OPEN ACCESS Freely available online

ISSN: 2157-7633
Journal of
Stem Cell Research
& Therapy

Commentary

Effects of Multipotent Stem Cells in DNA Methylation in Stem Cell Renewal

Maria Ester*

Departament of Physiological Sciences, University of Barcelona, Catalonia, Spain

DESCRIPTION

Multipotent stem cells, which may be collected from a variety of adult tissues, are a desirable source of stem cells for the replacement of damaged tissues in regenerative medicine due to their capacity for differentiation into a variety of cell types. Loss of the ability to proliferate and a gain in cell-type identity are necessary conditions for an adult stem cell to undergo cellular differentiation. Epigenetic changes that avoid the dangers of lineage-unrelated gene expression or the undifferentiated characteristics of stem cells in adult somatic cells may be used to limit these processes. In this review, they emphasize the function of DNA methylation in regulating the activity of genes crucial for self-renewal, the dynamic CpG methylation of tissue-specific genes during various differentiation programs, and other related topics, and whether CpG methylation may be used to induce the multilineage capability of adult stem cells early in the initial precursor stem cells. In addition, they evaluate data on spontaneous differentiation following treatment with demethylating drugs and take into account the evidence provided by reprogramming somatic cells into undifferentiated cells to highlight the significance of DNA methylation in adult stem cell differentiation (that is, somatic nuclear transfer or generation of induced pluripotent cells). The research makes it evident that DNA methylation is required for regulating stem cell proliferation and differentiation, although it is still unknown exactly what role they play in each lineage program. As a result, adult stem cells or their derivatives should be used with caution in a clinical setting before being used for regenerative medicine and the proper tests should be used to confirm the integrity of the genome and epigenome. Multipotent stem cells have been found in numerous organs and tissues, including bone marrow, peripheral blood, fat, skeletal muscle, brain, skin, cornea, heart, gut, liver, ovarian epithelium, and testis. These cells are an appealing stem cell resource for the replacement of damaged tissues in regenerative medicine. Undifferentiated cells that have the capacity to self-renew with a high proliferation rate and the ability to develop into specialized cells with certain tasks are all considered to be Multipotent stem cells. Multipotent Stem Cells, in contrast to pluripotent Embryonic Stem (ES) cells, are often constrained to a single lineage (mesodermal, endodermal, or ectodermal), but they have the capacity to develop into different somatic cell types given the right stimulation.

They avoid some ethical concerns associated with pluripotent ES cells, resulting in a quicker approval for research and therapeutic use, and adult stem cells and tissues derived from them are currently thought to be less likely to initiate rejection after transplantation. These are their two main advantages for use in clinical applications. Totipotent cells can self-renew and differentiate into all of an organism's cell types at the morula stage, including extra embryonic tissues. Pluripotent cells, such as Primordial Germ Cells (PGCs) from the embryo and *in vitro* Embryonic Stem (ES) cells created at the blastocyst stage, lose their ability to develop extra embryonic organs like the placenta. Normal development restricts differentiation, moving from Multipotent Stem Cells (MSCs), which can produce cells from numerous but not all lineages, to the distinct features of a somatic differentiated cell (unipotent). Since particular chromatin patterns and epigenetic markings are in charge of regulating the transcriptional activation and repression of tissue-specific and pluripotency-related genes, respectively, during human development, it is possible to observe these patterns and marks. During differentiation, heterochromatin markers and DNA methylation increase globally.

Correspondence to: Maria Ester, Departament of Physiological Sciences, University of Barcelona, Catalonia, Spain, Email: ester.maria@email.com

Received: 30-Dec-2022, Manuscript no: JSCRT-22-19805, **Editorial assigned:** 02-Jan-2023, Pre QC no: JSCRT-22-19805(PQ), **Reviewed:** 18-Jan-2023, QC no: JSCRT-22-19805, **Revised:** 23-Jan-2023, Manuscript no: JSCRT-22-19805(R), **Published:** 30-Jan-2023, DOI: 10.35248/2157-7633.23.13.575.

Citation: Ester M (2023) Effects of Multipotent Stem Cells in DNA Methylation in Stem Cell Renewal. J Stem Cell Res Ther. 13:575.