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Stem Cells from Menstrual Blood: Wealth Out of Waste

PD Gupta[1*] and K Pushkala[2]

[1]Former, Director Grade Scientist Centre for Cellular and Molecular Biology, India

[2]Former, Associate Professor, SDNB Vaishnav College for Women, India

1. Abstract

Cell transplant therapies are now in vogue. Many scientists are in search of new sources of stem cells which can be obtained without ethical problems, very frequently and easily and at low cost. Menstrual blood proved to be a good source. Menstrual blood-derived stem cells (MenSCs) are multipotent cells capable of differentiating into chrondrogenic, adipogenic, osteogenic, neurogenic endothelial, pulmonary epithelial, hepatic pancreatic and cardiogenic cell lineages. Now these are frequently used in cell transplant therapies to repair damaged adult tissues.

2. Introduction

Menstruation makes a woman a woman; recently anderson and FitzGerald [1] described sexual dimorphism in Circadian rhythm which is different in man and woman. Period blood is very different from blood that moves continuously through the veins of a woman [2]. Sometimes menstrual blood also will be different shades of red, from light to dark, it may have some dark clumps or clots of blood, which is normal. In fact, it's less concentrated blood. It has fewer blood cells than ordinary blood. Nevertheless, it isn't rejected body fluids or the body's way of flushing out toxins. The normal vaginal secretions are a physiologically important biomass. Vaginal cells contain glycogen and are continually shed into the lumen of the vagina. Infect, it is mixture of a little bit of blood, uterine tissue, mucus lining and bacteria [3,4].

The menstrual blood represents a novel source of stem cells is recognized in the remarkable capacity of the lining of the uterus for regeneration after each menstrual cycle [4-6]. Extraction of this rich source of stromal cells is efficient and noncontroversial. In studying the cells released from the uterine lining as part of the menstrual blood, multipotent cells capable of differentiating into [6-8] chrondrogenic, adipogenic, osteogenic, neurogenic [9], endothelial, pulmonary epithelial, hepatic [10]/pancreatic [11] and cardiogenic cell lineages have been identified and characterized. The newly defined adult stem cells are menstrual blood-derived stem cells (MenSCs), giving rise to hopes in clinical application of these cells. They are mesenchymal-like stem cells that can be harvested from monthly human menstrual blood shedding of endometrium. Women felt better about their periods after being made aware of the ability to donate menstrual fluid, meaning that MenSC therapy can be beneficial for donors and patients alike. The other advantage for using MenSC is that can be obtained without any ethical problems. The average volume of menstrual fluid during a monthly menstrual

***Corresponding author:** PD Gupta, 1Former, Director Grade Scientist Centre for Cellular and Molecular Biology, India, E-mail: pdg2000@hotmail.com

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period is 35 milliliters (2.4 tablespoons of menstrual fluid), with 10-80 milliliters (1-6 tablespoons of menstrual fluid) considered typical. About half of menstrual fluid is blood. This blood contains sodium, calcium, phosphate, iron and chloride, the extent of which depends on the woman. In addition to blood, the fluid consists of cervical mucus, vaginal secretions and endometrial tissue. Vaginal fluids in menses [3,4] mainly contribute water, common electrolytes, organ moieties and at least 14 proteins, including glycoproteins.

3. Method of Collection

To collect, bring a jar with you to the toilet and when you have removed the cup from inside your body [12], transfer the contents of it into the jar and close the lid. Always store your period blood in the fridge and use it quickly. Menstrual fluid may have an unpleasant odor, but given how period blood isn't exactly a rare substance, there is no need to 'save it for later' and let is get stale.

4. Menstrual Fluid Banking

Stem cells derived from menstrual fluid are extremely rich in Mesenchymal stem cell. Over the years, these cells has been utilised in various cosmetic and regenerative procedures with astounding success. The successes of these procedures lie in the ability of these Mesenchymal Stem Cells to form cells, tissues or organs that need repair or regeneration [13]. The fact that these cells are autologous and risk free, increases its application in the field of regenerative medicine, plastic surgery and cosmetology manifold. By virtue of ReeLabs' revolutionary, patented, proprietary technology, a collection of about 10 ml to 15 ml of menstrual fluid could easily yield between 10 million to 100 million Mesenchymal Stem cells. The cells are collected from a single sample and processed, purified, harvested, amplified and suitably stored under appropriate Good Manufacturing Practice (GMP) and Good Laboratory Practice (GLP) conditions. The laboratory can also suitably culture and amplify these stem cells yielding two to ten times its original count. Hence occasionally, even an insufficient original quantity can also be processed, cultured and suitably amplified before commencement of therapy. What was so far considered to be unsanitary human biological waste can now provide the client with a new lease of life [2]. Recent research has shown that menstrual stem cell banking provides women with a unique opportunity to collect and preserve vital stem cells that can be harvested from the body's menstrual blood. The collection of menstrual blood is painless, hassle free and can be done easily at home. It involves collection of stem cells from specialized sterile cups on the first day of a woman's menstrual cycle. They can also be collected and harvested multiple times depending on the therapy envisaged. The menstrual stem cells are unique because, in spite of being adult cells, they have many properties similar to bone marrow and embryonic cells. Whilst Umbilical cord and Cord Blood can only be stored once, menstrual blood can be preserved at any age and multiple times. An indispensable arm of ReeLabs conducts sophisticated, state-of-the-art stem cell research for a number of degenerative disorders. It employs the latest, most effective techniques by various experts and specialists considered leaders in their fields.

5. Theraputics, Transplantation, etc.

As early as the 1960s pointed towards the possibility that new nerve cells are formed in adult mammalian brains, this knowledge was not applied in the context of curing devastating brain diseases until the 1990s. But after along gap scientist found that stem cells recovered from menstrual blood have properties to get converted multifunctional stem cells [14].The potential of multi-directional differentiation of MenSCs suggests its potential for repair of various tissue damages in the body. Now these MenSCs have been broadly used in preclinical studies and many of which have shown effectively therapeutic functions in prevention and control of various diseases, including liver disease [10], diabetes [11-15], stroke, Duchenne

muscular dystrophy, ovarian-related disease, myocardial infarction, Asherman syndrome, Alzheimer's disease, acute lung injury, cutaneous wound, endometriosis and neurodegenerative diseases [16-19].

Along with several advantages, such as easy accessibility, high-yield, potential of enormous proliferation, menstrual blood-derived mesenchymal stem cells (MenSCs) have been proposed as a promising strategy in regeneration medicine, stem cell therapy, etc. Nowadays, stem cell therapy has become an effective strategy for many diseases. The most promising stem cell is neural stem cells (NSCs), because NSCs harbour a certain ability to differentiate into neural and glial cells when are transplanted in the brain at the site of SCI. However, some drawbacks also shadowed with NSCs: adult NSCs were not available for autologous cell transplant, fetal-derived NSCs had ethical concerns and a previous study reported a boy with ataxia telangiectasia (AT), who received human fetal neural stem cell transplantation, while he suffered from brain tumor.

Mesenchymal stem cells (MSCs) are multipotent adult stem cells which can differentiate into multiple cell types [20]. MSCs can be isolated from the bone marrow, umbilical cord blood, adipose tissue, muscle and dental pulp. In comparison with NSCs, MSCs show a high degree of genomic stability during culture and typically do not result in tumor formation. Transplantation of MSCs into the injured rat spinal cord promoted tissue preservation by directly replacing the damaged cells, decreasing the cyst and injury area, stimulating axonal sprouting, producing neurotrophic factors, as well as inhibiting inflammatory cytokines [21,22].

6. References

1. Seán T Anderson, Garret A Fitz Gerald. Sexual dimorphism in body clocks Science. 2020; 369: 1164-1165.
2. PD Gupta. Menstrual blood: Don't waste, treasure it. J Cell Tissue Res. 2020; 20: PV 1
3. https://www.plim.fr/en/content/19-about-menstrual-bloodhttps://www.plim.fr/en/content/19-about-menstrual-blood
4. Heyi Yang, Bo Zhou, Prinz M, Siegel D. Proteomic Analysis of Menstrual Blood Mol Cell Proteomics. 2012; 11: 1024-1035.
5. Gupta PD, Iino A et al. Mothering A Cause: Practical Knowledge Of Reproduction & Motherhood Paperback, Oxford&IBH, New Delhi
6. Meng X, Ichim TE, Zhong J, Rogers A, Yin Z, Jackson J, et al. Endometrial regenerative cells: A novel stem cell population. J Transl Med. 2007; 5: 57-66.
7. Lin J, Xiang D, Zhang JL, Allickson J, Xiang C. Plasticity of human menstrual blood stem cells derived from the endometrium. J Zhejiang Univ Sci B. 2011; 12: 372-80.
8. Chen L, Qu J, Xiang C. The multi-functional roles of menstrual blood-derived stem cells in regenerative medicine. Stem Cell Res Ther. 2019; 10; 1.
9. Wang X-J, Xiang B-Y, Ding Y-H, Chen L, Zou H, Mou X-Z, et al. Human menstrual blood-derived mesenchymal stem cells as a cellular vehicle for malignant glioma gene therapy. Oncotarget. 2017; 8: 58309-58321.
10. Khanjani S, Khanmohammadi M, Zarnani AH, Talebi S, Edalatkhah H, Eghtesad S, et al. Efficient generation of functional hepatocyte-like cells from menstrual blood-derived stem cells. J Tissue Eng Regen Med. 2015; 9: E124-E134.
11. Santamaria X, Massasa EE, Feng Y, Wolff E, Taylor HS. Derivation of insulin producing cells from human endometrial stromal stem cells and use in the treatment of murine diabetes. Mol Ther. 2011; 19: 2065-2071.

12. Mary Cheng, Rose Kung, et al. Menses Cup* evaluation study. Fertility and Sterility. 1995; 64: 661-663.
13. https://www.biotecharticles.com/Healthcare-Article/Use-of-Menstrual-Blood-to-Cure-Diseases-Medicine-Therapy-Applications-1033.htmlhttp://www.biotecharticles.com/Healthcare-Article/Useof-Menstrual-Blood-to-Cure-Diseases-MedicineTherapy-Applications-1033.html.
14. Wu X, Luo Y, Chen J, Pan R, Xiang B, Du X, et al. Transplantation of human menstrual blood progenitor cells improves hyperglycemia by promoting endogenous progenitor differentiation in type 1 diabetic mice. Stem Cells Dev. 2014; 23: 1245-1257.
15. Hida N, Nishiyama N, Miyoshi S, Kira S, Segawa K, Uyama T, et al. Novel cardiac precursor-like cells from human menstrual blood-derived mesenchymal cells. Stem Cells (Dayt., Ohio). 2008; 26: 1695-1704.
16. RO Raffi, KS Moghissi, et al. Proteins of human vaginal fluid Fertil Steril. 1977; 28: 1345-1348.
17. Sahni V, Kessler JA. Stem cell therapies for spinal cord injury. Nat Rev Neurol. 2010; 6, 363-372.
18. Mothe AJ, Tator CH. Advances in stem cell therapy for spinal cord injury. J Clin Invest. 2012; 122: 3824-3834.
19. Lu P, Wang Y, Graham L, McHale K, Gao M, Wu Di, et al. Long-distance growth and connectivity of neural stem cells after severe spinal cord injury. Cell. 2012; 150: 1264-1273.
20. Minguell JJ, Erices A, Conget P. Mesenchymal stem cells. Exp Biol Med (Maywood). 2001; 226: 507-520.
21. Seo DK, Kim JH, Min J, Yoon H-H, Shin E-S, Kim S-W, et al. Enhanced axonal regeneration by transplanted Wnt3a-secreting human mesenchymal stem cells in a rat model of spinal cord injury. Acta Neurochir. (Wien.). 2017; 159: 947-957.
22. Fu Y, Karbaat L, Wu L, Leijten J, Both SK, Karperien M, et al. Trophic effects of mesenchymal stem cells in tissue regeneration. Tissue Eng Part B Rev. 2017; 23, 515-528.

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