CORRESPONDENCE

Stem Cells Derived From Cord Blood in Transplantation and Regenerative Medicine

by Dr. rer. medic. Verena Reimann,
Prof. Dr. med. Ursula Creutzig,
Prof. Dr. rer. nat. Gesine Kögler
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Further Phenomena

We thank our colleagues for their clear position statement. In conclusion: “Cord blood is not the fountain of eternal youth in our time!”—and the ethical implications of “combined donations” should not be underestimated.

The statement: “Autologous stem cells from cord blood have poor prospects for use in regenerative medicine, because they have to be cryopreserved until use [and it isn’t possible to produce clinically relevant amounts of non-hematopoietic stem cells from cryopreserved material],” however, cannot be left unchallenged.

In addition to the two main mechanisms of cell damage during cryopreservation (namely osmotic dehydration and intracellular ice formation), further phenomena occur during the cooling, storage, and rewarming of biological cells (for example, toxicity of the cryoprotectives, “cold shock,” pH shifts, phase transitions and separations, lipid peroxidation, vesiculation, protein denaturation, “free” radicals, thermoelastic stress, embrittlement, crack formation, devitrification, recrystallization), all of which are the current subjects of cryobiological research. Such known damaging factors are likely to be responsible for the authors’ lack of success in culturing relevant amounts of non-hematopoietic stem cells (1).

In a scenario of growth rates of 13% or 19% however, it is possible to grow non-hematopoietic stem cells from cord blood. The authors seem to have been using a similar cryopreservation procedure as that published 15 years ago (2) and have not introduced variations with regard to known factors of influence (for example, the type and concentration of the cryoprotective, cooling and rewarming rates, cell concentration, and methods to remove the cryoprotective).

We should therefore not overemphasize the detail “cryopreservation does not turn out well”—this was assumed before 1949 (3). Instead we should better concentrate on ethical aspects when advising our patients not to store cord blood for autologous use.

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Conflict of interest statement

The author declares that no conflict of interest exists according to the guidelines of the International Committee of Medical Journal Editors.

In Reply:

The method we used to cryopreserve living cells is a procedure that is established worldwide, tried and tested; it meets the requirements of the pharmaceutical drug law and has been licensed by the supervisory authorities.

On the basis of our longstanding experiences in growing and culturing unrestricted, non-hematopoietic stem cells from umbilical cord blood (USSC), we do not agree that varying the freezing parameters would increase the generating frequency of the USSC from frozen material, because it turns out that fresh material contains non-hematopoietic stem cells only at a frequency of 1–11 colonies (1).

This is the actual problem, and it is the reason why generating USSC is successful only for about 30% of fresh cord blood. Changing the cryopreservation method would not change the cell loss and cannot easily be done owing to legal reasons.

In the long term, it would be advantageous to develop methods that further minimize the loss of hematopoietic, but also non-hematopoietic, cells—procedures that are superior to the current established protocols.

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Dr Reimann and Professor Kogler work at the José Carreras Stammzellbank (the public umbilical cord blood bank at Düsseldorf University Medical Center). Professor Creutzig declares that no conflict of interest exists according to the guidelines of the International Committee of Medical Journal Editors.

Erratum

In the CME article “The Epidemiology, Etiology, Diagnosis, and Treatment of Osteoarthritis of the Knee,” printed in the issue of 5 March 2010 (Deutsches Ärzteblatt, issue 9), reference 9 has been incorrectly cited. The correct reference is:

9. Jordan KM, Arden NK, Doherty M, et al.; Standing Committee for International Clinical Studies Including Therapeutic Trials ESCISIT: EULAR recommendations 2003: an evidence based approach to the management of knee osteoarthritis: report of a task force of the Standing Committee for International Clinical Studies Including Therapeutic Trials (ESCISIT). Ann Rheum Dis 2003; (12):1145–55.

MWR

Erratum

Regarding the original article “Clinical Findings in the Chronic Phase of Traumatic Brain Injury” by Scheid and Cramon in Deutsches Ärzteblatt International; 26 March 2010 (Issue 12): In the paragraph describing post-traumatic epilepsy on page 203, the term ‘cerebellar white matter’ is incorrect. The correct expression is ‘cerebral white matter’.

MWR