



MENSTRUAL BLOOD BANKING: MOLD “MONTHLY CURSE INTO MONTHLY BOON” BY ADVANCED STEM CELL TECHNOLOGY

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Abstract: Women are the embodiment of divine virtue and purity, blessed with the sweetness of speech and the beauty of God. The most obvious sign of sexual maturity in girls is menarche. More than a quarter (26%) of the World's Population are women and of reproductive age, and most menstruate monthly. During a woman's life, the lining of the uterus loses and degenerates no less than 400 times. Many girls and women are restricted in their daily life simply because of their menstruation. Impact of menstrual-related myths on women's lives and menstrual taboos in many societies affect the emotional state, mentality and lifestyle of girls and women, and most importantly, their health. But now Menstruation turned out to be a "monthly boon". Researchers have now successfully discovered these stem cells and obtained them from Menstrual Blood via the Menstrual Blood Bank. Menstrual Blood Banks are like a safeguard of your health against future disasters. The Menstrual Blood Banking process is silent, painless, natural and harmless with high patient safety. It is important to note that these blood stem cells can be easily collected, processed and processed during menstruation affordable and inexpensive way collected. painless and non-invasive. As the world is achieving to its greater heights of urbanization and technological advancements, the emerging newer and incurable diseases poses a threat as well as a challenge to medical field. However, recent research has shown that Menstrual Blood is a rich source of stem cells that can multiply and differentiate into any type of cell. These cells have opened up a new field for therapeutic treatment.

Index Terms - Menarche, Menstruation, Menstrual cycle, Menstrual Blood, Menstrual Blood Banking, Stem cell technology, Menstrual Blood Stem Cells (MenSC).

I. INTRODUCTION:

Menstruation is a phenomenon unique to girls, and is bleeding and uterine rupture between successive ovulations. Women experience menstruation for most of their lives. To date, women have dismissed menstrual blood as undesirable sanitary waste and menstruation as polluted, shameful, impure, and sometimes dangerous. But now menstruation turned out to be a "monthly boon". Now, researchers have succeeded in discovering and harvesting stem cells from menstrual blood through the menstrual blood bank. Menstrual Blood Banks have given menstruation a new meaning and Menstrual Blood has become a great area for regenerative medicine.

II. DEFINITION:

Menstrual blood is the regular discharge of blood and mucosal tissue from the inner lining of the uterus through the vagina occurs due to the rise and fall of hormones Changes. it is also known as menstruation\ menses\ periods\ catamenia\ monthly excavation\ natural purgation.

Menstrual blood banking enables women to store their menstrual blood under required condition and preserved it for future with the minimal charge of annual fee for storage and preservation and allow women to have lifelong benefits and to treat the diseases from them.

III. CONCEPT:

The menstrual cycle is a normal physiological process that happens to nearly all women during their age of puberty (10-14 years) to menopause (40-45 years). it occurs in 28 to 30 days of a rhythmic cycle in healthy women who is fertile. Menstrual blood is different from normal blood due to its composition and its physical properties. Menstrual blood is not just blood, it is a blood mix made up of specifically the functional layer, old cellular tissues, red blood cells, mucin, water, electrolytes and mainly Menstrual Blood stem cells secreted from the vagina and cervix. Australian researcher carline garget from Monash university were first discovered This Menstrual Blood stem cells.

Stem Cells also known as Primitive cells. this stem cells are self-renewing cells proliferating without differentiation and under defined conditions can differentiate into various cell types. This Stem Cells are derived from mainly two sources namely, Embryonic stem cells and adult stem cells. Menstrual Blood consists of mesenchymal stem cells derived from stomatic cells of adult stem cells. Mesenchymal stem cells of Menstrual Blood stem cells are multipotent stem cells. These cells display stem cell markers such as oct 4, SSEA4, Nango and C Kit (CD117) CD90, and CD105. Comprehension of the potential of these stem cells, viable cell led to the innovative concept of menstrual blood stem cell banking. Wherein these vital stem cells can be stored for future therapeutic use when needed. This was first introduced by American CryoCell company in November 2007 by internationally.

It is important to note that these menstrual blood stem cells can be easily harvested, processed and harvested in a convenient, painless and non-invasive manner. Marking the celebration of the 100th International Women's Day as another milestone, LifeCell International, pioneers in stem cell banking, launched LifeCell Femme Menstrual blood stem cell banking service in India On 8 march 2011 by film actress Lisa ray, who won the battle with cancer and recovered from deadly disease. LifeCell is the first and only company offering menstrual blood stem cell banking in India and the CEO is Mercedes Walton. It has been pioneered by CryoCell International, USA who are the technology partners of LifeCell and have been offering this service in other countries under the brand "C'Elle".

IV. CHARACTERISTICS OF MENSTRUAL BLOOD:

- **Size of the MenSC:** -50 to 70 μ
- **Growth Rate:** -The menstrual blood
- Mesenchymal stem cell rapidly expands at a doubling rate of 24 – 36hours, starting with 50,000 cells, 48,000,000 cells were obtained on day 26 of the research
- **Multipotent Marker Expression:** -These cells display stem cell markers such as oct 4, SSEA- 4, Nango & C-Kit (CD117) CD90, & CD105.
- MenSCs Differentiate into Mesodermal, Neural, Cardiogenic Lineage
- Menstrual stem cells are 'Blank Cells'(unspecified).
- Capable of dividing and renewing themselves for long periods of time.
- The basic cells of the menstrual blood allow to regrow certain parts of the body by the technology of Stem cell regeneration.

V. IMPORTANCE OF MENSTRUAL BLOOD:

- Tribal women kept their blood clots from their menstrual cycle in a small tube and applied some of the hidden blood clots to the wound. The wound healed overnight and the bleeding stopped because the clot caused the blood to clot in place.
- In 2009, patient Lisa Ray, a Bollywood actress and stem cell recipient, was diagnosed with multiple myeloma. Today he has returned to his career. This is due to the stem cells that made this possible and gave it a second life.
- Menstrual blood contains many self-renewing stem cells. Stem cells are stem cells that have the ability to develop into any type of cell in the body.
- These menstrual blood stem cells are highly proliferative and have the unique ability to develop into other types of healthy cells.
- These cells have stem cell markers such as oct4, SSEA4, Nanog and ckit (CD117).
- Mesenchymal stem cells derived from menstrual blood can also overcome the problem of immune rejection in female patients during organ transplantation.
- Scientists report that menstrual blood contains adult stem cells that can develop into 9 different cells.
 - ❖ Heart cells
 - ❖ Lung cells
 - ❖ Nerve cells
 - ❖ Muscle cells
 - ❖ Pancreatic cells
 - ❖ Liver cells
 - ❖ Fat cells
 - ❖ Bone cells
- Researchers say that these cells have a higher reproduction rate.
- Stem Cells found in Menstrual Blood could potentially be incorporated into treatments for,
 - ❖ Alzheimer's disease.
 - ❖ Atherosclerosis.
 - ❖ Acute Lung Injury.
 - ❖ Cirrhosis of liver.
 - ❖ COPD.
 - ❖ Critical Limb Ischemia.
 - ❖ Cardiac Arrhythmia.
 - ❖ Crohn's Disease.
 - ❖ Cardiac Disease.
 - ❖ Diabetes-Type 1.
 - ❖ Graft vs Host Disease.
 - ❖ Inflammatory bowel disease.
 - ❖ Lou Gehrig's disease or Amyotrophic. Lateral sclerosis.
 - ❖ Multiple Sclerosis.
 - ❖ Osteoarthritis.
 - ❖ Parkinson's Disease.
 - ❖ Rheumatoid arthritis.
 - ❖ Stroke.
 - ❖ Spinal Cord Injury.

- In addition, Menstrual blood used in cosmeceutical applications such as anti-aging therapies, and in arts.

VI. PROCEDURE FOR MENSTRUAL BLOOD BANKING:

Indications: -

- Who are in the age in between puberty to menopause, but it is effective in the age of below 36 years.
- Women who are suffering with disease.
- For Future health benefits of women.
- Interest of women.
- Menstrual blood can be used without any worry in the future in the case of,
 - ✓ Syphilis
 - ✓ Hepatitis
 - ✓ Human T-lymphotropic viruses type I and II (HTLV).
 - ✓ HIV/AIDS.
 - ✓ West Nile Virus (WNV).
 - ✓ Cytomegalovirus (CMV).

Preliminary Guidelines: -

- Client must complete the enrollment form and health form.
- Life cell shall obtain all statutory permission and licenses that might be required for providing the services contemplated under this agreement.
- Upon successful enrollment, LifeCell will provide the client with the following: A Collection kit
- A copy of the agreement.
- A unique client relationship management (CRM) identification number that enables the client to quote for all communications with LifeCell.

C'ELLE' Collection Kit: -

On the first day of the Menses, the customer calls LifeCell to inform them. A collection kit/Discreet collection kit is delivered to her doorstep immediately.

- 2 collection tubes with a medium for shipping the sample.
- 6 Gel Packs which should be placed in the freezer upon receipt of the kit until the sample is ready for shipping by maintaining 1100 C.
- 1 Menstrual Cup with usage instructions to collect the sample.
- 8 antiseptic wipes to clean the vaginal area before inserting and removing the pod.
- 2 alcohol swabs to wipe the inside of the cup.
- 1 biohazard bag to put the collection tubes after collection.
- Pink card (a form with your personal data and collection details i.e., collection, date, time etc.).
- 2 Parafilm strip.



Collection Process: -

- Collection is advised on the heavy bleeding days so day 2 can suffice.
- The bladder is emptied prior to inserting the menstrual cup for optimum comfort during collection.
- After washing the hands, Perineal area should clean with antiseptic wipes.
- The Menstrual cup/tampon/silicon cup is rinsed with warm water and is folded by pressing the sides of the lightweight flexible cup together.
- Then, it is folded in half again; followed by holding the cup between the thumb and index finger.
- To insert the cup, the customers sit in a relaxed position and the folded menstrual cup is inserted completely in to the vagina. The cup would unfold by the release of the fingers.
- The cup needs to be placed inside the vagina for at least three hours so as to collect approximately 1020 milliliters of blood.
- Once collected, the kit sealed and packed. Then LifeCell will then collect the kit from the customer's door step otherwise collection kit back to C'Elle' using the provided air billed FedEx box.
- In the laboratory where the Menstrual Blood is processed, frozen, and stored.



VII. PROCESS FOR MENSTRUAL BLOOD STORAGE:

The Menstrual Stem Cells are stored in two Cryo vials that are overwrapped to safeguard them during storage this technique is called Controlled rate freezing.

processing: -

Sufficient care is taken to make sure that the sample reaches the laboratory at intervals 3-4 hrs. Then the menstrual Blood is tested, processed, separated and Stem Cells are harvested.

Storage: -

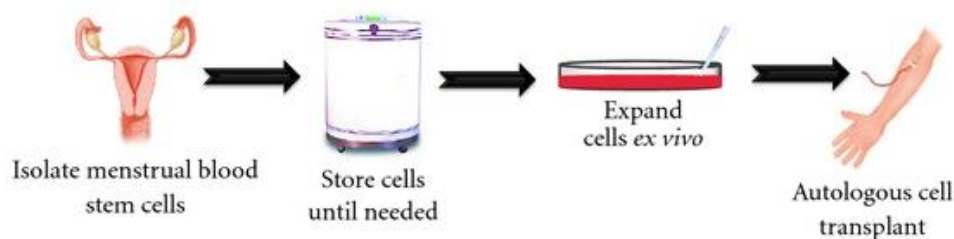
During the storage process, menstrual stem cells are frozen over time by placing them in liquid nitrogen storage container for cryogenic preservation at -196°C . This procedure allows stem cells to retain their potency and vitality even for decades in a cryopreserved form by controlling the rate of cooling through the use of "Speed Controlled Freezer".

The person has rights over the preserved stem cells for use at any time during the storage period, which can be subsequently renewed upon requirement.



Retrieval: -

For retrieving the stored stem cells the individual is requested to submit a written request accompanied by the doctor's certification as per the guidelines of ICMR for approved therapies /clinical trials.



VIII. MENSTRUAL BLOOD BANKS AND LABORATORIES:

Life cell is the leading menstrual blood bank network, headquartered in Chennai, India, and has over 100 branches spread across 21 states are located in Chennai and Gurgaon. REE Lab and LifeCell International Pvt Ltd Bangalore, Chandigarh, Hubli., Mysore, Aligarh, Pune, Ahmedabad, Mumbai, Hyderabad, Raipur, Warangal, Vijayawada, Jalgaon, Bhubaneshwar etc.,

- Enrollment fee: Rs. 5,000/-
- Processing fee: Rs. 23,400/-
- First year storage Fee: Rs. 1,500/-
- Total Initial Payment: Rs. 29,900/-
- Annual Storage Fee / year (Up to age of 60): Rs. 1,500/-.

IX. ADVANTAGES OF MENSTRUAL BLOOD BANKING:

- ✚ In Younger age, these cells have more potential to replicate and can multiply faster and these cells have a better fitness to become a larger range of tissues or organs.
- ✚ Menstrual Blood Stem Cells have been shown to be effective immune system boosters useful in fighting diseases such as non-Hodgkin's lymphoma, leukaemia, sickle cell disease, anemia and other diseases.
- ✚ Menstrual Blood Banking is like insuring your health against future calamity.
- ✚ High patient safety
- ✚ Menstrual blood collection is a non-invasive process and non-intrusive.
- ✚ Menstrual blood extraction is quite painless, natural and harmless.
- ✚ Menstrual blood is a rich source of mesenchymal stem cells that have the future potential for giving rise to fat, cartilage, bone, and skeletal muscle cells and may be potentially used for regenerative stem cell therapy.
- ✚ Renewable menstrual blood stem cells may also be an inexpensive option.
- ✚ They are more proliferative and multiply longer without damaging DNA.
- ✚ The stem cells are well tolerated with no potent deaths' no toxicity or any adverse side effects.
- ✚ Menstrual blood can also have the cosmetic properties. some of the LifeCell Skin Care Products are:
 - ✚ South Beach Skincare All in One Anti-Aging Treatment.
 - ✚ LifeCell Cooling Under Eye Treatment.
 - ✚ LifeCell BB Cream.
 - ✚ LifeCell pH Balanced Cleanser.
 - ✚ LifeCell Lip Plumping Treatment.
 - ✚ Firming Body Butter.
- ✚ Menstrual stem cells used in transplantation. our own cells will match our body 100%, but only 25% if they are needed for your close relatives.

X. FUTURISTIC SCOPE AND RESEARCHES:

- ★ Use of stem cell transplant has shown drastic increase in countries like united states, Europe, and Japan.
- ★ As research is advancing rapidly, the use of menstrual blood stem cells for therapeutic purposes in the treatment of various conditions.
- ★ The autologous menstrual blood derived stromal cells transplantation for severe Asherman's syndrome. Its results showed that in seven patients, 5 patients ensured embryo implantation by endometrial thickness. 2 patients conceived successfully.
- ★ In 2009 the patient Lisa Ray an actress and stem cell beneficiary, was diagnosed with Multiple Myeloma, today she is back to her career.
- ★ CryoCell and SEvans biosciences, Stanford University, Saneron therapeutics move forward on research and obtain FDA approval for clinical trials.
- ★ Mensural stromal stem cell samples were assessed by a preliminary general safety study in vivo on Harlan Sprague Dawley mice and Dunkin Hartley albino guinea pigs.
- ★ Stem cell technology is the future of medicine. Experiments performed at the Keio university school of medicine have succeeded in growing sheets of heart muscle from connective tissue cells taken from menstrual blood when it comes to developing heart muscle.
- ★ The purified Mesenchymal Stem Cells are very valuable in the future to treat a number of critical diseases.
- ★ The Therapeutic potential of MenSCs has already been recognized in, several kinds of following diseases in preclinical research, which is fundamental for future clinical applications in tissue repair and regenerative medicine.
 - ✓ Diabetes.
 - ✓ Liver disease.
 - ✓ Ischemic stroke.
 - ✓ Duchenne muscular dystrophy.
 - ✓ Critical limb ischemia.
 - ✓ Ovarian-related disease.
 - ✓ Myocardial infarction.
 - ✓ Alzheimer's disease.
 - ✓ Acute lung injury.
 - ✓ Cutaneous wound.
 - ✓ Endometriosis.

CONCLUSION

Menstruation serves an important purpose, clearing the uterus out monthly in order to prepare the womb for a potential pregnancy. Women create life, but now they will medically help save lives through the Endometrial regeneration cells (ERC) or stem cells collected from discarded menstrual fluid. With the advancement going on, medical fraternity is sure that the future of regenerative medicine has arrived. Collecting stem cells from menstrual blood is quite easy and safe. Every woman should explore the possibility of storing her stem cells to protect against future life-threatening diseases, and every woman should thank God for giving life's precious gift i.e., her period.

SUMMARY

Women create life, but now women are medically helping save lives through regenerative endometrial cells (ERC) or stem cells from excreted menstrual fluid, which is known to be the most disgusting phase in a woman's life. "When it comes to making life decisions, there is no better time than now, and when it comes to something as important as harvesting life-saving stem cells that occur naturally in menstrual blood, now is the ideal time."

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