

论著

# 低营养及低氧状态下NIH3T3细胞增殖及细胞周期的变化及对bFGF的影响

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收稿日期 2007-9-6 修回日期 2008-1-10 网络版发布日期 2008-11-30 接受日期 2008-1-10

**摘要** 目的: 体外模拟慢性创面缺氧、低营养环境,观察成纤维细胞在该状态下增殖及细胞周期的变化及对外源性生长因子(bFGF)的反应,探讨低氧、低营养条件下成纤维细胞的病理生理变化。

**方法:** 单纯缺氧环境采用厌氧培养箱,通入混合气,氧分压(PO<sub>2</sub>)分为27 mmHg和44 mmHg 2个水平;低营养环境则控制培养液新生牛血清(NCS)浓度。用MTT法检测细胞活性以及其对外源性生长因子的反应,用流式细胞仪检测细胞周期。

**结果:** PO<sub>2</sub> 44 mmHg时细胞增殖速度较同期对照组无明显差异;PO<sub>2</sub> 27 mmHg时,细胞增殖速度较同期对照组明显减慢(P<0.01),细胞被阻滞于G<sub>0</sub>期,S期细胞比例明显减少,bFGF未显示促增殖作用。NCS浓度为0.5%的低营养状态下细胞增殖速度较同期对照组明显减慢(P<0.01),细胞被阻滞于G<sub>0</sub>-G<sub>1</sub>期(P<0.01);bFGF能明显改善低营养状态下的增殖减慢(P<0.01),使G<sub>2</sub>-M期细胞比例增加(P<0.05)。

**结论:** 27 mmHg PO<sub>2</sub>或NCS浓度为0.5%的低营养环境使细胞阻滞于G<sub>0</sub>-G<sub>1</sub>期,影响成纤维细胞增殖;bFGF可以改善低营养条件下细胞增殖减慢的状态,但对极度缺氧条件下的成纤维细胞增殖障碍无明显作用。

**关键词** [低营养](#); [低氧](#); [NIH3T3细胞](#); [成纤维细胞生长因子](#); [细胞周期](#)

分类号 [R363](#)

## NIH3T3 cell proliferation and cell cycle in the conditions of hypoxia or low nutrition and its response to bFGF

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### Abstract

<FONT face=Verdana>AIM: To investigate NIH3T3 cell proliferation and cell cycle in the condition of hypoxia or low nutrition and its response to bFGF, and to explore the pathophysiological changes of fibroblast under hypoxic or low nutritional conditions.<BR>METHODS: The cells were placed in anaerobic workstation where the mixture gas was given to simulate hypoxic environment. Partial oxygen pressure (PO<sub>2</sub>) of medium was controlled in 27 mmHg, 44 mmHg and 175mmHg. NIH3T3 cells were cultured with low nutritional medium contained new bovine serum (NCS) less than 10% to simulate low nutritional environment. MTT assay was used for observing cell activity and flow cytometry for cell cycle analysis.<BR>RESULTS: Under 44 mmHg PO<sub>2</sub>, no obvious difference was shown between hypoxia group and normal group. Under 27 mmHg PO<sub>2</sub>, the proliferation activity of NIH3T3 cells was significantly lower than that in normal group (P<0.01), as well as the cell numbers in G<sub>0</sub>-G<sub>1</sub> phase increased (P<0.05), S phase decreased (P<0.01). bFGF had no effect on cell proliferation. In 0.5% NCS medium, the NIH3T3 cell proliferation speed decreased (P<0.01) and cell cycle was arrested at G<sub>0</sub>-G<sub>1</sub> (P<0.01). The proliferation speed was improved by bFGF (P<0.01).<BR>CONCLUSION: In lower PO<sub>2</sub> or lower nutritinal condition, fibroblast proliferation activity is inhibited by cell cycle arrest in G<sub>0</sub>/G<sub>1</sub> phase. However the decreasing proliferation in low nutritional medium could be improved by external bFGF.</FONT>

**Key words** [Low nutrient](#) [Anoxia](#) [NIH3T3 cells](#) [Fibroblast growth factor](#) [Cell cycle](#)

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