

Abstract

The diploma thesis deals with the erythrocyte antigens genotyping using microarray techniques. It compares the results of microarray methods with the phenotypes obtained by serological techniques. The aim of the theses is to evaluate the degree of identical results (phenotype - genotype) and the applicability of microarray techniques in the immunohematology laboratory. The testing was carried out in the National Reference Laboratory, Institute of Hematology and Blood Transfusion, Prague, in the period January 2014 – December 2015. Methods BLOODchip Reference and ID CORE XT™, Progenika Biopharma S. A., were used for genotyping. Serological determination of phenotypes was performed using Grifols and BioRad gel agglutination techniques. The study encompassed 78 samples of healthy donors of diagnostic red blood cells, 62 patient samples with no possibility to determine the presence of certain antigens by serological methods, and 28 patient samples with the discrepant result of RhD determination. Genotyping of the donors' samples enabled to record variant and weak antigens not detectable by serological methods. Donor samples displayed 100% conformity of serological and genotyping results. Considerable variability in patients' samples was found in comparism of genotyping and serological techniques. The results were not possible to detect predominantly in multi-transfused patient samples because of the presence of double population of red blood cells. On the contrary, genotyping provided requested results. Using microarray technique contributed to the determination of the particular RhD antigen in patient samples with discrepant RhD results. However, some samples had to be sent by the reason of the additional investigation by sequencing method. Microarray technologies significantly contribute to the immunohematology testing but for the time being cannot fully substitute routine serological tests by reason of higher time and cost requirements.

Keywords

Immunohematology, Red Blood Cell Antigen, Microarray methods, Serological methods, Fenotype, Genotype, Genotyping