

THE POTENTIAL OF A PROSPECTIVE HLA HAPLOBANK OF THE BULGARIAN POPULATION

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Public cord blood banks are an extensive source of HLA-typed cells suitable for reprogramming into induced pluripotent stem cells (iPSCs), which are a promising tool in the field of regenerative medicine. HLA-compatible iPSC lines are a potential source of cells for allogeneic therapy. The establishment of HLA homozygous iPSC banks (haplobanks) using HLA-typed cord blood units (CBUs) has been initiated in several countries. The goal is to create iPSC lines that will provide cells for allogeneic treatment in a large part of the population. Therefore, we aimed to assess the potential of the development of a prospective haplobank in our country.

Thus, 464 CBUs stored in the National Public Stem Cell Bank and 635 healthy adults (≥ 18 years) from the Bulgarian population were included in the study. The samples were characterized for HLA class I (HLA-A, -B) and class II (-DRB1) polymorphism by using low-resolution (PCR-SSOP) and high-resolution (SBT and NGS) genotyping techniques.

Among the investigated CBUs, we found one homozygous for the HLA-A, -B and -DRB1 loci: HLA-A*01-B*08-DRB1*03 (0.2% of the units). It is important to mention that the same haplotype appears to be the most frequent haplotype when evaluating the frequency of the HLA-A-B-DRB1 three-locus haplotypes in the entire studied group of 1099 individuals (CBUs units and healthy adults) from the Bulgarian population. Additionally, two more homozygous for the studied loci haplotypes were found in the group of healthy adults: HLA-A*02-B*18-DRB1*11 and -A*24-B*18-DRB1*11. Both haplotypes are among the eleven most common three-locus HLA-A -B-DRB1 haplotypes (frequency greater or equal to 1%) in the entire studied group of CBUs and healthy individuals from the Bulgarian population.

Our study showed the availability of HLA homozygous adult donors and homozygous CBUs stored in the National Public Stem Cell Bank. These units can be a source of cells for creating iPSC lines and can initiate the establishment of an iPSC haplobank capable of providing treatment to Bulgarian patients.