1. **Principle**

The antibody identification test is used to identify immune A or B antibodies.

In this gel test, A and B red blood cells in a hypotonic saline solution are combined with patient plasma to allow antigen/antibody interaction in the upper chamber of the microtube. The cards are then incubated to enhance antigen/antibody interaction and if cells become sensitized, the sensitized red cells will react with the Anti-IgG incorporated in the gel of the microtube during centrifugation Agglutination indicates the presence of an antigen/antibody reaction while lack of agglutination indicates no antigen/antibody reaction. No agglutination indicates the phenotype for the particular antigen tested to be negative, whereas agglutination indicates the phenotype to be positive. The inclusion of an autocontrol facilitates recognition of the presence of autoantibodies in the plasma sample being tested.

1. **Scope and Related Policies**
   1. A high percentage of group O mothers will have an IgG immune form of anti-A and/or Anti-B. If the baby is group A or B there is a possibility of hemolysis due to these antibodies which are able to cross the placenta. When an ABO incompatibility is identified between a Group O mother and her baby a routine screen should be performed for maternal anti-A or anti-B.9.1
   2. Known adult A1, B and O cells are tested to exclude the presence of immune A/B.
   3. The following cells will be used to determine the presence of Immune A/B in the following patient categories:

|  |  |
| --- | --- |
| Materials | Cells |
| Group O | A, B, O |
| Group A | B, O |
| Group B | A, O |

1. **Specimens**

EDTA anticoagulated whole blood drawn within 14 days of testing is the preferable sample although serum can be used.

Cord blood serum may also be used.

Hemolyzed and grossly icteric specimens may cause difficulty in interpretation. See Procedure Notes 8.7

Grossly lipemic specimens containing particles that clog the gel, as indicated by diffuse blotches of red cells, may be clarified by centrifugation or filtration and re-tested.

1. **Materials**

**Equipment:** Centrifuge

Incubator

Pipettor

Dispenser

Set-up workstation, optional

Serologic centrifuge

**Supplies:** Pipette tips

Test tubes – 10 x 75 mm

Serologic pipettes

Package insert

**Reagents:** MTS Anti-IgG Card, Anti-IgG (Rabbit) suspended in gel

Adult A1, B and O cells, 3%, to be prepared in-house for

use in MTS Anti-IgG Gel testing (reagent reverse

grouping cells and a group O Screen cell may be used)

MTS Diluent 2, a hypotonic saline solution (for in-house preparation only)

Saline

Do not use beyond expiration date. Store cards at 2 to 25°C. Store diluent and red cells at 2 to 8°C. Bring reagents to room temperature (18 to 25°C) prior to use.

1. **Quality Control**
   1. To recognize reagent deterioration, the reagents must be tested on day of use with appropriate controls.
   2. False positive or false negative results may occur from bacterial contamination of test materials. MTS Diluent 2™ must be visually checked to ensure that the liquid is not discolored, turbid or showing any signs of bacterial contamination.
   3. To confirm the specificity and reactivity of the MTS Anti-IgG Card™, it is recommended that each lot be tested on each day of use with known positive and negative samples with the appropriate red cell. Reactivity must be present with the positive sample only.
   4. Do not freeze or expose cards to excessive heat. Store upright at 2 to 25°C. If the cards have not been stored in an upright position, centrifuge the cards before use.
   5. Do not use cards that show signs of drying. A liquid layer should appear on top of the gel in each microtube.
   6. Do not use cards in which the microtubes show discoloration, bubbles or crystals.
   7. Do not use the microtube cards where the seal to the microtube appears to be damaged or opened.
   8. Do not remove the foil seal to the microtubes until ready to use.
   9. The manufacturer recommends that, following centrifugation, results should be read immediately. Results may be affected by drying of the gel, hemolysis of the red cells and slanting of the reaction patterns due to storage in a non-upright position.
2. **Procedures**

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| * 1. Cell Preparation | * + 1. Label test tubes for A, B and O cells. |
| * + 1. With an appropriate pipette, dispense one (1) volume (suggested minimum 100μL) of each cell sample to its appropriately labeled tube. Add a small volume of MTS Diluent 2™ to each test tube for volume. |
| * + 1. Centrifuge for one (1) minute to pack the red blood cells. |
| * + 1. Decant the supernatant (a dry cell button is recommended) and then add two (2) volumes of MTS Diluent 2™ (200μL if the initial volume were 100μL) to each tube. |
| * + 1. Mix gently. Final cell suspensions should be approximately 0.8% and stable for 24 hours. For best results, suspensions should not be less than 0.6% or exceed 1.0%.   **Note**: The preparation of a small volume of a 0.8% red cell suspension has been modified to best target 0.8%, within a range of 0.6-1.0%. |
| * 1. Antibody Identification Test Procedure | * + 1. Label the MTS Anti-IgG Cards™ with the appropriate identification and test information. |
| * + 1. Remove the foil seal from the microtubes to be used.   **Note**: Foil should be removed immediately before testing or within one hour of testing. Once opened, the gel may begin to dry out which could affect test results. Ensure that residual foil does not block the opening of any microtube after removal of the foil. |
| * + 1. Using an appropriate pipette, add 50μL of each 0.8% antibody panel cell suspension of cells to be tested (A, B, O) and the 0.8% autocontrol suspension to the correct microtubes. Do not touch pipette to Gel card. |
| * + 1. Using an appropriate pipette, add 25μL of serum or plasma to the correct microtubes. |
| * + 1. Incubate at 37±2ºC for 15 minutes. Refer to instruction for use for comment on extending incubation times. See Procedure Note 8.9 |
| * + 1. Centrifuge the gel cards at the preset conditions of 895±25 rpm for 10 minutes. |
| * + 1. After centrifugation, remove the card(s) from the centrifuge and observe each card for the following signs: * Unagglutinated red cells observed in the gel are usually caused by an interrupted centrifuge cycle. These red cells will appear dark pink and hazy * A line of red cells streaming down one side and forming a “J” appearance is caused by improperly seated card in the card holder. * If the card(s) show a sign of improper centrifugation, repeat the test. Do not recentrifuge the card(s) |
| * + 1. Read the front and the back of each microtube. |
| * + 1. Record reactions from the chart below.  |  |  | | --- | --- | | **Grade** | **Description of Reaction\*** | | Neg | Unagglutinated red blood cells form a well-defined button at the bottom of the microtube. See Procedural Notes 8.1 if a few unagglutinated cells are trapped at the top or sides of the gel. | |  | No W in updated guide | | 1 | Agglutinates predominantly observed in the lower half of the microtube. Unagglutinated red cells form a button in the bottom of the microtube. | | 2 | Agglutinates dispersed throughout the length of the gel column. A few unagglutinated cells may be observed in the bottom of the microtube. | | 3 | Majority of agglutinates trapped in the upper half of the microtube. | | 4 | A solid band of red cell agglutinates on top of the gel. A few agglutinates may filter into the gel, but remain near the predominant band. | | H | Hemolysis with few or no red cells in the gel. Report if hemolysis is present in the microtube but not in the specimen. | | mf | A band of red cell agglutinates at the top of the gel or dispersed throughout the gel, accompanied by unagglutinated cells in the bottom of the microtube. | | NT or ND | Not tested or not done |   Do not use half grade, superscript or “plus signs”  See the discussion section of each grading in the MTS Interpretation Guide for more information on grading. |

1. **Reporting**
   1. Agglutination of any of the cells in the gel card indicates the presence of an antibody directed against the corresponding antigen that is present on that reagent cell sample.
   2. No agglutination of the test cells in the gel card is a negative result and indicates the absence of an antigen/antibody reaction.
   3. Hemolysis in the absence of a hemolyzed sample of any of the red cells in the gel card indicates the presence of an antibody.
   4. Identification of the antibody present in the plasma or serum may be made by matching the reactions obtained with the A, B and O cells.
   5. The result of the immune antibody screen is reported as “Immune maternal anti-A or anti-B present”.
2. **Procedural Notes**
   1. Interpretation of mixed-field reactions must be done with caution. The presence of fibrin, clots or particulates may result in some cells layering at the top of the gel. Mixed-field reactions are generally only observed in tests containing a dual population of red cells, such as a transfused patient, bone marrow recipient or when a pooled cell sample is used for testing. However, not all mixed cell situations have a sufficient minor population to be detected.
   2. Too few or too many cells in the microtube may cause false positive or false negative reactions. This may be due to one or both of the following errors:
      1. Improperly prepared cell suspension.
      2. Adding the incorrect quantities of cells to the upper chamber.
      3. In this case repeat the test(s) ensuring correct quantities using new cell suspensions.
   3. Rouleaux is a property of test plasma or serum resulting in a characteristic pattern of red cell aggregation. It can occur if sufficient quantities of abnormal proteins are present in the test sample and may infrequently cause difficulties in gel test interpretation. Rouleaux must be confirmed using tube hemagglutination methods and saline replacement performed when necessary.
   4. Red cells present in the gel and hemolysis in the liquid portion is usually due to a hemolyzed specimen. In this case, hemolysis should not be reported as a positive test result. If hemolysis occurs during centrifugation, the liquid portion above the gel will appear pink or red but there will be few or no cells in the gel.
   5. False positive or false negative test results can occur from bacterial contamination of test materials, inadequate incubation time or temperature, improper storage of materials.
   6. False-positive results may occur in gel cards showing signs of drying.
   7. Addition of cells and plasma
      1. Red cell suspension should be added before the plasma because the volume of red cell suspension is greater than the volume of plasma. Insufficient mixing may occur if the smaller volume of plasma is added before the red cell suspension.
      2. Plasma should be added within 10-15 minutes of adding the red cell suspension to the reaction chambers. Any red cells that come in contact with the gel column prior to centrifugation may not have the opportunity to come in contact with the plasma and may begin to migrate through the gel potentially giving a weaker reaction after centrifugation.
   8. Incubation times in low ionic strength solutions between 5 – 40 minutes have been recommended in the literature. No single incubation time will be optimal for all antibodies. If the incubation time is changed from the manufacturer’s recommendation, validation studies are required.
   9. There is the potential for IgM antibodies to react in this test. Some patient antibodies that are IgM in nature may react with corresponding antigens in the upper portion of the microtube and be trapped in the top portion of the gel at the time of centrifugation resulting in a positive reaction.
   10. Adherence to the manufacturer’s instruction for use is critical to test performance.
   11. Antibodies below the threshold level may not be detected by this test.
   12. False-positive results may occur if antibodies to components of the preservative solution are present in the serum tested.
   13. Anti-IgG may occasionally fail to detect antibodies that are demonstrable by the use of antiglobulin reagents that contain anti-C3.
   14. Anomalous results may be caused by fresh serum, fibrin or particulate matter in serum or plasma, or red cells that stick to the sides of the microtube. Use of EDTA plasma will minimize this problem.
3. **References**
   1. CSTM Stds , Version 3 February 2011; 5.9.2.4
   2. Roback JD, ed. American Association of Blood Banks Technical Manual, 17th ed. Bethesda, MD: American Association of Blood Banks, 2011:639
   3. ID-Micro Typing SystemTM Interpretation Guide-2010-06-04
   4. INSTRUCTIONS FOR USE Anti-Human Globulin Anti-IgG (Rabbit) MTS™ Anti-IgG Card, Version 2.0
4. **Revision History**

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| **Revision Date** | **Summary of Revision** |
| April 30, 2014 | * Revised name of manual * Changed document number from GM. 009 to GM. 010 * Revised wording of section 1.0 * Specified that the preferred sample is EDTA anticoagulated whole blood within 14 days of collection in section 3.0 * Revised wording to include “See Procedure Notes 8.7” in section 3.0 * Renumbered section 5.0 * Revised and renumbered sections 6.0, 7.0 and 8.0 * Revised list of references |