Differentiation of UC-MSC into Ligament-Like Cell in vitro by Mechanical Tension and Various Media

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Introduction
The presence of such umbilical cord stem cells has been considered extremely promising for application in regenerative medicine. Also, many studies have demonstrated that mechanical stimulation of culture can induce expression and synthesis of matrix protein and differentiation of MSCs.

Materials and Methods
Flexercell System (Flexcell International Co., PA, USA) and various basal media such as DMEM, Advanced D-MEM/F-12 (GIBCO® Invitrogen Co), MegaCell™ DMEM (Sigma Co) were used in this work. (For differentiation of supplement with 10% FBS, 2mM I-Glutamine, 50 m Asc-2p, 0.1mM NEAA, 1ng/ml bFGF, 5ng/ml TGF-B, 5ng/ml IGF-II, 5 g/ml Insulin, 1ng/ml EGF)
Control cells were cultured on the same plates without cyclic strain.

Results
Almost, ECM production in the Megacell DMEM group was significantly higher than that of the other groups. In addition, RT-PCR revealed that mechanical stimulation led to increased collagen-III, α-SMA and tenascin-C was highly expression.

Discussion and Conclusion
These reports showed that Megacell DMEM of the cell or matrix was recognized by specific interactions between ECM molecules and membrane proteins higher than that of the other groups. Also, mechanical stimulation could promote UC-MSCs to differentiation, thereby induced expression and synthesis of matrix protein and ligament-like cell differentiation of UC-MSCs.

References

Acknowledgments
This work was supported by a grant from the Korean Health 21 R&D Project, Ministry of Health and Welfare, Republic of Korea (0405-BO01-0204-0006).