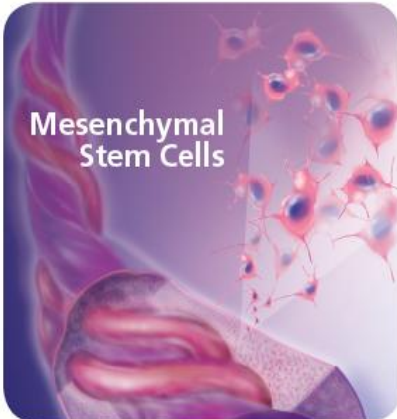




FEATURED ARTICLE: CORD TISSUE MESENCHYMAL STEM CELLS IN HUMANS SHOWS POSITIVE RESULTS



Mesenchymal Stem Cells

Transplant Medicine

- Reduce transplant complications

Regenerative Medicine

- Promote tissue repair

The first reported human clinical application of umbilical cord tissue-derived mesenchymal stem cells (MSCs) was recently published in *Transplantation*.(1) The study found that the use of cord tissue MSCs was feasible, safe and effective in treating patients with graft versus host disease (GvHD), which is a serious and potentially fatal complication of stem cell transplantation.

Because of their prospective impact on immune suppression, injury recovery and tissue engineering, MSCs are of increasing interest to researchers across a broad spectrum of regenerative medicine applications including autism, bone injury, cardiomyopathy, diabetes, HIV, liver failure, multiple sclerosis, spinal cord injury and stroke.(2)

Overcoming Graft v. Host Disease

In the study recently published in *Transplantation* (1), the investigators first compared the form and structure, surface markers, and behavior of cord tissue MSCs to those found in bone marrow. They found that MSCs obtained from cord tissue had similar appearance, superior proliferative potential and more immunosuppressive effects compared to bone marrow MSCs. Because of these unique properties and the relative ease of collection, isolation and culture, the investigators infused cord tissue MSCs expanded in the

lab, into two patients with severe steroid-resistant acute GvHD. There were no side-effects or severe infections noted in either patient during the treatment period showing the MSCs were safe. The GvHD also improved dramatically in both patients following each infusion indicating the treatment was successful.

This study could pave the way for future studies of cord tissue-derived mesenchymal stem cells to better understand how to maximize treatment for this serious transplant complication. However, GvHD may only be scratching the surface of the possible future applications for cord tissue MSCs. Considering that collecting cord tissue from newborns is easy, safe and noninvasive compared to harvesting from bone marrow, the authors of this study concluded that these cells appear to be the ideal candidates for cell-based therapies. The authors of the study also indicated that cord tissue may be an alternative MSC source for clinical applications, just as cord blood itself has become a good source of hematopoietic stem cells for transplantation.(1) By collecting and saving cord tissue from newborns, families will have access to a rich source of MSCs which hold great promise for stem cell therapies in the future.

Graft versus host disease (GvHD) is a frequent immune incompatibility reaction of stem cell transplantation with often serious to fatal complications. GvHD occurs when donor cells recognize the recipient as foreign, and attack his or her organs and other tissues. GvHD is usually treated with steroids, but some patients may develop steroid resistance and require complicated treatment regimens.

Mesenchymal stem cells (MSCs) are found in bone marrow, cord blood and in particularly high concentrations in cord tissue.(3) They give rise to the cells of bone, fat, cartilage and other connective tissues. Cord tissue MSCs are being studied in more than 25 clinical trials to date according to the National Institutes of Health web site clinicaltrials.gov.

References:

1. Wu KH, Chan CK, Tsai C, et al. Effective treatment of severe steroid-resistant acute graft-versus-host disease with umbilical cord-derived mesenchymal stem cells. *Transplantation*. 2011;91(12):1412-6.
2. U.S. National Institutes of Health. Clinicaltrials.gov. Umbilical Cord Mesenchymal stem cells. Accessed September 15, 2011.
3. Secco M, Zucconi E, Vieira NM, et al. Multipotent stem cells from umbilical cord: Cord is richer than blood! *Stem Cells* 2008; 26: 146.

QUOTE OF THE MONTH

"Umbilical cord blood is a potential cancer therapy that is thrown away every day," said lead author Elizabeth Hexner, MD, an assistant professor in the division of Hematology-Oncology in Penn's Abramson Cancer Center.

"Donor lymphocyte infusions (DLI) are frequently given to patients who need them following stem cell transplants from living donors, but until now, we have been unable to offer this therapy to cord blood transplant patients because the source of their cells is used up at the time of transplant," Hexner says. "Our results show that we are able to grow sufficient numbers of T cells to be available both for that use as well as to buoy the number of cells that patients receive during the transplant itself, which seems to have helped their immune systems come back online more quickly than is typically seen in umbilical cord blood transplants."

UMBILICAL CORD BLOOD STEM CELLS: PRIME SOURCE FOR TRANSPLANTS AND FUTURE REGENERATIVE MEDICINE

The 5th ITERA Life-Sciences Consortium Symposium took place in Maastricht, the Netherlands, and showcased the progress of stem cell research and promising therapeutic applications. Thanks to solid scientific data, researchers confirmed that umbilical cord blood stem cells are one of the prime sources to be used in current stem cell transplants, ongoing research and future regenerative medicine.

Cord blood is one of the prime sources for stem cells, more and more used for stem cell transplants

The eminent Prof. Gluckman opened the Symposium. She was the first to execute a cord blood stem cell transplant curing a child with Fanconi's Anemia in 1988, using the stem cells of a sibling. At the occasion of the Symposium, she showed that cord blood is becoming rapidly the preferred source for unrelated cord blood transplants: in 2000 only 1% of the transplants used stem cells from cord blood, today more than 22% use cord blood stem cells. This strong growth is due to the superior characteristics of the cord blood stem cells, but also underlines how easily the stem cells from cord blood can be isolated, in opposition to bone marrow for example.

Since the first cord blood stem cell transplant in 1988, there has been reports on over 25 000 cord blood stem cell transplants worldwide and almost 7800 of these transplant have been reported to Eurocord. The main disease to be treated was acute leukemia (47% children and 59% adults), followed by other blood related disorders (10% children and 20% adults). The ITERA academic and industry researchers alike are committed to increase the number of diseases that can be treated with stem cell transplants.

Ongoing clinical trials, tackling unmet medical needs

Regenerative medicine is one of the most promising therapeutic domains addressed at the ITERA Symposium. Different therapies are underway to address spinal injury, organ repair and regeneration including heart, liver, kidney and bladder. During the Symposium, researchers from all over the world had the opportunity to share and report on their latest results of pre-clinical work and clinical trials. These studies tackle ailments that have no treatment yet and hold a lot of promises for the patients. Results of these studies are to be expected soon.

Experimental treatments in the lab, moving towards clinical trials

Prof. Surbek, from Switzerland, reported on their efforts to treat premature infants suffering from prenatal brain injury with stem cell transplantation. There is no established therapy available and the injury often leads to a severe long-term disability. On animal models, human stem cells were successfully transplanted. Dr. Surbek comments: "We are excited about these first results as they confirm survival and functional activity of the transplanted donor cells. I see many premature babies and we are committed to improve their survival rate and quality of life. With the continuous support of Cryo-Save International and the Eagle Foundation in Switzerland, we hope to offer new treatments to our patients within the next few years."

ITERA awarded by UNESCO International Code of Ethics

The current experimental treatments are likely to offer new possibilities for treatment of unmet medical needs in the future. Meanwhile the promises regenerative medicine hold for the future raise social and ethical questions. ITERA supported by Cryo-Save, the leading family stem cell bank, is committed to develop an engaged and informed discussion in response to the ethical and social hopes, demands and concerns from the public. For its hard work, ITERA and the chairman Dr. Albert Ramon received the prestigious UNESCO International Code of Ethics rewarding the different ITERA researchers for their efforts to take into account the shared values and ethical principles.

CRYO-SAVE NEWS

Cryo-Save India adds another stone to its stem cell banking service by receiving the prestigious **AABB accreditation**

Cryo-Save International announced the achievement of **200,000 samples stored** from umbilical cord blood and umbilical cord tissue.

Cryo-Save International released a six-year-old child's **sample for treatment** of cerebral palsy (CP) at Duke University (USA).

Cryo-Save South Africa launched its **Cost-free Family Donation Programme**, free of charge*, to families wishing to store their newborn's umbilical cord blood stem cells for a family member diagnosed with a life threatening disease treatable by stem cells*

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