

间充质干细胞在拉力作用下的大鼠皮下成骨能力研究

马 念^{1, 2} 曾德良³ 赵 宁¹ 黄家亮¹ 钱玉芬¹

(1. 上海交通大学医学院附属第九人民医院 口腔正畸科; 2. 上海市口腔医学重点实验室;

3. 上海交通大学医学院附属第九人民医院 口腔修复科, 上海 200011)

【摘要】目的 构建一个简易、有效的体内加力动物模型, 研究大鼠骨髓间充质干细胞(rBMSC)在大鼠皮下受拉力作用下的成骨能力。**方法** 将成骨诱导后的rBMSC与聚乳酸-羟基乙酸共聚物(PLGA)支架材料复合构建骨移植材料, 再运用澳丝弯制成加力装置与该移植材料复合, 实验分为细胞-材料-加力装置复合物(A组)和细胞-材料复合物(B组, 对照组)2组, 分别植入12只SD雄性大鼠皮下, 术后4w、8w取材, 分别行micro-CT扫描、苦味酸-品红染色、骨钙素免疫组化染色, 采用SPSS19.0进行统计学处理。**结果** micro-CT扫描可见与低密度的支架材料形成明显对比的高密度影像, 且成骨量A组>B组, 2组间存在明显差异。组织学评分表明A组与B组之间的差异具有统计学意义($P<0.05$)。**结论** 相比较不受力条件, 受到拉力作用的rBMSC在体内的成骨量更多, 本研究建立的大鼠皮下加力动物模型有效、可靠。

【关键词】 骨髓间充质干细胞 拉力 PLGA 成骨

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An *in vivo* study of rat subcutaneous osteogenesis of mesenchymal stem cells under tensile force

Ma Nian¹ Zen Deliang² Zhao Ning¹ Huang Jialiang¹ Qian Yufen¹

(1. Department of Orthodontics, Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai 200011;

2. Department of Prosthodontics, Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai 200011)

【Abstract】Objective To build a simple and effective experimental animal model under tensile force and explore the osteogenic capability of rat mesenchymal stem cells under mechanical strain subcutaneously. **Methods** Mesenchymal stem cells were isolated from SD rats, and seeded into PLGA after osteogenic induction in vitro. The cell-scaffold-force-device complex (A group) as the experimental group was generated under mechanical loading in the PLGA scaffold with Australian wire inserted, and the cell-scaffold complex (B group) without mechanical loading as the control group, and both complex were subcutaneously implanted to rats, respectively ($n=12$). Micro computer tomography (Micro-CT), immunohistochemical staining and Van-Gieson's staining were performed respectively after 4, 8 weeks post-surgery. **Results** Micro-CT showed that high density shadows among the PLGA under tensile force was more than those without tensile force. Histological evaluation showed that new bone formation and mineralization of the PLGA under tensile force were markedly accelerated than those under no strain ($P<0.05$). **Conclusion** Mesenchymal stem cells under tensile force showed more bone formation compared to

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通信作者: 钱玉芬, E-mail: qianyf1960@163.com