OSTEOGENIC POTENTIAL OF OSTEOGENIC CELL / COLLAGEN SPONGE CONSTRUCT FOR BIO-ARTIFICIAL PERIOSTEUM

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INTRODUCTION
Open fractures are often associated with many complications. Therefore, initial treatments for open fracture are very important. Copious irrigation and enough debridement are recommended and secondary rigid fixation should be deferred until after the second week, because the danger of infection if it was done early. During the observation period, bone marrow is to be aspirated from the patient and osteogenic cells from bone marrow are to be expanded in membranous scaffold. If fracture site were covered with the osteogenic cells / membranous scaffold construct as bioartificial peristeum on the second operation, fracture site would get good microosteogetic environment and complications would be reduced. So we examine the osteogenic potential of the bioartificial peristeum.

MATERIALS AND METHODS
Bioartificial peristeum
From femora of Fisher rats, bone marrow was aspirated and primary culture was done in T75 flask. The primary culture was maintained in standard culture conditions for 10 days and the subculture was done for 10 days with the medium supplemented with 10 mM Na\(_2\)glycerophosphate, 82 \(\mu\)g/mL vitamin C phosphate and 10\(^{-8}\) M dexamethasone in the collagen sponge. In this way, we cultured the bioartificial peristeum and examined the osteogenic potential.

Biochemical analysis (in vitro study)
After the primary culture, subculture of the bioartificial peristeum continued for 1, 2, 3 and 4 weeks. The in vitro cultured bioartificial peristeums were used for biochemical analysis.

In vitro study, the bioartificial peristeum had high alkaline phosphatase activity after 2weeks incubation at the presence of dexamethasone (Fig.2).

In vivo study, we recognized the difference between the control group and the bioartificial peristeum group in the process of callus and bone formation. The control group showed that callus and bone formation were occurred in the bone edge. But the artificial peristeum group showed that callus and bone formation were occurred in the bone edge and center part of bone defect.

DISCUSSION
we designed and manufactured the bioartificial peristeum. In this study, it was primary filled with the osteogenic cell and provide good osteogenic environment. Moreover, we showed statistically osteogenic potential of the bioartificial peristeum in radiological analysis. Now we plane the next generation bioartificial peristeum that has strongly osteogenic potential, experimental study is presently underway.

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