P45 *In Vitro* Differentiation of Human Adipose Tissue-derived Stem Cells into Hepatocyte-like Cells

Park S[1], Kim J[1], Kim H[1], Kang SG[2], Kim SK[3], Cho DJ[3], Do BR[4], You J[4]

[1]Department of Biology, Seoul women's University, Seoul, Korea, [2]Department of Biology, School of Biotechnology and Biomedical Science, Inje University, Kimhae, Korea, [3]Department of OB/GYN, College of Medicine, Yonsei University, Seoul, Korea, [4]HurimBioCell Inc. 402 Umi Bldg., Nonhyeon-dong, Gangnam-gu, Seoul, Korea

Objectives: Embryonic stem cells, bone marrow- and umbilical cord blood-derived mesenchymal stem cells have been shown to differentiate into hepatocytes. However, their utilization as therapeutic purposes has been constrained by many difficulties. We examined whether human adipose tissue-derived stem cells (HAD) might differentiate into hepatocyte *in vitro*.

Materials and Methods: HAD were isolated from adipose tissue donated from patients undergoing a plastic operation. Effect of various growth factors including FGF1, FGF4, FGF8, BMP2 and BMP4 on the hepatic differentiation of HAD was examined. Effect of DMSO on the hepatic differentiation of HAD was also examined. Hepatic differentiation was assessed by immunoblotting, immunocytochemistry using anti-human albumin antibody and PAS staining.

Results: After culture for 3 weeks, initial fibroblastoid morphology of HAD changed into cuboidal shape typical of hepatocytes. Immunocytochemical analyses showed that all growth factors gave more intense staining than without growth factors. PAS staining gave similar results as immunocytochemistry. DMSO did not affect the intensity when ascorbic acid and EGF were present. immunoblotting analyses of HAD-conditioned media showed that all group of HAD released albumin into the media when cultivated with both ascorbic acid and EGF. Again DMSO did not affect the albumin release.

Conclusions: HAD could differentiate into hepatocyte-like cells and various growth factors appeared to enhance the differentiation.

Key words: Adipose tissue-derived stem cells (HAD), Hepatocyte-like cells, Albumin, Glycogen, growth factor

P46 *In Vitro* Differentiation of Human Adipose Tissue-derived Stem Cells into Insulin Producing Cells

Kang HM[1], Kim J[1], Kim H[1], Kang SG[2], Kim SK[3], Cho DJ[3], You J[4]

[1]Department of Biotechnology, Seoul Women's University, Seoul, Korea, [2]Department of Biology, School of Biotechnology and Biomedical Science, Inje University, Kimhae, Korea, [3]Department of OB/GYN, College of Medicine, Yonsei University, Seoul, Korea, [4]HurimBioCell Inc. 402 Umi Bldg., Nonhyeon-dong, Gangnam-gu, Seoul, Korea

Objectives: Regeneration of insulin producing cells from stem cells has been awaited for treatment of insulin-dependent diabetes mellitus. This study was aimed to examine whether human adipose tissue-derived stem cells (HAD) could be used a new source of the therapeutic cells for the type I diabetes.

Materials and Methods: HAD were cultured on collagen-coated culture dish in DMEM-HG supplemented with 10% FBS, FGF7, nicotinamide (NIC), glucagons-like peptide-1 (GLP-1) or activin A. Cells were divided into 4 groups and then cultivated in medium containing one of a combination of NIC+GLP-1, NIC+activin A, activin A+GLP-1 or NIC+activin A+GLP-1. After culture for 3 weeks, each group of HAD was challenged by 25mM glucose and the cell-conditioned media was analyzed for the presence of insulin and C-peptide using enzyme-linked immunosorbent assay (ELISA).

Results: Among the cell-conditioned media, the one containing either activin A+GLP-1 or NIC+activin A+GLP-1 produced more amount of both insulin and C-peptide compared to the other media. Initial fibroblastoid appearance of HAD changed into round shape during culture in differentiation medium.

Conclusions: HAD have the ability to differentiate into insulin producing cells, and further support the idea that engineering to generate insulin producing cells could provide a useful resource for future therapies for diabetes mellitus.

Key words : HAD, Insulin producing cell, NIC, GLP-1, C-peptide