

Molecular Analyses of Osteoblastic Niche and its Application with the Development of Nano Science

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【Outline of survey】

Bone formation is based on osteoblastic population which derive from its precursor cells or stem cells. However, the microenvironment for such stem cells for osteoblastic lineage has not yet been clearly identified. Down stream to this stem cells, there exists the function of transcription factors which determine the fate of cells. However, the components and structures of the network of this transcription factors are not also well defined. Especially, osteoblastic activity should be regulated by number of cytokines and hormones in the adult stage. The nature of these modulators in the adult bone formation should be elucidated to contemplate measures for the treatment for osteopenic diseases. Nerve-dependent regulation of osteoblastic activity and osteoclastic activity was reported while its involvement in the cellular regulation has yet been defined. To reconstruct bone, it is necessary to utilize molecules obtained by basic findings though lishing efficient delivery system based on tissue engineering technologies. Our research will focus on these points.

【Expected results】

Our research on the regulatory mechanisms for the maintenance of osteoblastic stem cells in niche environment would lead to findings to contribute to contemplate measures for the utilization of cell-based technology for the treatment of patients with major bone defects. In addition, we would be revealing the function of new transcription factor network and cytokine systems for the purpose to obtain bone formation for the treatment of osteopenic diseases.

【References by the principal researcher】

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【Term of project】 FY2006 - 2010	【Budget allocation】 17,800,000yen
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【Homepage address】

<http://www.tmd.ac.jp/mri/mph/indexmph.html>