



**Biotica
Research
Today**

Vol 2:8 ⁶⁹⁹/₇₀₁
2020

Umbilical Cord Blood Banking: The Birth of New Healthcare Technique

Jyoti Prakash Sahoo*, Kailash Chandra Samal and Chetan Kumar Panda

Dept. of Agricultural Biotechnology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha (751 003), India



Open Access

Corresponding Author

Jyoti Prakash Sahoo

e-mail: jyotiprakashsahoo2010@gmail.com

 **Keywords**

Health care, Stem cell, UBC, Umbilical cord

Article History

Received in 02nd August 2020

Received in revised form 03rd August 2020

Accepted in final form 04th August 2020

E-mail: bioticapublications@gmail.com

How to cite this article?

Sahoo *et al.*, 2020. Umbilical Cord Blood Banking: The Birth of New Healthcare Technique. *Biotica Research Today* 2(8): 699-701.

Abstract

Stem cells are immature cells which have the capacity to turn out to be different styles of cells that shape organs and tissues. They are powerful, precise cells which are the constructing blocks of the body. Stem cell based treatments are being applied more with promising outcomes in each malignant and non-malignant disorder. Three reasserts of cells had been used for haematopoietic reconstitution – bone marrow, peripheral blood, and umbilical twine blood (UCB). It is lately diagnosed that umbilical cord blood stem cells, seems to be as powerful as bone marrow while an HLA-matched grownup adult donor isn't always available.

Introduction

After a child is born and the umbilical cord has been clamped and cut, a few blood stays with inside the blood vessels of the placenta and the connected part of the umbilical cord. The placenta is a far higher supply of stem cells because it consists of up to 10 instances extra than cord blood. The cord blood consists of all of the factors discovered in complete blood. It consists of red blood cells, white blood cells, plasma, platelets and is likewise wealthy in effective hematopoietic (blood-forming) stem cells. Cord blood is gathered as it consists of stem cells, inclusive of hematopoietic cells, which may be used to deal with hematopoietic and genetic disorders. Preserving umbilical cord stem cells is a totally easy and secure process. But this could be performed best on the time of birth. Umbilical cord blood is a wealthy supply of haematopoietic progenitor cells which may be used to deal with more than a few malignant, genetic, metabolic and immune disorders. For the reason of transplantation, haematopoietic progenitor cells sourced from wire blood have numerous blessings over the ones sourced from bone marrow or peripheral blood. Cord blood is broadly to be had and without problems accessible; series is particularly non-invasive, secure and painless; and due to the fact haematopoietic progenitor cells derived from wire blood are immunologically naïve, they may be effectively infused even if they're an incomplete in shape for the recipient. Physicians and researchers have started to make development comparing the protection and efficacy of umbilical wire blood stem cells for sure healing makes use of past blood cancers and genetic illnesses of the blood.

Umbilical Cord Blood (UCB) Banking

The series collection and garage storage of cord blood with the aim of the usage of it to deal with a clinical circumstance is referred to as is umbilical cord blood (UCB) banking. Cord blood includes blood stem cells, which could grow to be the cells observed in blood and the immune

system. Some people (commonly kids and, sometimes adults) with sure diseases like leukaemia, lymphoma, sickle cell anaemia, and others - may be injected with those stem cells to fill up their blood deliver with new, healthful cells. The stem cells also can assist the frame get over a few most cancers remedies like chemotherapy or radiation. Cord blood is a proven, powerful supply of blood-forming stem cells. Cord blood is saved with the aid of using each public and personal cord blood banks. Public cord blood banks save cord blood for the advantage of the overall public. Private cord blood banks are commonly for-earnings businesses that save twine blood for the specific use of the donor or donor's relatives. Three public banks are hooked up in India – Relicord, Jeevan Cord and Stemcyte, together having 5,000 units. Similarly, seven non-public banks had been hooked up to date. These are Life Cell with most stock of 19,000 accompanied with the aid of using Cryo Banks having 17,000 plus samples and approximately 4,500 among Cryosave, Cord Life, Baby Cell, Stem One and ISSL (International Stem Cell Service). Four of those are licensed with the aid of using ISO while Lifecell and Relicord are permitted with the aid of using American Association of Blood Banks (AABB). Most of those are affiliated with or are subsidiaries of global companies. LifeCell is India's first and biggest stem mobileular financial institution that is hooked up in 2004 with brand new laboratories at Chennai and Gurgaon and a community unfold over one hundred provider facilities with inside the country. It is playing the agree with of over 85,000 mother and father who've banked their kids' stem cells with the enterprise. The enterprise is likewise the maximum permitted stem mobileular financial institution with certifications from countrywide and global businesses for standards. LifeCell is likewise the simplest participant withinside the enterprise imparting complete stem mobileular answers inclusive of menstrual stem mobileular banking, R&D and point-of-care stem mobileular remedy for orthopedic, vascular and cardiovascular specialties.

Collection and Storage of Cord Blood

There are numerous techniques for gathering cord blood. The approach maximum generally utilized in medical exercise is the 'closed approach', that is much like popular blood series collection techniques. Cord blood is received via way of means of syringing out the placenta thru the umbilical wire on the time of childbirth, after the wire has been indifferent from the newborn. With this approach, the technician cannulates the vein of the severed umbilical cord the use of a needle this is linked to a blood bag, and wire blood flows thru the needle into the bag. On average, the closed approach allows series of approximately 75 ml of wire blood. Collected cord blood is cryo-preserved after which saved in a wire blood financial institution for destiny transplantation. Cord blood is gathered as it incorporates stem cells, which include hematopoietic cells, which may be used to deal with

hematopoietic and genetic disorders.

How Would a Parent Store Their Baby's Cord Blood?

If you're thinking about storing cord blood, this desires to be mentioned with each your obstetrician and representative at an early level of pregnancy, so that you can permit time for the vital preparations to be made. Strict new regulations had been brought on the gathering and storage of cord blood. By law, each person amassing cord blood has to have a licence from the authorities and which means their team of workers and premises need to meet requirements set out via way of means of the Government. As umbilical twine blood is robotically thrown away as medical institution waste, so there aren't any moral troubles in phrases of storing or the use of it. Fees for the use of personal cord blood banks vary, however are presently round Rs. 50,000.00. It is crucial to be clean approximately how plenty you may be charged and whether or not there are probably any extra costs, inclusive of annual garage charges.

If you are considering storing your child's cord blood, here are some questions that you may wish to ask your obstetrician, doctor and cord blood banking authority.

1. Is the bank licensed by the Government to store cord blood?
2. Can cord blood stored with the bank be used for transplants in any hospitals?
3. Will my child's cord blood only be available for my family to use?
4. What technology does the bank use to process the cord blood (is the cord blood stored whole or reduced volume)?
5. Has the bank had any successful cord blood transplants?
6. Who are the bank's staff and what are their qualifications?
7. Where will the cord blood be stored?
8. How long will they store the cord blood for?
9. How will they ensure the security of my cord blood?
10. What would happen to my cord blood if the storage facility broke down?
11. What would happen to my cord blood if the bank went out of business?
12. How will they safeguard the privacy of my information?
13. Will the bank use my child's cord blood for any other purposes, e.g. for research?
14. Will there be any additional costs?
15. Could there be any problems that I might need to bear in mind?

Advantages and Applications

- During transplants, cord blood stem cells offer a far better match than stem cells from other sources.
- Have no expiry date. It can be frozen and preserved for a

lifetime and retrieved easily without long waiting periods and become available for treatment during not just for childhood but also in adulthood and perhaps utilizable more than once.

- They are the main source of stem cells for treatment of different disease conditions such as leukemia, myeloma, lymphoma, neuroblastoma, thalassemia, sickle cell disease, traumatic brain injury, autism, congenital heart defects, hearing loss and cerebral palsy etc.
- Genetic disorders that are treated with bone marrow transplant can often be treated using a cord blood transplant, and the groups of genetic conditions for which cord stem cell transplant might be offered are: metabolic storage disorders, some immune system disorders, haematological disorders including haemoglobinopathies, e.g. thalassaemia and sickle cell disease.
- Researchers are exploring the use of cord blood stem cells in Type 1 Diabetes. Preliminary results demonstrate that an infusion of cord blood stem cells is safe and may provide some slowing of the loss of insulin production in children with Type 1 diabetes.
- The stem cells found in a newborn's umbilical cord blood appear to hold great promise in cardiovascular repair. Cord blood stem cells have shown the ability to selectively migrate

to injured cardiac tissue, improve vascular function and blood flow at the site of injury, and improve overall heart function.

Conclusion

India has high-quality capability for umbilical cord blood (UCB) banking because of a high birth rate and genetic diversity. In this case, umbilical cord blood is an extensively widespread supply of progenitors for hematopoietic stem mobileular transplantation. However, to-date the entire quantity of UCB transplants finished in India has been very low in particular because of excessive value and restrained quantity of umbilical twine blood financial institution units. But those figures are possibly to enhance with inside the coming years because of established order of umbilical cord blood banks with the aid of using authorities and personal agencies. To meet the destiny transplantation desires of the country, complete participation and big funding with the aid of using the Government is necessary. Establishing a foundation, such as infrastructure (facilities, technical and great warranty expertise, etc.) will assist an UCB programme with a view to be consultant for all areas of the country. The fundamental hassle confronted in India is series of UCB because of excessive value and relatively much less practical public banks. In addition, thinking about a massive populace with deliveries in public sanatorium because of low value, UCB storage in India desires expanded public-non-public partnership version wherein UCB may be saved with the aid of using cheap and non-cheap humans as well.

References

- Sachdeva, A., Gunasekaran, V., Malhotra, P., Bhurani, D., Yadav, S.P., Radhakrishnan, N., Jog, P., 2018. Umbilical cord blood banking: Consensus statement of the Indian Academy of Pediatrics. *Indian pediatrics*, 55(6), 489-494.
- Verma, V., Tabassum, N., Yadav, C.B., Kumar, M., Singh, A.K., Singh, M.P., *et al.* Cord blood banking: An Indian perspective. *Cell Mol Biol*. 2016; 62:1-5.
- Ballen, K.K, Gluckman, E., Broxmeyer, H.E., Umbilical cord blood transplantation: the first 25 years and beyond. *Blood*. 2013; 122:491-8.

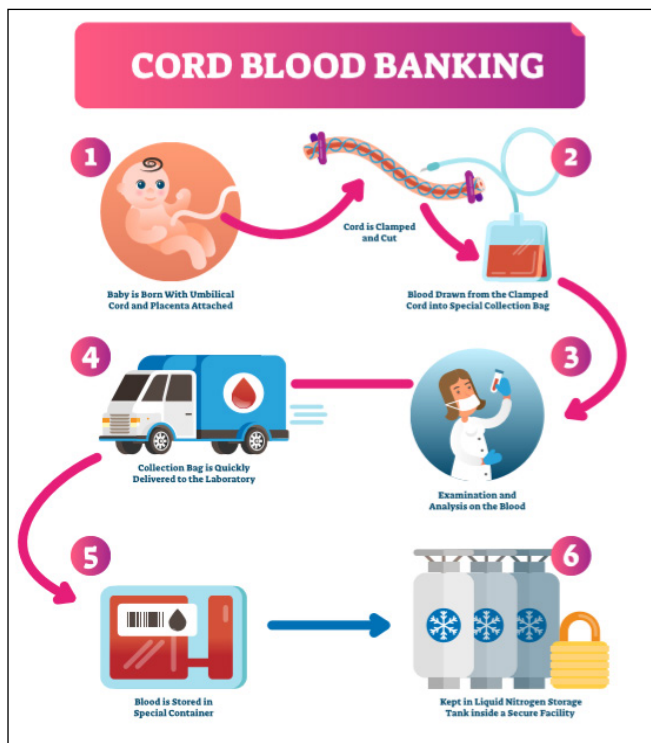


Figure 1. Blood stem cells are collected from the umbilical cord and can then be processed to be banked for public or private use (Image adapted from ©VectorMine/Adobe Stock)