

Genetic and Epigenetic landscape of Germline Stem Cells

Moein Farshchian^{1,2}, Mahtab Dastpak^{1,2}, Maryam M. Matin^{1,2}, Dirk Geerts³, *Ahmad Reza Bahrami^{1,2}

¹ Department of Biology, Faculty of Science, Ferdowsi University of Mashhad, Mashhad, Iran.

² Cell and Molecular Biotechnology Research Group, Institute of Biotechnology Ferdowsi University of Mashhad, Mashhad, Iran.

³ Department of Pediatric Oncology / Hematology, Erasmus University Medical Center, Rotterdam, The Netherlands.

Abstract:

Elucidating the critical epigenetics events involved in differentiation and reprogramming of cells to primordial germ cells (PGCs) is among the interesting issues in stem cell research.

Here, I will talk about critical transcription factors and global hypomethylation in development of germ cells. Evidence strongly suggests that the earliest PGCs emerging in the E7.25 mouse embryo epiblast have a highly methylated genome, and high level of H3K9me2 in chromatin but during development, genome demethylated and patterns of histone codes changes dramatically.

We designed a polycistronic lentiviral vector and overexpressed Stella, Oct4 and Nanos2 simultaneously in transduced cells; Increasing level of Prdm14, Nanog and decreasing of G9a expression is an interesting finding which might be considered as a primary step of reprogramming toward germline progenitor cells, here we propose decreasing H3K9me2 level as a consequence of G9a down regulation is a critical step which facilitated transition to different stemness state through creating a new epigenetic memory for the early germ cells.

Keywords: Epigenetic, hypomethylation, Germ line Stem Cells, polycistronic lentiviral vector.

Oral Presentation

*Corresponding Author: Ahmad Reza Bahrami, Department of Biology, Faculty of Science, Ferdowsi University of Mashhad, Mashhad, Iran.