GMR Genetics and Molecular Research
Online Journal
ISSN:1676-5680

Repair of cartilage defects in BMSCs via CDMP1 gene transfection

G. Wu[1], Y. Cui[2], Y.T. Wang[2], M. Yao[2], J. Hu[2], J.X. Li[2], Y. Wang[2] and B. Zhang[2]

[1]Department of General Surgery,
The First Affiliated Hospital of Liaoning Medical University,
Jinzhou, Liaoning Province, China
[2]Department of Otolaryngology,
The First Affiliated Hospital of Liaoning Medical University,
Jinzhou, Liaoning Province, China

Corresponding author: Y. Cui
E-mail: yingcuicn@126.com

Genet. Mol. Res. 13 (1): 291-301 (2014)
Received January 9, 2013
Accepted April 23, 2013
Published January 17, 2014
DOI http://dx.doi.org/10.4238/2014.January.17.14

ABSTRACT. This study aimed at investigating the ability of cartilage-derived morphogenetic protein 1 (CDMP1) gene-transfected bone marrow mesenchymal stem cells (BMSCs) loaded on the poly(lactic-co-glycolic acid) (PLGA) scaffold for the repair of laryngeal cartilage defects and make a preliminary assessment of its repair effect. The mRNA and protein expressions of hCDMP1 were detected by reverse transcriptase-polymerase chain reaction and Western blotting. The expression of type II collagen (Col II) and glycosaminoglycan (GAG) were detected by immunohistochemistry. The cytoskeletal culture systems before and after transfection were transplanted into the rabbit full-thickness defects of thyroid cartilage for observation of the repair of cartilage defects from general and histological aspects. The exogenous hCDMP1 gene could be successfully transplanted into BMSCs through adenovirus infection to obtain a stable expression. Compared with the control group, hCDMP1 gene-transfected BMSCs

 ©FUNPEC-RP www.funpecrp.com.br

had enhanced secretory abilities of Col II, GAG, and other cartilage-specific matrices, with a trend of promoting cartilage differentiation. The transfected cytoskeletal complexes could more effectively repair laryngeal cartilage defects. hCDMP1 gene-transfected BMSCs/PLGA 3-D biological scaffold compounds transplanted into animal bodies could effectively repair laryngeal cartilage defects.

Key words: Cartilage tissue engineering; Adenovirus transfection; Cartilage-derived morphogenetic protein 1; Bone marrow mesenchymal stem cells