star in cell replacement therapy. However, their clinical use is restricted because of our poor knowledge of the inner and outer mechanism of proliferation and differentiation of NSCs. Recent studies suggested that Ca^{2+} signals may regulate these processes. In this research, calcium imaging was used to observe the process that single NSC proliferated and/or differentiated in vitro. The results implied that the calcium signals in NSCs appear in both proliferation and differentiation process, and in proliferation, calcium transients are the accompanying signals reflecting cellular events, while in differentiation, the dependent signals associated with cell fate tightly. Eventually, it hypothesized a possibly mechanism that how Ca^{2+} signals regulate the process of the differentiation of NSCs and pointed out the perspective of the future research.

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