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Genetic polymorphism and haplotypes of HLA-A, -B, and -DRB1 locus distribution analysis based on low-resolution HLA-typing of umbilical cord blood samples stored in the public bank of the North-West region of the Russian Federation

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Abstract

Aim: The aim of the given investigation is to determine the major histocompatibility complex antigens of UCB samples from a public bank by a molecular-genetic method, based on the "Stem Cell Bank Pokrovsky", and also to establish a list of samples and to analyze loci HLA-A, -B, -DRB1 polymorphism of the residents of the North-West region of Russia.

Methods: During the study, 430 samples of cord blood were analyzed using polymerase chain reaction (PCR) with sequence specific primers (SSP). DNA was isolated from 0.7 ml of whole blood by DNA extraction column Protrans DNA Box 500 (Protrans, Germany). HLA-A, HLA-B, and HLA-DRB1 loci were analyzed using the cycloplate system Protrans HLA-A*, -B*, -DRB1* (Protrans, Germany) and Biotest (Biotest Medical Diagnostics, Germany) according to the manufacturer's instructions.

Results: It was identified that the most frequent alleles are: HLA-A*02, 28.1%; *03, 14.5%; *24, 14.0%; HLA-B*07, 13.3%; *35, 12.7%; *44, 8.2%; HLA-DRB1*15, 15.8%; *13, 15.0%; and *03, 12.5%.

Conclusions: These results of genetic polymorphism of HLA-A, -B, -DRB1 loci distribution in these inhabitants of the North-West region of Russia can complement the existing information database on population genetics and associated diseases. The main advantage of owning our own public bank of UCB samples in the North-West region of Russia — in addition to reducing the cost and availability of material for transplantation — is that the probability of matching HLA-genotypes of one population is much higher than finding them through a global register.

Keywords: hematopoietic stem cells, umbilical cord blood, cord blood public register, transplantation, HLA-typing

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