HLA HAPLOTYPE FREQUENCIES BASED ON FAMILY ANALYSIS AND CROSS-OVER EVENTS IN THE SERBIAN POPULATION

Zeljka Miladinovic , Barbara Jovanovic, Nikola Kacaki, Danica Stefanovic, Jovan Vujovic, Glorija Blagojevic, Bjanka Lako Soskic, Zorana Andric

Blood Transfusion Institute of Serbia, Tissue Typing Department, Belgrade, Serbia

The knowledge of HLA haplotype represents a valuable tool for donor search, and, along with the generation of novel HLA alleles, is a result of recombination events within the HLA region. The analysis of HLA haplotypes contributes to understanding the genetic structure of the population. This study aimed to investigate HLA haplotype frequencies and recombination events in the haematological patient families. A total of 309 families typed for HSCT between 2021 and July 2025 were included. The haplotypes were determined by segregation. A total of 1168 different HLA-A-B-C-DRB1-DQB1 haplotypes were identified in this retrospective study, of which 450 (38.5%) unique and 718 (61.5%) were repetitive. A frequency higher than 1% was found for 132 HLA-A-B-C-DRB1-DQB1 haplotypes. The most frequent haplotype was pan-European A*01-B*08-C*07-DRB1*03-DQB1*02 (4.28%) followed by A*03-B*07-C*07-DRB1*15-DQB1*06 (1.62%) and A*02-B*18-C*07-DRB1*11-DQB1*03, A*02-B*51-C*15-DRB1*01-DQB1*05, A*26-B*38-C*12-DRB1*13-DQB1*06 (1.11% each). The presence of crossover events has been detected in 5 (2.07%) families and is 1.5 times more frequent in spermatogenesis than in oogenesis. In one case, the parental origin of recombination could not be determined. The recombination frequency between HLA-A and HLA-B loci was 40%, while between HLA-B and HLA-DRB1 loci was 60%. No novel haplotype resulting from recombination was found in the Serbian population. This is the first study of 5 loci real haplotype in the Serbian population. These data could be helpful in the search for donors for haematological patients and future research on the mechanisms behind HLA haplotype recombination and evolution.

E-mail: zeljkamiladinovic1@gmail.com