

Cryopreservation of Cord Blood

Dr Muthu Venkat T

Consultant Pathologist, Graduated from Manipal University, Manipal, India

Abstract: *The cord blood on post processing, are used for various community purposes, for medical therapeutic purposes and for wound healing purposes. The various tissues stored in cryo-preservation are cord blood, cord tissue, Femme and dental stem cell samples, for lifelong period. The community requirements for the stem cells are for various healing and tissue regeneration purposes. The process of cryopreservation mainly involves the CRF (control rate freezers), cryo cart and Liquid Nitrogen 2 vessel. The process of initial transport of cord blood from the post processing of samples, in the cleaning room after addition of DMSO is by the ice tray in cool condition. After the initial transport, the samples are stored in CRF for a period of 40 minutes and noted in the software. The entire process to be completed within 1 hour.*

Keywords: Cord blood, LN2 vessel, cryocart

1. Introduction

Cryopreservation is the process of the cold storage of the cord tissue and other tissues for the purposes of various wound healing purposes and ailments. The temperature to be maintained is -140 degree celsius and the tissue should be preserved by addition of cryopreservatives. The maximum temperature that can be reached for preservation is -196 degree celsius. The LN2 vessel to be refilled before the storage of the samples. The oxygen stability, humidity and the pressure to be monitored periodically for stability of the product.

2. Method

- Single storage method.
- Dual storage method.

Equipments need are CRF, LN2 vessel, cryocart, towers for holding the sample and Dry shipper.

Temperature conditions

The temperature had to be periodically checked on the basis of four stages.

- Stage 1- -1 to -10 deg celsius.
- Stage 2- -10 to -20 deg celcius.
- Stage 3- -1 to -40 deg celsius.
- Stage 4- -40- -140 deg celcius.

3. Volume of Samples

The sample to be stored in the volume are 20 mL and for dual storage purpose 5 mL is also used. The tower contains 10 in 1 racks for holding the samples for storage and for cord tissues, the tower contains 8 in 1 racks for the storage purposes.

4. Calibration

The annual calibration and integrity check to be maintained by the external vendor source and by the medical directors.

The sample receiving records and the temperature maintenance records to be periodically followed.

References

- [1] Onofre J., Baert Y., Faes K., Goossens E. Cryopreservation of testicular tissue or testicular cell suspensions: a pivotal step in fertility preservation. Hum Reprod Update. 2016;22:744–761. [PMC free article] [PubMed] [Google Scholar]
- [2] Ibars E.P., Cortes M., Tolosa L., Gómez-Lechón M.J., López S., Castell J.V. Hepatocyte transplantation program: Lessons learned and future strategies. World J Gastroenterol. 2016;22:874–886. [PMC free article] [PubMed] [Google Scholar]
- [3] Mandawala A.A., Harvey S.C., Roy T.K., Fowler K.E. Cryopreservation of animal oocytes and embryos: Current progress and future prospects. Theriogenology. 2016;86:1637–1644. [PubMed] [Google Scholar]
- [4] Yong K.W., Wan Safwani W.K., Xu F., Wan Abas W.A., Choi J.R., Pingguan-Murphy B. Cryopreservation of human mesenchymal stem cells for clinical applications: current methods and challenges. Biopreserv Biobank. 2015;13:231–239. [PubMed] [Google Scholar]
- [5] Zeron Y., Pearl M., Borochoy A., Arav A. Kinetic and temporal factors influence chilling injury to germinal vesicle and mature bovine oocytes. Cryobiology. 1999; 38:35–42. [PubMed] [Google Scholar]
- [6] Fuller B.J., Petrenko A.Y., Rodriguez J.V., Somov A.Y., Balaban C.L., Guibert E.E. Biopreservation of hepatocytes: current concepts on hypothermic preservation, cryopreservation, and vitrification. Cryo Letters. 2013;34:432–452. [PubMed] [Google Scholar]