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Low and high-resolution HLA typing of cord blood samples of register of donors in St. Petersburg

Elena A. Kotelevskaya, Svetlana A. Smirnova, Alexander B. Smolyaninov

Stem Cell Bank Pokrovski, St. Petersburg, Russia

Correspondence: Elena A. Kotelevskaya, Stem Cell Bank Pokrovski, 199106, Bolshoi Prospekt V.O., 85, St. Petersburg, Russia, Phone: +7 (812) 908-7727, E-mail: stemcellbank@inbox.ru

Abstract

Umbilical cord blood (CB) contains hematopoietic stem cells (HSC) and can be used as an alternative to bone marrow transplantation in certain cases. Currently, the first register of cord blood donors is be created by the Stem Cell Bank Pokrovski. It aims to resolve the problem of deficiency the of HSC units in the country. The most important factor of effective transplantation is the degree of HLA matching. The target of this work is to HLA type each cord blood unit by low-resolution and then transition to high-resolution typing by sequence based typing (SBT).

During the work, 20 samples of cord blood were analyzing by polymerase chain reaction (PCR) with sequence specific primers (PCR-SSP). DNA was isolated from 0.7 ml of the entire quantity of blood by the PROTRANS DNA Box 500 (PROTRANS, Germany) DNA extraction column. HLA-A, HLA-B, and HLA-DRB1 loci were analyzed using the PROTRANS HLA-A*, -B*, -DRB1* (PROTRANS, Germany) Cyclerplate System according to the manufacturer's instructions. HLA-DRB1 high-resolution genotyping of 5 units was performed by the PROTRANS S4 system (PROTRANS, Germany), specially designed for the Beckman Coulter SEQ 8000 Genetic Analyzer (Beckman Coulter, USA). The program software Sequence Pilot for sequence result analyzing was also provided by PROTRANS.

The most frequently identified alleles were: HLA-A*02 (25%), *01 (20%), *24 (17.5%); HLA-B*08 (17.5%), *18 (12.5%), *35 (12.5%); HLA-DRB1*15 (17.5%), *07 (15%), *03 (12.5%).

The results of low-resolution HLA typing could be applied to the primary selection of donors when an HSC transplant HSC is required. Also they significantly simplify the high-resolution typing operation. The advantages of a national HLA-identified cord blood register in Russia are accessibility and lower costs of samples. But the major positive is the increased likelihood of HLA-matching in the same population.

Keywords: hematopoietic stem cells, umbilical cord blood, register of cord blood donors, transplantation, HLA typing