INTRODUCTION
Numerous products with various materials and architecture design were applied in cartilage regeneration for functional tissue repair [1]. Porous 3-D matrix becomes essential to cell interpenetration and nutrient supplement into the matrix and fibrous scaffolding matrices are generally recognized as capable of pore geometry compared with sponge type scaffolding matrices. Recently, porous fibrous PGA-chitosan hybrid matrix was developed by dispersing PGA in chitosan. Fabrication of matrices using this technique is limited since heterogeneous hybridizing of chitosan and poly (α-hydroxy acids) would remain insufficient in mechanical properties [2]. The thrust of this study was to fabricate homogeneous chitosan-PLGA (C/Pc) fibrous matrices from the co-solvent system that was composed of 1,1,1,3,3,3-hexafluoroisopropanol (HFIP) and methylene chloride (MC) and to improve mechanical properties and cell compatibility of previous fibrous scaffolding matrices.

MATERIAL AND METHODS
Fabrication of chitosan/PLGA fibrous matrix: C/Pc fibrous matrices were fabricated using a wet spinning technique. A polymer solution was prepared by dissolving both chitosan and PLGA in an organic solvent mixture of MC/HFIP (1.2 volume ratio). PLGA-dispersed chitosan (C/Pd) fibrous matrices were also fabricated by emulsifying PLGA-MC solvent system of HFIP-MC produced one-phase solution of C/Pc which indicated that chitosan and PLGA were homogeneously mixed. The co-mechanical properties [2]. The thrust of this study was to fabricate homogeneous chitosan-PLGA (C/Pc) fibrous matrices from the co-solvent system that was composed of 1,1,1,3,3,3-hexafluoroisopropanol (HFIP) and methylene chloride (MC) and to improve mechanical properties and cell compatibility of previous fibrous scaffolding matrices.

RESULTS
The C/Pc fibrous matrix showed smooth and uniformly striated surface indicating that chitosan and PLGA were homogeneously mixed. The co-solvent system of HFIP-MC produced one-phase solution of C/Pc which allowed wet-spinning process and C/Pc demonstrated single peak DSC thermogram of fiber (Fig. 1). The homogeneity of C/Pc fibers was beneficial in terms of acid-neutralizing effect of chitosan in the composite matrices. Mechanical test: The compressive mechanical property was tested according to the guideline set in ASTM D5022-95a. Scanning electron microscopy (SEM): Morphology of fibrous matrices was observed by using SEM at an accelerating voltage of 20Kv. Chondrocyte culture: Bovine articular chondrocytes were isolated by sequential digestion with proteinase and collagenase. The primary chondrocytes were incubated at 37 °C, 95 % of humidity and 5 % CO₂ in standard culture medium (DMEM+10 % FBS). Cells reached confluence and then seeded at a density of 4×10⁵ cells/matrix. Cell viability assay: The viable cell number was measured using the 3-(4,5-dimethylthiazol-2-yl)-5-(3-carboxymethoxyphenyl)-2-(3-sulfophenyl)-2H-tetrazolium inner salt (MTS) method using a commercially available kit (Promega, USA). Glycosaminoglycan (GAG) and DNA amount assay. The synthesis of GAG was determined by binding to dimethylmethylen blue (DMB) dye and absorbency was measured at 530 nm and 590 nm at each time point. The amount of DNA was determined using indole assay. Total amount of GAG was normalized vs the total amount of DNA. RNA isolation and RT-PCR: Total RNA was isolated from chondrocytes using Trizol® (Invitrogen, USA). After generation of single stranded cDNA, RT-PCR was performed. The expression of constitutive matrix gene, type II collagen. The novel C/Pc fibrous matrix could be a potential scaffolding biomaterial for cartilage regeneration.

DISCUSSION
C/Pc fibrous matrices were successfully fabricated as a novel scaffold for cartilage regeneration employing co-solvent system of HFIP and MC. Thermal analysis confirmed the homogeneous microstructure of chitosan-PLGA which provided proper degradability, mechanical property and hydrophilicity. Active chondrocytes growth was observed on the C/Pc fibrous matrices with typical expression of proteoglycan and type II collagen. The novel C/Pc fibrous matrix could be a potential scaffolding biomaterial for cartilage regeneration.

REFERENCES
1) Hutnachler DW et al., Biomaterials 21:2529-43, 2000

ACKNOWLEDGEMENT
This work was supported by a grant of the Korea Health 21 R&D Project, Ministry of Health & Welfare, Republic of Korea (02-PJ3-PG6-EV11-0002).