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BIOGRAPHY

Ming Pei completed his PhD from Beijing University, China and postdoc training from Harvard-MIT Division of health sciences and Technology, USA. Currently he is a tenured professor and director of stem cell and tissue engineering laboratory in the department of orthopaedics, West Virginia University, USA. He has over 100 publications that have been cited over 3100 times, and his publication H-index is 32 and has been serving as an editorial board member of reputed Journals.

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SITE-DEPENDENT VARIATION OF LINEAGE PREFERENCE FROM ADIPOSE STEM CELLS

Stem cells from subcutaneous adipose tissue (ScASCs) are considered a potential cell source for cartilage regeneration. Unfortunately, the capacity of ScASCs toward chondrogenesis is very limited. Interestingly, recent reports indicate that stem cells from infrapatellar fat pad (IPFSCs), an adipose tissue depot next to knee joints, exhibit an excellent potential to differentiate into cartilage. Despite the fact that some studies have investigated these two kinds of adipose stem cells in chondrogenic differentiation, few reports are available to compare adult stem cells from these two tissues in genome sequencing and protein composition. ScASCs and donor-matched IPFSCs were isolated from four 4-month-old healthy rabbits. Our cell proliferation assay showed that ScASCs proliferated faster than IPFSCs, while IPFSCs exhibited much higher expression of CD146, a marker related to pericytes, stemness, and maybe chondrogenesis. IPFSCs exhibited obvious preference for chondrogenic differentiation based on the expression of *SOX9, COL1A1, COL2A1*, and ACAN ($p<0.05$), while ScASCs were preferential for adipogenic differentiation based on the expression of *ADIPOQ, LPL, PPARG*, and *LEP*, and the synthesis of adiponection ($p<0.05$). None of them showed priority in osteogenesis based on the expression of BGLAP, RUNX2, DCN, and SPARC, and the synthesis of osteocalcin ($p>0.05$). Expression of stemness and senescence related genes (*NANOG, REX1, NES, SOX2, CDKNIA, TP53*) indicated that no differences were evident between both groups ($p>0.05$). Proteomes of IPFSCs and ScASCs are uniquely distinguishable for both the cells and the secreted ECM using both partial least squares discriminant analysis (PLS-DA) and volcano plot. The finding is also consistent with the data from a principal component analysis (PCA) of RNA sequencing. The results demonstrated that, despite similar source from adipose tissue, the preference for differentiation lineage is depot dependent, indicating that local microenvironment might dominate the fate of local stem cells. Our findings suggested that IPFSCs are more suitable for cartilage regeneration while ScASCs tend to differentiate toward adipose tissue.