

ABO Discrepancy #7; ANSWERS

Case study by Jim Perkins, M.D. (© 2009)



1. What is the forward ABO type? If that is correct, what anomaly must one explain?

The forward type is AB, although the reactions of the patient's RBCs with anti-B appear abnormal. If this is true one must explain why the patient's plasma reacts with the group B reverse typing cell.

2. What is the reverse ABO type? If that is correct, what anomaly must one explain?

The reverse ABO type is A. If this is true, one must explain why the reagent anti-B reacted with the patient's RBCs.

3. Which of these two possibilities did the technologist investigate? What information in the type-and-screen results prompted them to do so?

This patient illustrated a number of characteristics of the acquired B phenomenon including the fact that the patient typed as A₁ (a few A₂ individuals with acquired B are described), the patient's anti-B does not react with their own acquired B cells (the DAT is negative), and donor anti-B showed varying reactivity including mixed field reactions.

Therefore, the technologist investigated the second possibility looking for evidence of the acquired B phenomenon. Of note, this is a very old problem, investigated at a time when different anti-B monoclonal typing sera were not as standardized as they are now. Five different lots of monoclonal anti-B typing sera from 4 different manufacturers' anti-B reagents gave different reactions. Today all would all be expected to be non-reactive with the patient's RBCs. Acidification of all but one anti-B typing reagents eliminated the reaction with the patient's cells.

The history of chronic infection is consistent with the acquired B phenomenon. Colon cancer is classically associated with acquired B, but 30-40% of cases are NOT associated with GI diseases.

4. What is the serologic diagnosis?

Acquired B phenomenon

5. What is the biochemical explanation for the discrepancy?

Acquired B is thought to be due to bacterial deacetylases which convert the group A immunodominant sugar N-acetylgalactosamine to galactosamine. This sugar is apparently similar enough to galactose, the B immunodominant sugar, that some clones of anti-B will react with it. Reactions of anti-B are decreased or eliminated by acidification, presumably because the amino group(-NH₂) of galactosamine is converted to NH₃⁺ which eliminates reactivity with anti-B clones which would otherwise react with the deacetylated A antigen.