Fumio Arai, J Cell Sci Ther 2014, 5:4
http://dx.doi.org/10.4172/2157-7013.S1.028

OMICS Group Conferences
Accelerating Scientific Discovery

4th World Congress on
Cell Science & Stem Cell Research
June 24-26, 2014 Valencia Conference Centre, Valencia, Spain

Pot1 regulates the self-renewal activity of hematopoietic stem cells

Fumio Arai
Kyushu University, Tokyo

Aging or repeated cell division induces the accumulation of DNA damage, which impairs hematopoietic stem cell (HSC) function. Protection of telomeres 1 (Pot1), a component of shelterin, contributes to the suppression of unnecessary DNA damage response (DDR) at telomeres. It was identified that high levels of Pot1a was expressed in HSCs, and that this expression decreased with age and during *in vitro* culture. Knockdown of Pot1a increased telomeric DDR and the frequency of symmetric differentiation divisions in cultures, and significantly reduced long-term reconstitution (LTR) activity. In contrast, overexpression of Pot1a or treatment with exogenous Pot1a protein Pot1a protein prevented telomeric DDR and maintained symmetric self-renewing divisions and LTR activity in HSCs, indicating that Pot1a rejuvenated stem cell activity of HSCs. Human POT1 protein also increased the number of cord blood HSCs. These data suggest that the protection of telomeric DNA from DDR signaling is critical for sustained self-renewal of HSCs and that Pot1a is a novel target for ex vivo expansion of HSCs.

Biography

Fumio Arai is a Professor of Department of Stem Cell Biology and Medicine, Graduate School of Medical Sciences, Kyushu University. In 2002, he moved to School of Medicine, Keio University, Tokyo and investigated the molecular mechanism of the regulation of hematopoietic stem cells (HSCs). In April he moved to Kyushu University and is working as a Professor in the Faculty of Graduate School of Medical Sciences. 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@a3.keio.jp