

Genetic Diversity of Cord Blood of the National Center of Blood Transfusion, Mexico (NCBT)

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Abstract : Introduction: The transplant of Umbilical Cord Blood Units (UCBU) are a therapeutic possibility for patients with oncohaematological disorders, especially in children. In Mexico, 48.5% of oncological diseases in children 1-4 years old are leukemias; whereas in patients 5-14 and 15-24 years old, lymphomas and leukemias represent the second and third cause of death in these groups respectively. Therefore it is necessary to have more registries of UCBU in order to ensure genetic diversity in the country; the above because the search for appropriate a UCBU is increasingly difficult for patients of mixed ethnicity. Objective: To estimate the genetic diversity (polymorphisms) of Human Leucocyte Antigen (HLA) Class I (A, B) and Class II (DRB1) in UCBU cryopreserved for transplant at Cord Blood Bank of the NCBT. Material and Methods: HLA typing of 533 UCBU for transplant was performed from 2003-2012 at the Histocompatibility Laboratory from the Research Department (evaluated by Los Angeles Ca. Immunogenetics Center) of the NCBT. Class I HLA-A, HLA-B and Class II HLA-DRB1 typing was performed using medium resolution Sequence-Specific Primer (SSP). In cases of an ambiguity detected by SSP; Sequence-Specific Oligonucleotide (SSO) method was carried out. A strict analysis of populations genetic parameters were done in 5 representative UCBU populations. Results: 46.5% of UCBU were collected from Mexico City, State of Mexico (30.95%), Puebla (8.06%), Morelos (6.37%) and Veracruz (3.37%). The remaining UCBU (4.75%) are represented by other states. The identified genotypes correspond to Amerindian origins (HLA-A*02, 31; HLA-B*39, 15, 48), Caucasian (HLA-A*02, 68, 01, 30, 31; HLA-B*35, 15, 40, 44, 07 y HLA-DRB1*04, 08, 07, 15, 03, 14), Oriental (HLA-A*02, 30, 01, 31; HLA-B* 35, 39, 15, 40, 44, 07,48 y HLA-DRB1*04, 07,15, 03) and African (HLA-A*30 y HLA-DRB1*03). The genetic distances obtained by Cavalli-Sforza analysis of the five states showed significant genetic differences by comparing genetic frequencies. The shortest genetic distance exists between Mexico City and the state of Puebla (0.0039) and the largest between Veracruz and Morelos (0.0084). In order to identify significant differences between this states, the ANOVA test was performed. This demonstrates that UCBU is significantly different according to their origin ($P < 0.05$). This is shown by the divergence between arms at the Dendrogram of Neighbor-Joining. Conclusions: The NCBT provides UCBU in patients with oncohaematological disorders in all the country. There is a group of patients for which not compatible UCBU can be find due to the mixed ethnic origin. For example, the population of northern Mexico is mostly Caucasian. Most of the NCBT donors are of various ethnic origins, predominantly Amerindians and Caucasians; although some ethnic minorities like Oriental, African and pure Indian ethnics are not represented. The NCBT is, therefore, establishing agreements with different states of Mexico to promote the altruistic donation of Umbilical Cord Blood in order to enrich the genetic diversity in its files.

Keywords : cord blood, genetic diversity, human leucocyte antigen, transplant

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