



# REMAINING RED BLOOD CELL ALLO-ANTIBODIES IN BLOOD PRODUCTS DONATED BY ALLO-SENSITIZED BLOOD DONORS. A COMPARATIVE TITRATION STUDY

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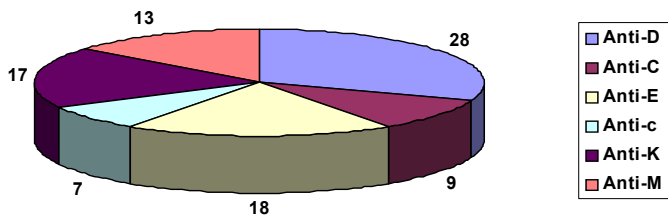
**Background:** Eligibility criteria for blood donation by individuals carrying red blood cell antibodies (AB) are heavily debated by national and international authorities. By now, there are no data available describing residual AB in blood products (BP) that were manufactured out of blood donations from allo-sensitized blood donors (alloBD). Therefore, variable roles concerning donor eligibility criteria are in place. In Switzerland, alloBD may be accepted to donate exclusively red blood cell concentrates (RBC-C) depending on AB titer in donor's plasma. However, recovered fresh frozen plasma (FFP) of such donors will be discarded. Alternatively, alloBD may be excluded from blood donation at first place. We investigated the fate of AB in BP donated by alloBD using classical serology techniques.

**Methods:** Between 2000 and 2004, 118 donations were given by alloBD and contained AB which were specified and semiquantified by titration in the respective BP applying commercially available test cell panels and standard gel technique, resp. All tests were performed in low-ionic-strength solution (LISS) environment and by application of indirect antiglobulin test (IAT). Processing of donated whole blood (WB) into BP for transfusion was performed following standard methods in compliance with the prescriptions of Swiss Red Cross.

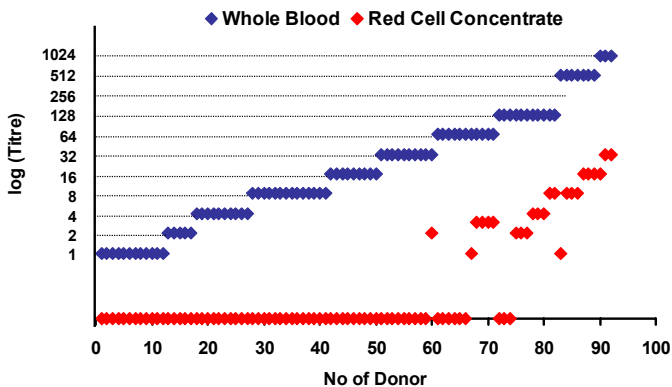
## Results I

92/118 (77,9%) donations contained AB titre  $\geq 1$  and were suitable for comparative study. Figure 1 shows the specificities of AB found. AB titre  $\geq 1$  in WB compared with AB titre in the corresponding RBC-C is shown in Figure 2.

**Figure 1: Specificity of antibodies in 92 blood donors with AB titre  $\geq 1$  in donated whole blood**

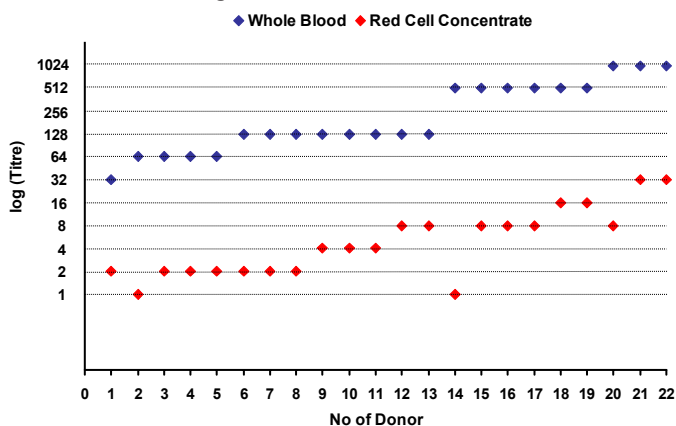


**Figure 2: Comparison of AB titre in whole blood and in the corresponding RBC-C (n=92)**



Allo AB with titre  $\geq 32$  in blood donor's WB lead to 22 RBC-Cs containing residual alloAB of reduced titre by 5-6 titre levels (Figure 3). WB donations with AB titre =32 resulted in 1/11 (9%) RBC-C containing residual alloAB. In contrast, if the AB titre was 128, 8/11 (73%) of RBC-C contained alloAB, and if the titre was 512, 7/7 (100%) RBC-C contained alloAB, resp. (Figure 2). Overall, 76/118 (64%) of alloBD carried AB titer  $< 32$  and provided alloAB free RBC-Cs.

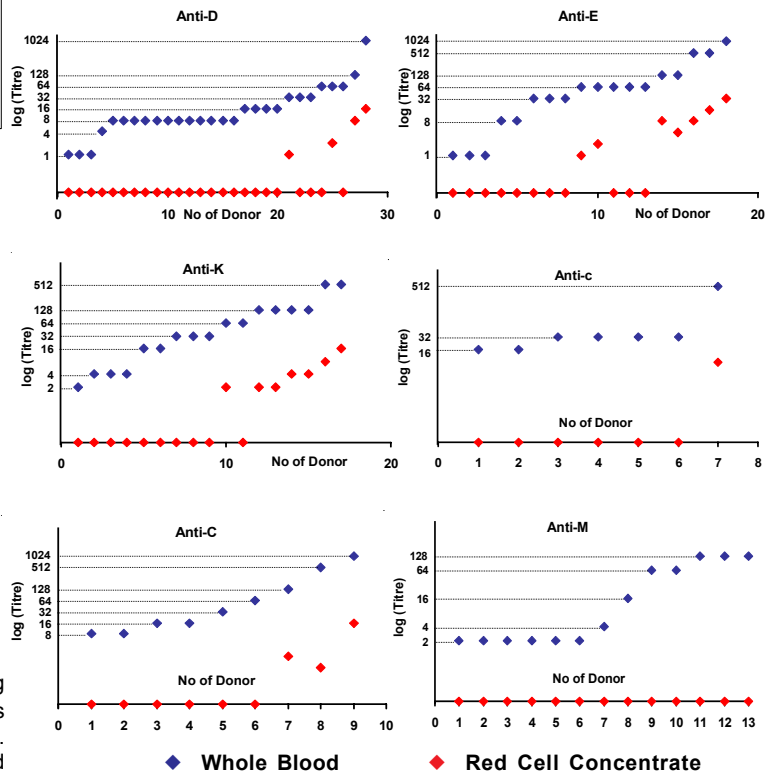
**Figure 3: Comparison of AB titre in whole blood and RBC-C containing residual alloantibodies**



## Results II

IgG alloAB (e.g. Anti-D, -K) up to titre =16 in WB were completely absent in leukoreduced (filtered) RBC-C. IgG alloAB with titre  $> 32$  were only partially removed by the BP manufacturing process. In contrast, IgM antibodies (Anti-M) were completely removed from RBC-C independent of alloAB titre in donor's WB. Figure 4 shows the diminution of AB titre in the respective RBC-C depending on AB specificity and its titre in donated WB.

**Figure 4: Diminution of AB titre in RBC-C depending on AB specificity**



## Conclusions

1. AB of alloBD are substantially diminished by manufacturing process of RBC-C. In contrast, the concentration of AB will not be altered in plasma-containing BP donated by alloBD (data not shown).
2. For RBC-C, the AB titre will be diminished by 5-6 titre levels independent of AB specificity. However, Anti-M will be depleted completely regardless of AB titre in WB.
3. A threshold AB titre of  $\leq 32$  can be considered as donor eligibility criteria for alloBD. However, in any case, recovered FFP of such donors has to be discarded.
4. By these selection criteria, 30-40% of alloBD will have to be deferred permanently from blood donation.
5. AlloBD should not be accepted for platelet donation, since the product's high plasma content will constitute similar AB titre in the platelet concentrate as it is found in donor's plasma.