Immune-modulation vs Immunogenecity of MSCs

1. Specific Aim of the Center (SCIRC at UUCM) Research Project

The specific aim of the center is the development of MSC-based, survival-enhanced, gene-edited, immune-modulatory next-generation cellular therapeutics targeting chronic intractable immune diseases including SLE and GVHD

2. Major Research Areas

- Validation of immunogeneity of MSCs following in vivo implantation and exploration of key factors for the regulation of the immunogeneity
- Identification of genes for regulation of viability and secretory phenotype of MSCs
- Development of MSC-based cellular therapy equipped with immune-evasive strategy and excellent immune-modulation efficacy
- Development and optimization of integrative manufacturing execution systems consisting of efficacy validation, gene editing, pharmacokinetics/pharmacodynamics and QC

3. Major Achievements

1) YongHwan Kim et al. Small hypoxia-primed mesenchymal stem cells attenuate graft-versus-host disease. Leukemia. 2018 May; Epub.
2) Bongkun Choi, et al. Dipeptidyl peptidase-4 induces aortic valve calcification by inhibiting insulin-like growth factor 1 signaling in valvular intersitial cells. Circulation. 2017 May;135(20):1935-1950.
3) Jiyeon Kweon et al. Fusion guide RNAs for orthogonal gene manipulation with Cas9 and Cpf1. Nat Commun. 2017 Nov;8;1723
4) Hyung Joon Kwon, et al. Stepwise phosphorylation of NF-kB activation and NK cell responses during target cell recognition. Nat Commun. 2016 May;7:11686.
5) Hye Jin Jin, et al., Senescence-Associated MCP-1 Secretion Is Dependent on a Decline in BMI1 in Human Mesenchymal Stromal Cells. Antioxid Redox Signal. 2016 Mar 20;24(9):471-85.
6) Hyo-Kyoung Choi, et al. Programmed cell death 5 mediates HDAC3 decay to promote genotoxic stress response. Nat Commun. 2015 Jun 16;6;7390