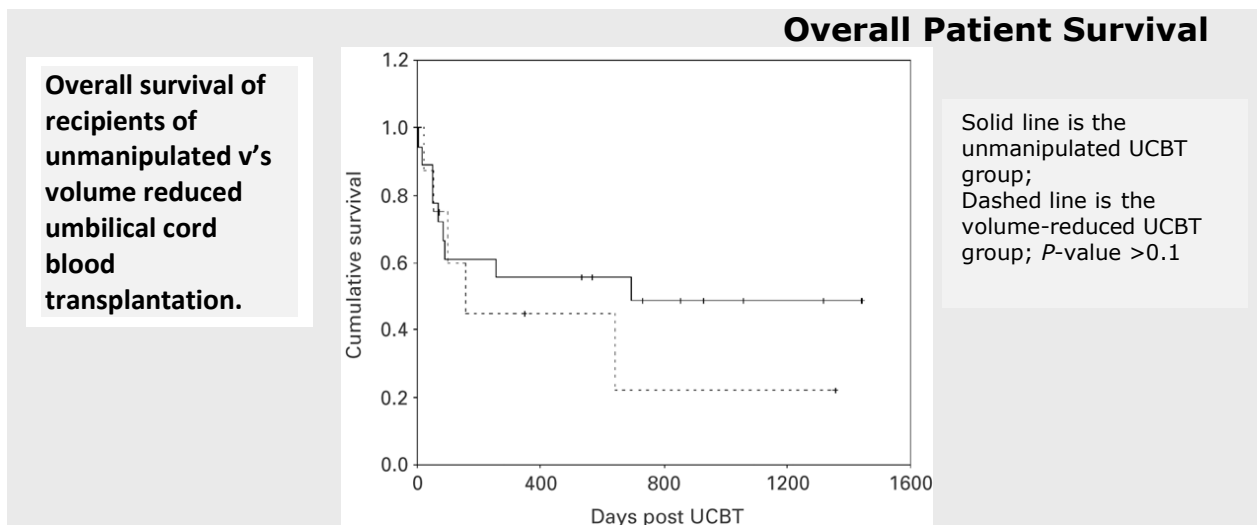


WHY WE SAVE MORE CELLS AT CELLS4LIFE

One of the most important factors during cord blood transplantation is the number and volume of viable cells during a transplant. At Cells4Life we understand that sample quality and cell number is critical for engraftment of cells during transplantation. With our superior minimal manipulation method of processing umbilical cord blood, the maximum number of precious stem cells are collected and stored for you and your family.

The presence of all 12 types of stem cells in cord blood as well as growth factors, hormones, and cytokines has been clinically proven to result in superior engraftment in a transplant setting. The following is scientific evidence indicating the superior engraftment of umbilical cord blood samples which have the presence of different cell types in the sample ensuring overall patient survival following transplantation improves.



Use of nonvolume-reduced (unmanipulated after thawing) umbilical cord blood stem cells for allogeneic transplantation results in safe engraftment

T Hahn, U Bunworasate, M C George, A S Bir, W Chinratanalab, A R Alam, B Bambach, M R Baer, J L Slack, M Wetzler, J L Becker and P L McCarthy Jr

There is scientific agreement that precious stem cells are lost during the volume reducing processing technique. The Cells4Life doctors understand the importance of cell number during a transplant, and the less your umbilical cord blood sample is handled and manipulated, the less cell number will be lost.

There are 12 different types of cells present in cord blood. These include HSC's, MSCs, CD34+ cells, CD37+ cells, VSELs, as well as growth factors, cytokines and chemokines, all of which help the cord blood to engraft better and faster in a transplant setting. All of these cells along with hormones and growth factors are lost when the blood is volume reduced. Less handling and manipulation of the sample before it is cryopreserved also minimises the risk of contamination to the blood.

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CLINICAL EVIDENCE OF THE SUPERIOR CELLS4LIFE PROCESSING METHOD

8 independent peer reviewed scientific papers providing evidence for the clinical advantages of the Cells4Life process.

1. “These results are important since the removal of RBCs from the graft, a process which could result in cell loss is not necessary.”

“In summary, our data do not support that the infusion of lysed RBCs and consumption of NO explains the systemic toxicity associated with PBSC infusions in this acute setting and suggest a limitation of the role of lysed RBCs in the pathophysiology of SCD” (Sickle Cell Disease).

Reference: Infusion of hemolyzed red blood cells within peripheral blood stem cell grafts in patients with and without sickle cell disease, Courtney D. Fitzhugh, Hayato Unno, Vincent Hathaway, Wynona A. Coles, Mary E. Link, R. Patrick, The American Society of Hematology-BLOOD, 30 APRIL 2012; 10.1182/blood-2011-11-392654

2. There is evidence that cell separation techniques to remove all parts of the blood except the white blood cells (volume reducing method) results in an unacceptably high loss of cells.

Reference: Human umbilical cord blood as a potential source of transplantable hematopoietic stem/progenitor cells, Broxmeyer HE, Douglas GW, Hangoc G, Cooper S, Bard J, English D, Arny M, Thomas L, Boyse EA. Medical Sciences, 1989 May; 86(10):3828-32.

3. A direct comparison between Total Nucleated Cell count in unmanipulated blood versus volume reduced, showed that Total Nucleated Cell count was better in samples that were not separated in comparison to blood that was volume reduced.

‘After thawing and washing, TNC recovery was better in the group of unmanipulated Cord Blood samples than in the group of samples that was processed and volume reduced before storage’.

Reference: Does the volume reduction manipulation before cryopreservation influence cord blood cell recovery pretransplant? Screnci M, Salvatori S, Carmini D, Arcese W. Transfus Med. 2007;17:208-9

4. “We stopped volume depleting the UCB units after we observed delayed engraftment in the first five units and became concerned about loss of stem cells during the procedure.”

“There was no serious toxicity from UCB infusion using unmanipulated UCB units. We conclude that unmanipulated UCB units may be infused safely into UCBT patients with adequate engraftment and survival.”

“Red Blood Cells present in Cord Blood do not affect the overall quality of the Sample”

Reference: Use of non volume-reduced (unmanipulated after thawing) umbilical cord blood stem cells for allogeneic transplantation results in safe engraftment, T Hahn, U Bunworasate, MC George, AS Bir, W Chinratanalab, AR Alam, B Bambach, MR Baer, JL Slack, M Wetzler, JL Becker and PL McCarthy Jr, Bone Marrow Transplantation (2003) 32, 145–150 & 2003 Nature Publishing Group

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5. “There is no difference between RBC depleted and non-RBC depleted transfusion reactions from patients. Both varieties of transfusion can have issues associated with RBC depleted and non-RBC depleted”

Reference: *Another case of acute cardiopulmonary toxicity with cord blood infusion: is dextran the culprit?* Sung Choi MD, Sandra Hoffmann MT(ASCP), SBB, Laura Cooling MD, MS, *Transfusion*, 3 JAN 2012; 10.1111/j.1537-2995.2011.03424.x

6. Whole UCB showed no adverse effects on engraftment of the cells or survival of the patient when compared with volume reduced UCB. The incidence of adverse reactions with whole blood were low, mild and reversible and were no different to those seen with separated blood.

Reference: *Placental/umbilical cord blood for unrelated-donor bone marrow reconstitution: Relevance of nucleated red blood cells*, Cladd E. Stevens, Jessica Gladstone, Patricia E. Taylor, Andromachi Scaradavou, Anna Rita Migliaccio, Jan Visser, N. Ludy Dobrila, Carmelita Carrier, Michael Cabbad, Peter Wernet, Joanne Kurtzberg, and Pablo Rubinstein, *BLOOD*, 1 OCTOBER 2002_ VOLUME 100, NUMBER 7.

7. “The medically important Very Small Embryonic-Like Stem Cells (VSELs) present in cord blood are lost during volume reducing methods. VSELs are pluripotent stem cells with maximum regenerative potential and are the focus of much research and study, indicating that they could potentially be powerful tools for tissue and organ repair in the future”.

Reference: *Correlation of umbilical cord blood hormones and growth factors with stem cell potential: implications for the prenatal origin of breast cancer hypothesis*, Todd M Savarese, William C Strohsnitter, Hoi Pang Low, Qin Liu, Inkyung Baik, William Okulicz, David P Chelmow, Pagona Lagiou, Peter J Quesenberry, Kenneth L Noller, and Chung-Cheng Hsieh *Breast Cancer Res.* 2007; 9(3): R29.

8. “Volume reduction of the cord blood means cells are irretrievably lost. Therefore any discoveries utilizing VSEL or other non-hematopoietic cells in regenerative medicine will not be available to clients of banks who volume reduce samples”.

Reference: *Very Small Embryonic-Like Stem Cells with maximum regenerative potential get Discarded During Cord Blood Banking and Bone Marrow Processing for Autologous Stem Cell Therapy*; Deepa Bhartiya, Ambreen Shaikh, Punam Nagvenkar, Sandhya Kasiviswanathan, Prasad Pethe, Harsha Pawani, Sujata Mohanty, SGA Rao, Kusum Zaveri, Indira Hinduja, *Stem Cells & Development*, 2011.

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