

# PREGNANT SCD PATIENT WITH ANTI-RH23 AMONG MULTIPLE ALLOANTIBODIES

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## Background

In Switzerland extended antigen-matching for Duffy, Kidd and MNS - besides Rhesus and Kell - is recommended for sickle cell disease (SCD) patients. The ethnic diversity of red blood cell (RBC) antigen polymorphism engender that these patients are often transfused with RBCs from donors of African origin.

This strategy, however, increases the likelihood of being exposed to certain low-prevalence antigens, such as Rh23 (D<sup>w</sup>), as these are almost exclusive to African populations [1].

Rh23 is encoded by several types of *RHD*\*DV alleles as well as by *DAU-5* (*RHD*\*10.05) [2]. Anti-Rh23 is associated with delayed hemolytic transfusion reactions (HTR) and may cause moderate hemolytic disease of the fetus and newborn (HDFN).

Previously, we reported a case of a pregnant woman with SCD and rare anti-Fy<sup>5</sup> amongst other more common alloantibodies, the latter presumably a consequence of earlier pregnancies (DGTI, 2017). Only four registered Swiss blood donors were compatible to supply her with a total of eight RBC products during pregnancy.

## Methods

Standard serological methods were used for antibody specification (BioRad, Cressier, CH and in-house). Crossmatches were carried out by indirect antiglobulin test (IAT) at 37°C. Molecular typing of donors' and parental blood group antigens was performed by PCR-SSP (inno-train GmbH, Kronberg i. T, D and in-house).

## Results

The patient's predicted phenotype was O R<sub>0</sub>r, K-k+, Fy(a-b-), Jk(a-b+) and Rh23-.

Pretransfusion testing showed strong positive crossmatches with two of the compatible donors. Further serological analysis (INTS, Paris) revealed an anti-Rh23 in addition to anti-Fy<sup>5</sup>, anti-E and anti-Jk<sup>a</sup>.

Genotyping of the two donors causing positive crossmatches presented heterozygosity for *RHD*\*10.05 which encodes Rh23.

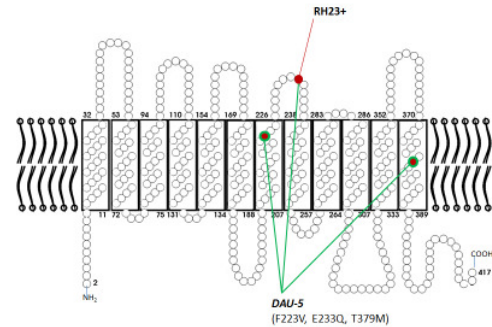


**Figure 1.**  
positive (3+) crossmatch  
(IAT, 37°C, gel-card)  
with RBCs  
of antigen compatible donor

The newborn's phenotype was A R<sub>0</sub>r K-, Fy(a-b+) and most likely Rh23- and Jk(a+b+), considering both maternal and paternal (A R<sub>0</sub>r, K-k+, Fy(a-b+), Jk(a+b-), Rh23-) predicted phenotypes. The neonatal serum contained maternal anti-A1, anti-Rh23 and anti-E.

The direct antiglobulin test was positive but elution only showed nonspecific reactions with papain-treated cells. Latter might have been caused by anti-Fy<sup>5</sup> possibly in combination with anti-Jk<sup>a</sup>.

The newborn showed no clinical signs of HDFN.



**Figure 2.** Model of the Rhesus D protein on the erythrocyte membrane [3]. Colored circles show the amino acid substitutions encoding the *RHD* allele *DAU-5* (*RHD*\*10.05) of the two donors causing positive crossmatches. Rh23 is defined by the amino acid exchange E233Q (red dot).

## Summary

Recently, we reported a pregnant SCD patient with a specific anti-public-antibody (anti-Fy<sup>5</sup>) amongst other alloantibodies.

During her present pregnancy we were able to demonstrate that two positive crossmatches of two former compatible donors were caused by a new alloantibody against a low-prevalence antigen, namely anti-Rh23, derived from several Rh23+ RBC transfusions during the previous pregnancy.

Despite this challenging blood supply we were able to support the patient with a total of ten antigen compatible and crossmatch negative RBC units from French and Swiss donors until delivery. This case illustrates the growing importance of national and international collaboration for provision of rare blood products.

## References

- [1] Floch et al., Transfusion, 2018
- [2] Flegel et al., Transfusion, 2008
- [3] modified from Wagner EF, Flegel WA, Immunohematology, 2004

## Acknowledgements

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