**PP 54. The Resolution of a Complex Serology Case Using the Immunohaematology Toolbox**

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**Background**
Complex or unresolved serology cases are directed from within SANBS to the Immunohaematology Reference laboratory. Each case is unique and therefore requires a selection of tests to be completed according to the testing options available in the Immunohaematology toolbox. The tests available in the toolbox include an extended panel of rare cells including those cell panels that are negative for high frequency antigen, extended panel of rare antisera, red cell genotyping for 10 blood group systems and 37 red cell antigens, BAGene red cell genotyping using sequence specific primers for resolution of partial and weak D variants and ABO subgroups and a new method currently under validation which is the monocyte monolayer assay. This case study describes a sample from patient MN that was difficult to resolve by standard serological methods and had to be resolved by additional serological test methods and red cell genotyping by molecular methods.

**Method**
Sample MN was referred to the Reference laboratory and was tested using an extended panel of rare cell types, rare antisera and red cell genotyping using the IDCORE$^{XT}$ software.

**Results**
Red Cell Serology (RCS) laboratory - Red cell screening and identification produced positive results in all screen/panel cells by the saline indirect antiglobulin (IAT) method and was inconclusive. The red cell identification result obtained by the WADiana gel method produced a possible anti-e. The DAT and AA was negative. Due to the inconsistent results obtained, the sample was referred to the Reference laboratory.

Reference laboratory - red cell antibody identification using the standard panel cells reacted as an anti-e. Based on the knowledge that in order for the antibody to be present, the corresponding antigen should be lacking on the red cells, cell typing was performed but was 'e' antigen positive. Due to anti-hrS and anti-Rh34 being related to anti-e like antibodies, cell phenotyping was completed simultaneously using selected hrS- Ro(cDe/cDe), $R_2R_2$(cDE/cDE) and RH:-34 Ro (cDe/cDe) rare units. Positive reactions with the hrS- cells excluded the presence of anti-hrS whereas the negative reactions with the Rh:-34 cell type confirmed the presence of anti-Rh34.

Anti-e can form if the patient had a partial e antigen and was transfused with blood positive for e antigen. To confirm this, red cell genotyping covering the RHCE gene and red cell antigens C, c, E, e, hrS, and hrB was completed. The results confirmed the presence of a partial e antigen expression in the RHCE gene and the absence of the hrB allele thus confirming the patient was negative for the high frequency antigen Rh34.

**Conclusion**
This case illustrates the importance of having a wide range of test methods available in a Reference laboratory to resolve complex serological cases. A routine laboratory may have confirmed an anti-e antibody but the Reference laboratory concluded the presence of the rare Rh:-34 phenotype with partial e antigen expression. The introduction of red cell genotyping by molecular methods has been an important tool available in the algorithm of testing in the Reference laboratory.