

Enhanced Osteogenesis of Canine Allogenic Umbilical Cord Blood-Derived Mesenchymal Stem Cells Associated with Beta-Tricalcium Phosphate in Orthotopic Implantation

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Generally, autogenous cancellous bone is considered as best compatible grafting materials. But, limit of supply and difficulty to obtain associated with the use for autogenous bone grafts are significant disadvantages. Therefore, bone substitution biomaterials can be used. These materials can be combined with vital cells such as mesenchymal stem cell (MSC) to increase bone generation.

This study was performed to evaluate the osteogenesis of allogenic canine umbilical cord blood derived mesenchymal stem cells (cCB-MSCs) mixed with beta-tricalcium phosphate (β -TCP) in orthotopic implantation.

Seven hundred milligram of β -TCP mixed with 1×10^7 cCB-MSCs (CM) and the same volume of saline as control (C) were implanted into a 1.5 cm diaphyseal defect in the radius of Beagle dogs weighting 6-7 kg. Radiograph of the antebrachium were made immediately after surgery as well as 2, 4, 8 and 12 weeks after implantation. The implants were harvested 12 weeks after implantation. Additionally, cCB-MSCs were applied to 3 non-union cases.

In radiograph, continuity between the implant and host bone in the group CM was more excellent and faster than the group C. In the group CM, level of replacement of implant was also excellent. In application at non-union cases, fracture healing was occurred in one case.

In conclusion, present results indicated that cCB-MSCs have osteogenic potential on repairing bone defects.

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