Aliya Sekenova et al., J Tissue Sci Eng 2016, 7:2(Suppl)
http://dx.doi.org/10.4172/2157-7552.C1.025

5th International Conference on
Tissue Engineering & Regenerative Medicine
September 12-14, 2016 Berlin, Germany

The effect of hypoxia on erythroid differentiation of human induced pluripotent stem cells

Aliya Sekenova[2], Venera Kumasheva[1,2], Yelena Li[2], Sholpan Baidosova[1,2] and **Vyacheslav Ogay[1,2]**
[1]Nazarbayev University, Kazakhstan
[2]National Center for Biotechnology, Kazakhstan

Oxygen is an important factor in the maintenance, differentiation and function of adult and emryonic stem cells. It has been shown that low oxygen tension promotes the growth and expansion of mesenchymal stem cells, survival of neural crest cells, hematopoietic stem cells and prevents spontaneous differentiation of human embryonic stem cells. Based on these evidence, in this work we studied the effect of hypoxia on erythroid differentiation of human T cell-derived induced pluripotent stem cells (TiPSCs).

In our experiments, for erythroid differentiation of TiPSCs two-step protocol was utiluzed. This protocol comprised of differentiation of TiPSCs by formation of embryoid bodies in the presence of a number of cytokines (EPO, SCF, BMP-4, TPO, VEGF, IL-6 and IL-3) and human plasma to obtain early erythroid commitment (step I) and differentiation/maturation to the stage of cultured erythroid cells in the presence of cytokines (SCF, IL-3 and EPO) (step II). Erythroid differentiation of TiPSCs was performed in both hypoxic (2% O2) and normoxic conditions (21% O2).

Our results showed that in comparison with normoxia erythroid differentiation of TiPSCs under hypoxic conditions resulted in more significant formation of enucleated erythroid cells with discoid morphology. Iimmunocytochemistry revealed that the enucleated erythroid cells highly expressed CD235a and CD71 markers which is consistent with a terminal erythroid phenotype. Moreover, flow cytometric analysis showed that number of CD235a+cells obtained under hypoxia reached up to 56,4%, whereas the number of CD235a+cells was 19,3%.

Thus, based on our data we conclude that hypoxia significantly affect on differentiation of TiPSCs and result in high yield of erythroid cells.

Biography

Dr. Vyacheslav Ogay has completed his PhD at the age of 26 years from Pushchino State University and postdoctoral studies from Seoul National University School of Natural Sciences. He is a head of Stem Cell Laboratory at National Center for Biotechnology. He has published more than 40 papers in peer reviewed journals on biotechnology and biomedicine.

ogay@biocenter.kz

Notes: