

7th International Conference on

TISSUE ENGINEERING & REGENERATIVE MEDICINE

October 02-04, 2017 Barcelona, Spain

Identification of novel mesenchymal stromal cells that have the potential to support hematopoietic stem cell activity

Fumio Arai

Kyushu University, Japan

Interaction of stem cells with their supportive microenvironment “niche” facilitate the signaling networks that control the balance between self-renewal and differentiation. In the hematopoietic system, Nestin-GFP⁺ mesenchymal stromal cells (MSC), Leptin receptor (LepR)⁺ MSCs, NG2⁺ MSCs, CAR cells which located in the perivascular area have been implicated in the regulation of HSC maintenance. On the other hand, we identified that endosteal cells (bone lining cells) were composed of three populations: ALCAM+Sca-1⁻ osteoblasts, ALCAM-Sca-1⁺ MSC, and ALCAM-Sca-1⁻ cells osteoprogenitor/other stromal cells. All three fractions maintained long-term reconstitution (LTR) activity of hematopoietic stem cells (HSCs), and ALCAM+Sca-1⁻ cells, in particular, showed robust supporting activity for HSCs. For characterization of the three endosteal cell populations, we performed the single cell gene expression analysis and identified the small subpopulation in ALCAM+Sca-1⁻ cells that expressed pluripotent stem cell marker genes. These data indicate that ALCAM+Sca-1⁻ cells are a heterogeneous population that contains immature cells. With the repeated single cell analysis, we found that the subpopulation of ALCAM+Sca-1⁻ cells specifically expressed Cdh2. As expected, the gene expression pattern of ALCAM+Sca-1-Cdh2⁺ cells was similar to ES cell rather than bone marrow MSCs. Furthermore, ALCAM+Sca-1-Cdh2⁺ cells maintained LTR activity of HSCs after the coculture with HSCs. These data suggest that ALCAM+Sca-1-Cdh2⁺ cells are novel MSCs with niche cell activity for HSCs.

Biography

Fumio Arai is a Professor of Department of stem cell biology and Medicine, Graduate School of Medical Sciences, Kyushu University. He has completed his Ph.D at the age of 28 years from Meikai University and postdoctoral studies from Keio University School of Medicine. His research interest is in studying the mechanisms of the cell fate regulation of HSCs at the single cell level for the establishment of the system that is able to expand HSCs.

farai@scr.med.kyushu-u.ac.jp

Notes: