Answers:

1. The correct answer is **D.** This is an anti-M antibody demonstrating a dosage effect. Antibodies of this type react more strongly with red blood cells that are homozygous expressers of the M antigen (i.e. M-positive and N-negative) and less strongly (or not at all) with those red blood cells that are heterozygous expressers of the M antigen (i.e. M-positive and N-positive). The M and N antigens are co-dominant alleles of the glycophorin A gene.

2. The correct answer is **E.** Anti-M antibodies are characteristically pH-dependent, demonstrating enhanced reactivity in serum to which a weak acid is added. These antibodies are also predominantly IgM. As such, they characteristically demonstrate enhanced reactivity in colder temperatures (e.g. room temperature or 4°C). Anti-M antibodies demonstrating a dosage effect can also be more definitively identified by testing patient serum or plasma against additional reagent red blood cells with homozygous expression of the M antigen. Finally, anti-M reactivity can be abrogated with the use of enzyme-treated red blood cells, as the glycoprotein carrying the M antigen is destroyed by enzyme treatment.

3. The correct answer is **A.** The glycophorin A molecule carries either the M or N blood group antigen. Glycophorin B carries the S or s blood group antigen. Glycophorin C and glycophorin D carry the antigens of the Gerbich blood group system.

4. The correct answer is **D.** Anti-M antibodies are a complex mixture of IgG and IgM isotypes, but the IgM component almost always predominates. As such, these immune responses are predominantly cold-reactive, naturally occurring (i.e. do not require exposure to the antigen in the context of red blood cells- as with pregnancy or transfusion) and are not generally clinically significant. Anti-M antibodies are a rare cause of both hemolytic transfusion reactions and hemolytic disease of the newborn.

5. The correct answer is **B.** Since anti-M antibodies are so rarely clinically significant, abrogated testing of the unit to be transfused is permissible. Specifically, these units should be crossmatch-compatible, but it is not necessary to assure that they are M antigen-negative by antigen-testing the unit in question. With anti-M antibodies, and other antibodies rarely shown to be clinically significant (e.g. Lewis antibodies), the crossmatch alone has been shown to be an excellent predictor of transfusion safety. In the case of this patient's antibody, such an approach might result in the transfusion of a unit with heterozygous expression of the M antigen (since the patient's antibody does not react with reagent red blood cells with heterozygous expression of the M antigen). Nonetheless, this has not been shown to be a problematic practice with respect to hemolytic transfusion reactions. In contrast, patient's with IgG antibodies that are always considered to be clinically significant (e.g. antibodies against Rh, Kell, Duffy and Kidd blood group antigens) must always receive crossmatch-compatible units known to lack the antigen to which their antibody is directed.

