International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347-6435(Online) Volume 15, Issue 01, January 2026)

"Unlocking the Future: The Power of Menstrual Blood Banking"

C. Keerthana[1], Dr. Suja Suresh[2], Devi.K[3]

[1]*Tutor,* [2]*Principal & Corresponding Author,* [3]*Vice Principal, SRM Trichy College of Nursing, Affiliated to The Tamilnadu Dr. M.G.R Medical University, Chennai, India.*

***Abstract*-- The Menstrual Blood Bank concept is a relatively new and innovative approach to using biological material—specifically menstrual blood—for medical and scientific purposes. This facility or process involves the collection, storage, and potential use of menstrual blood for various regenerative applications, most notably due to the stem cells it contains. These cells can be harnessed for therapeutic and research purposes, offering a non-invasive and potentially highly valuable resource in medicine.**

***Keywords*— Innovative approach, Menstrual cycle, Menstrual blood bank, Regenerative approach, stem cell.**

I. INTRODUCTION

Menstrual blood, long considered a waste product, is gaining attention as a novel source of mesenchymal stem cells (MenSCs) with significant regenerative capabilities. The process of menstrual blood banking involves collecting, processing, and storing menstrual blood for potential future use in medical therapies and research.The emergence of this concept marks a shift in how society and science view menstruation—not merely as a reproductive or hygienic issue, but as a resource with vast biomedical potential. As regenerative medicine evolves, menstrual blood banking may play a vital role, especially in enhancing women's participation in stem cell donation and personalized health solutions.

Menstrual Cycle Phase

The menstrual cycle is a monthly process in which the body undergoes a series of changes to prepare for potential pregnancy. Each month, one of the ovaries releases an egg, a process known as ovulation. Hormonal fluctuations during this time help prepare the uterus for pregnancy. If the egg isn't fertilized after ovulation, the uterine lining is shed through the vagina, resulting in a menstrual period. The menstrual cycle typically lasts around 28 days, although its duration can vary among individuals. It usually begins with puberty and ends at menopause.

II. MENSTRUAL FLUID

Menstrual fluid contains a high concentration of mesenchymal stem cells and thousands of times more stem cell growth factors than other sources. Over time, menstrual stem cells have been used in various cosmetic and regenerative treatments.

II. A. Menstrual blood contains stem cells that are:

Multipotent: They can differentiate into various tissue types (bone, fat, nerve, cardiac, etc.).

High in proliferation: They divide and grow faster than many other adult stem cells.

Immunomodulatory: They can regulate immune responses, making them suitable for treating inflammatory diseases.

II.B. Power of Menstrual Blood

Menstrual blood is not just waste material; it is a goldmine of stem cells that offer a plethora of therapeutic possibilities. These mesenchymal stem cells have the potential to:

- Regenerate damaged tissues, including bone, cartilage, muscle, and skin.
- Promote wound healing and tissue repair, making them invaluable for conditions like burns or injuries.
- Repair organs: from heart muscle regeneration post-heart attack to liver regeneration for those with cirrhosis.
- Be used in cell therapy to treat diseases like Parkinson's, diabetes, and autoimmune disorders.
- Offer a more accessible and less invasive option compared to traditional stem cell collection methods, such as bone marrow aspiration.

The beauty of menstrual blood banking is that it is a **routine process** that can be easily collected, eliminating the need for invasive and costly procedures. Women around the world, who experience menstruation as a regular part of their life cycle, could potentially donate or bank their menstrual blood for future medical use.

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347-6435(Online) Volume 15, Issue 01, January 2026)

III. Menstrual Blood Banking

Menstrual blood banking refers to the process of collecting, storing, and preserving stem cells derived from menstrual blood for future medical or therapeutic use. The blood, typically collected using a menstrual cup, contains mesenchymal stem cells (MenSCs), which have the potential to regenerate various tissues and organs. These stem cells are non-invasive to collect and offer a promising resource for regenerative medicine, tissue repair, and cell-based therapies.

III.A. Intiation

The concept of menstrual blood banking was first introduced globally in 2007 by Cryo Cell, an American company. In India, it was launched on March 8, 2011, by Life Cell International. Life Cell Femme became the first and only service in India offering menstrual blood stem cell banking.

III.B Banking

- Cryo-Cell International has been in the umbilical cord banking business since 1989.
- It recently formed a subsidiary called C'Elle for purpose of banking menstrual blood for the stem cell harvesting.

III.C. The Promising Applications Of Menstrual Stem Cells

The potential uses of menstrual stem cells are vast and diverse. These stem cells are already being researched for:

IV. Regenerative Medicine

One of the most exciting applications is tissue regeneration. Stem cells from menstrual blood can differentiate into multiple tissue types, making them incredibly valuable for regenerative therapies**.** Some potential applications include:

- *Bone Regeneration:* These stem cells could help repair bone fractures or treat conditions like **osteoporosis** and **osteoarthritis** by stimulating the growth of new bone tissue.
- *Cartilage Repair:* Stem cells can be used to regenerate cartilage in joints, offering a potential cure for conditions like **rheumatoid arthritis** and **joint degeneration**.
- *Skin and Muscle Healing:* They can accelerate the healing process in burns or wounds by generating new skin cells, or even help to regenerate muscle tissue in cases of **muscular dystrophy**.

V. Cell Based Therapies

Menstrual stem cells are being explored for use in **cell-based therapies**, such as:

- *Neurological Regeneration:* Researchers are looking into how these stem cells could be used to treat **Parkinson's disease**, **Alzheimer's**, and other neurodegenerative conditions by replacing damaged neurons and promoting brain healing.
- *Heart Regeneration:* After a **heart attack**, stem cells could be used to regenerate damaged cardiac muscle and restore heart function.
- *Immune System Disorders:* Menstrual stem cells may help treat **autoimmune diseases**, where the immune system attacks the body's own tissues.

VI. Personalized Medicine

The non-invasive nature of collecting menstrual stem cells means that **women can bank their own stem cells for future use**—a process known as **autologous stem cell banking**. This makes these stem cells especially useful in treating:

- **Personalized treatments for disease**, where stem cells are derived from the same individual to ensure compatibility and minimize the risk of rejection.
- **Tissue repair and regeneration**, tailored to an individual's specific needs, leading to more effective and personalized medical solutions.

VII. Steps Collection And Preservation Process

The collection of menstrual blood for stem cell banking is **simple, non-invasive**, and can be done discreetly at home. Here's a breakdown of how it works:

1. *Collection:* During menstruation, women can use a **menstrual cup**—a medical-grade silicone device that collects menstrual blood without discomfort. This method ensures the collection of blood in a sterile and controlled environment.
2. *Transport and Processing:* The menstrual blood is carefully transported to a stem cell bank or laboratory, where it is processed to isolate the **mesenchymal stem cells**. These stem cells are then purified to ensure that only the highest-quality cells are preserved.

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347-6435(Online) Volume 15, Issue 01, January 2026)

3. *Cryopreservation:* Once isolated, these stem cells are stored in **cryogenic conditions**—meaning they are frozen at extremely low temperatures, usually in **liquid nitrogen**, to maintain their viability for future use.
4. *Long-term Storage:* Stem cells can be stored for years, sometimes even decades, making them available for personalized therapies, clinical research, or regenerative treatments when needed.
5. On completion of this process, they will send you a Preservation Certificate from their laboratory, along with a detailed lab report for your records.
6. Please keep this certificate safely.
7. Collection of about 10 to 15 ml of menstrual fluid could easily yield between 10 million to 100 million Mesenchymal Stem cells.
8. The stem cells are extracted from the uterine lining (endometrium) that is shed during the menstrual period.
9. Stem cells multiply rapidly and can differentiate into many other types of stem cells such as neural, cardiac, bone, and fat.

VIII. Advantages

In recent years, stem cells, have been shown to be effective immune system boosters useful in fighting diseases such as

- Non-hodgkin's Lymphoma
- Leukemia
- Sickle Cell Disease
- Anemia and Other Diseases
- Heart Disease
- Parkinson's Disease

IX. Conclusion

Menstrual blood banking isn't just a futuristic concept—it's a tangible innovation that is transforming the medical landscape. As more research is conducted, and as awareness about this powerful resource spreads, we are entering a new era of medical regeneration, personalized treatments, and healing. The future is indeed unlocking, and the potential of menstrual blood may be one of the key ingredients to the health solutions of tomorrow.

REFERENCES

[1] Meng X, et al. (2007). Endometrial regenerative cells: a novel stem cell population. J Transl Med.

[2] Patel AN, et al. (2008). Multipotent menstrual blood stromal stem cells. Cell Transplant.

[3] Khanjani S, et al. (2014). Differentiation potential of menstrual blood-derived stem cells. Reprod Biol Endocrinol.

[4] ISSCR. (2023). Guidelines for Stem Cell Research and Clinical Translation.

[5] WHO. (2022). Menstrual Health and Hygiene: Policy and Practice Review.

[6] Edwards, R.G.(2004).Stem Cells Today:B1 Bone Marrow Stem Cells. Reproductive Biomed Online,9,541 – 583.

[7] Gargett, C.E., 2004. Stem cells in gynaecology. Aust. N. Z. J.Obstet. Gynaecol., 44(5):380-386.

[8] Patel, A. N., Park, E., Kuzman, M., Benetti, F., Silva, F. J., and Allickson, J. G. (2008) Multipotent Menstrual Blood Stromal Stem Cells: Isolation, Characterization, and Differentiation. Cell Transplantation , 17,303–11.