1. **Principle**

Group A1 RBCs may acquire B-like antigens in vivo by the action of bacterial deacetylases that convert alpha-N-acetylgalactosamine (blood group A immunodominant sugar) into galactosamine. The latter is sufficiently similar to alpha-galactose (group B immunodominant sugar) as to cross-react with human anti-B reagents. These acquired B-antigens are extremely susceptible to changes in pH and are not detectable with human anti-B at pH 6.0, in contrast to normal B antigens.

1. **Scope and Related Policies**
   1. The ABO group shall have been determined by testing the patient’s red cells with anti-A and anti-B reagents. See RT.004 – ABO Grouping.
   2. The patient’s plasma shall have been tested with A1 and B reagent red cells. See RT.004 – ABO Grouping.
   3. Any discrepancy should be investigated and resolved with appropriate documentation before issuing red cells. See NRT.003 – ABO Discrepancies.
   4. All reagents shall be used and controlled according to the supplier’s recommendations and procedures and the CSTM Guidelines.
   5. If a discrepancy is detected and transfusion is necessary before resolution, only group O red cells shall be issued.
2. **Specimens**

EDTA anticoagulated whole blood

1. **Materials**

**Equipment:** Serological centrifuge

Block for test tubes

**Supplies:** Test tubes 10 x 75 mm

Serological pipettes

**Reagents:** Normal Group B donor cells

Anti-B commercial antisera (not monoclonal) **or**

Plasma from a known Group A donor

1 N HCI (0.1mL 12N HCI in 1.1 mL saline)

1. **Quality Control**
   1. See QCA.001 – Quality Control of Reagent Red Cells and Antisera.
2. **Procedure**

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| --- | --- |
| * 1. Perform a patient history check. See PA.003 – Patient History Check. Review the results of the initial ABO grouping tests. | |
| * 1. Label two tubes, one with the first 3 letters of patient’s family name and the other with ‘Norm B cell’. Add an aliquot of red cells to the appropriately labeled tube. Wash cells three times with normal saline, prepare a 3% saline suspension. | |
| * 1. Prepare acidified antisera. | * + 1. Mix 0.1 mL of 1N HCI with 0.9 mL of anti-B. Check the pH and if necessary adjust to 6.0 with additional 1N HCI. |
| * + 1. Label the tube ‘acidified anti-B’. |
| * + 1. Add an aliquot of anti-B to a second tube and label as ‘untreated anti-B’. |
| * 1. Label 4 10 x 75 mm tubes * Acid-B + Patient (first three letters of the patient’s family name) * Acid-B + Norm B cell * Norm-B + Patient (first three letters of the patient’s family name) * Norm-B + Norm B cell | |
| * 1. Add 1 drop of 3% patient red cell suspension to each of the tubes labeled with the patient’s name. Add 1 drop of 3% normal B cell suspension to each of the tubes labeled Norm B cell. | |
| * 1. Add 2 drops of acidified anti-B to the two tubes labeled Acid -B and 2 drops of untreated anti-B to the two tubes labeled Norm –B. | |
| * 1. Mix contents of tubes. | |
| * 1. Centrifuge all tubes at 3400 rpm for 10-15 seconds. | |
| * 1. Mix gently and examine macroscopically for agglutination. | |
| * 1. Grade and record the results. | |
| * 1. Incubate tubes at room temperature for 1 hour. | |
| * 1. Centrifuge all tubes at 3400 rpm for 10-15 seconds. | |
| * 1. Mix gently and examine macroscopically for agglutination. | |
| * 1. Grade and record the results. | |
| * 1. Interpret ABO grouping. See 7.0 – Reporting. | |
| * 1. Verification of results must be recorded either manually or in the computer. | |

1. **Reporting**
   1. Hemagglutination tests for patients with acquired-B antigen should react as follows:

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| --- | --- | --- |
| Acid Anti-B | Normal Anti-B | Interpretation GROUP |
| **Patient Cells** | |  |
| Neg | Pos | A |
| **Normal B Cells** | |  |
| Pos | Pos | B |

Acquired-B cells do not react with acidified anti-B, normal group B cells do.

1. **Procedural Notes**
   1. Acquired-B was first described in 1959 when 7 group A individuals where found to have acquired the B antigen in vivo. Since then numerous similar cases have been reported. The phenomenon is often associated with carcinoma and with massive infections of the gut.This is a rare condition where group A antigen sites are transformed by bacterial enzymes, resulting in B-like activity when tested with anti-B. The reactions obtained with the anti-B sera are usually weaker than the reactions obtained with the anti-A, and the auto control is negative. This transformation is sometimes seen in group A1 patients who have carcinoma of the colon or inflammatory bowel disease, septicemia, etc.
   2. Acquired-B has not been reported in patients who type as A2.
   3. When group A1 cells are transfused to a patient with acquired-B, they will also acquire the B antigen. As expected, Group O cells are unaffected. The patient’s plasma does not react with their own, or other, acquired-B cells.
   4. Acquired B antigen is not detected when monoclonal anti-sera are used.
2. **References**
   1. Judd, WJ ed. Judd’s Methods in Immunohematology, 3rd ed., Bethesda, MD: pg. 577-579.
3. **Revision History**

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| **Revision Date** | **Summary of Revision** |
| September 1, 2014 | * Revised name of manual * Changed RT.001 to RT.004 in sections 2.1 & 2.2 * Revised wording in section 6.0 * Added section 8.4 “Acquired B antigen is not detected when monoclonal anti-sera are used.” |