

論 文 要 旨

Efficacy of chitinase-3-like protein 1 as an *in vivo* bone formation predictable marker of maxillary/mandibular bone marrow stromal cells

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Introduction: Maxillary/mandibular bone marrow stromal cells (MBMSCs) are a useful cell source for bone regeneration in the oral and maxillofacial region. To further ensure the clinical application of MBMSCs in bone regenerative therapy, it is important to determine the bone formation capacity of MBMSCs before transplantation. The aim of this study is to identify the molecular marker that determines the *in vivo* bone formation capacity of MBMSCs.

Methods: The cell growth, cell surface antigens, *in vitro* and *in vivo* bone formation capacity of MBMSCs were examined. The amount of chitinase-3-like protein 1 (CHI3L1) secreted into the conditioned medium was quantified. The effects of CHI3L1 on the cell growth and osteogenic differentiation potential of MBMSCs and on the cell growth and migration of vascular endothelial cells and fibroblasts were examined.

Results: The cell growth and *in vitro* and *in vivo* bone formation capacity of the cells treated with different conditions were observed. MBMSCs that secreted a large amount of CHI3L1 into the conditioned medium tended to have low *in vivo* bone formation capacity, whereas MBMSCs that secreted a small amount of CHI3L1 had greater *in vivo* bone formation capacity. CHI3L1 promoted the migration of vascular endothelial cells, and the cell growth and migration of fibroblasts.

Conclusion: Our study indicates that the *in vitro* osteogenic differentiation capacity of MBMSCs and the *in vivo* bone formation capacities of MBMSCs were not necessarily correlated. The transplantation of high CHI3L1 secretory MBMSCs may suppress bone formation by inducing fibrosis at the site. These results suggest that the CHI3L1 secretion levels from MBMSCs may be used as a predictable marker of bone formation capacity *in vivo*.