**HDFN TECHNICAL CASE #1, ANSWERS**
Case study by Jim Perkins, M.D. (© 2009)

Indian Immunohematology Initiative

1. Is the antibody identification of the outside laboratory confirmed? If not, what is the phenotype of the additional cells you would like to test?

   *If we can assume that the 2 screening cells were $Fy^a$ positive the anti-$Fy^a$ is confirmed and antibody identification is complete (3 $Fy^{a+}$ cells reactive, 3 $Fy^{a-}$ cells non-reactive, "everything" else is ruled out, patient is $Fy^{a-}$).*

2. Does this antibody cause hemolytic transfusion reactions?

   *Yes, including a "few" fatal reactions cited by Daniels (Human Blood Groups, 3rd ed., 2013.)*

   Hemolytic disease of the fetus and newborn (HDFN)?

   *Yes, including 2 cases requiring intrauterine transfusion (Daniels, ibid.)*

3. What is the titer? Is anti-$Fy^a$ of this titer likely to cause anemia in the fetus?

   *The titer, according to our criteria, is 4, measured as the reciprocal of the last dilution at which a macroscopic reaction is seen with a single dose titering cell. Although there are multiple case studies of HDN due to this and other blood group antibodies which include the mother's antibody titer, such reports frequently do not include the conditions under which the titer was performed (e.g. incubation times, phenotype of titering cell), and definitive studies are lacking due to the infrequency of affected cases. In the absence this knowledge the critical titer for significant in utero HDN is often assumed to be 16. Another reason for concern might be a rapid rise in titer.*

4. What is the probable immunizing stimulus in this case?

   *She was transfused at age 8. If the fetus were $Fy^a$ positive an anamnestic reaction due to fetal RBCs leaking into the maternal blood could have boosted the antibody's strength, but the likelihood that this pregnancy is the entire cause of the antibody is low.*

5. Is there any further testing that could be performed to evaluate the possibility of HDFN? (Hint: could the fetus be antigen negative?)

   *Assuming her immunization derived from a source other than a pregnancy with her current partner, it is possible that he is $Fy^a$ negative and cannot father a $Fy^a$ positive child. Therefore, one might determine his Duffy phenotype. If the father of this pregnancy could transmit a $Fy^a$ allele to the fetus, or if this fact were unknown, most laboratories would perform serial titers of the mother's antibody and intervene with more specific invasive tests if the titer increased significantly.*

6. What percentage of Caucasian donors are expected to be compatible with this recipient? *34%*
   African-American donors? *90%*

**Follow-up testing:**

A specimen was drawn from the patient's husband for determination of his Duffy phenotype. He was $Fy^a$ neg, $Fy^b$ pos. No further titration was performed.