BLOOD GROUPING REAGENT
Anti-D *blend*
ALBAclone®
(Human/Murine Monoclonal IgM/IgG Blend)
For Slide and Tube Techniques

REF **Z041U**

- **FOR *IN VITRO* DIAGNOSTIC USE**
- **Meets FDA potency requirements**
- **Discard if turbid**
- **Preservative: 0.1% (w/v) sodium azide**

CAUTIONS: THE ABSENCE OF ALL VIRUSES HAS NOT BEEN DETERMINED. THIS PRODUCT HAS COMPONENTS (DROPPER BULBS) CONTAINING DRY NATURAL RUBBER.

INTERPRETATION OF LABELING SYMBOLS

LOT	Batch code
	Use by (YYYY-MM-DD)
REF	Product code
8°C 2°C	Storage temperature limitation (2-8 °C)
IVD	*in vitro* diagnostic medical device
www.quotientbd.com	Consult instructions for use
	Manufacturer

INTENDED USE

This Anti-D reagent is for the *in vitro* detection and identification of human RhD blood group status in donor samples by the indirect antiglobulin test, and in patient samples by direct agglutination, and the indirect antiglobulin test if desired.

SUMMARY AND EXPLANATION

First described in 1939, the RhD antigen is surpassed in importance only by the antigens of the ABO blood group system. Transfusion of RhD positive blood to an RhD negative recipient or failure to administer prophylactic Anti-D to an RhD negative woman can result in the production of Anti-D. Consequently, establishing the correct RhD group is fundamental to safe transfusion practice. Certain individuals exhibit a quantitative reduction in the expression of their RhD antigen and are categorized as weak D (D^u). Others display a qualitative variation in RhD antigen expression and are referred to as partial RhD. Weak D individuals may also be partial RhD.

This monoclonal Anti-D reagent will directly agglutinate red blood cells from most weak D and partial RhD except DVI and, therefore, is suitable for RhD grouping of patient samples. This reagent will also detect DVI and weak D by IAT and, therefore, is also suitable for RhD grouping of donor samples.

PRINCIPLE OF THE TEST

When used by the recommended techniques, this reagent will cause agglutination (clumping) of red blood cells carrying the RhD antigen. Lack of agglutination demonstrates the absence of the RhD antigen.

REAGENT DESCRIPTION

The main component of this reagent is derived from the *in vitro* culture of the IgM/IgG secreting human/mouse heterohybridomas:

Product Name	Product Code	Cell Line
Anti-D *blend*	Z041U	LDM3/ESD1

The formulation also contains bovine material, potentiators, EDTA and 0.1% (w/v) sodium azide.

NOTE: The volume delivered by the reagent bottle dropper is approximately 40 µL. Care should be taken to ensure that appropriate serum to cell ratios are maintained in all test systems.

WARNINGS AND PRECAUTIONS

For *in vitro* diagnostic use only
Products should be used by qualified personnel
Do not use beyond the expiration date
Do not use if turbid
Do not dilute
The format of the expiration date is expressed as YYYY-MM-DD (Year-Month-Day)

This reagent contains 0.1% (w/v) sodium azide. Sodium azide may be toxic if ingested and may react with lead and copper plumbing to form explosive compounds. If discarded into a sink, flush with a large volume of water to prevent azide buildup.

This reagent is of animal origin (murine and bovine), therefore care must be taken during use and disposal as there is a potential infection risk.

CAUTION: ALL BLOOD PRODUCTS SHOULD BE TREATED AS POTENTIALLY INFECTIOUS. SOURCE MATERIAL FROM WHICH THIS PRODUCT WAS DERIVED WAS FOUND NEGATIVE WHEN TESTED IN ACCORDANCE WITH CURRENT FDA REQUIRED TESTS. NO KNOWN TEST METHODS CAN OFFER ASSURANCE THAT PRODUCTS DERIVED FROM HUMAN BLOOD WILL NOT TRANSMIT INFECTIOUS AGENTS.

The bovine material used in the manufacture of this reagent was collected in a USDA approved facility.

Monoclonal antibodies exhibit a high degree of potency, avidity and specificity. When using such antibodies, great care should be taken to avoid cross contamination.

This product has components (dropper bulbs) containing dry natural rubber.

STORAGE

The reagent should be stored at 2-8 °C.

SPECIMEN COLLECTION AND PREPARATION

Specimens should be collected by a standard collection technique. The specimen should be tested as soon as possible after collection. If testing is delayed, the specimen should be stored at refrigerated temperatures.

Clotted samples or those collected in EDTA should be tested within fourteen days from collection. Donor blood may be tested until the expiration date of the donation.

Special care should be taken if hemolyzed samples must be tested. Grossly icteric or contaminated blood specimens should not be used.

MATERIALS

Material provided
- ALBAclone® Anti-D *blend*

Materials required but not provided
- Isotonic saline
- Reagent red blood cells suitable for the control of Anti-D
- Polyspecific Anti-Human Globulin/Monospecific Anti-Human IgG
- IgG sensitized red blood cells
- 10 x 75 mm or 12 x 75 mm glass test tubes
- Pipets
- Optical aid (optional)
- Centrifuge
- Glass slides (optional)
- Timer
- Heating block/waterbath

PROCEDURES

General Information
NOTE: This reagent has been standardized for use by the techniques described below and therefore its suitability for use by other techniques cannot be guaranteed.

When a test is required to be incubated for a specific time period, a timer should be used.

It is recommended to allow reagents to reach 20-24 °C prior to use.

When using supplemental testing equipment (i.e. centrifuge), follow the procedures that are contained in the operator's manual provided by the device manufacturer.

For routine typing of patient samples, the tube technique with immediate spin, or 15-20 minute incubation/spin, should be used. If the detection of weak D, or Rh DVI red blood cells is required, the 15-20 minute incubation/spin technique followed by IAT should be used.

Tube Technique - Immediate Spin
1. Prepare a 2-4% suspension of red blood cells in isotonic saline solution (Reagent red blood cells may be used directly from the vial or according to the manufacturer's instructions).
2. Add 1 drop of blood grouping reagent to a glass test tube.
3. Add 1 drop of red blood cell suspension. Steps 2 and 3 may be performed in either order.
4. Mix the contents of the test tube and centrifuge.
   NOTE: Suggested centrifugation: 900-1000 g (approx. 3400 rpm) for 10 seconds or a time and speed appropriate for the centrifuge used that produces the strongest reaction of antibody with antigen-positive red blood cells, yet allows easy re-suspension of antigen-negative red blood cells.
5. After centrifugation, gently shake the tube to dislodge the cell button from the bottom and immediately observe macroscopically for agglutination. Negative reactions may be examined with an optical aid.
6. Record results.

NOTE: If detection of weak D or DVI is required proceed as follows. The test tubes read above may be further tested beginning with step 4 of the IAT technique, or step 4 of the 15-20 minute incubation technique.

Tube Technique – 15-20 Minute Incubation/Spin
1. Prepare a 2-4% suspension of red blood cells in isotonic saline solution (Reagent Red Blood Cells may be used directly from the vial or according to the manufacturer's instructions).
2. Add 1 drop of blood grouping reagent to a glass test tube.
3. Add 1 drop of red blood cells suspension. Steps 2 and 3 may be performed in either order.
4. Mix the contents of the test tube and incubate at 37 ± 1 °C for 15-20 minutes.
5. Centrifuge the test tube.
   NOTE: Suggested centrifugation: 900-1000 g (approx. 3400 rpm) for 10 seconds or a time and speed appropriate for the centrifuge used that produces the strongest reaction of antibody with antigen-positive red blood cells, yet allows easy re-suspension of antigen-negative red blood cells.
6. After centrifugation, gently shake the tube to dislodge the cell button from the bottom and immediately observe macroscopically for agglutination. Negative reactions may be examined with an optical aid.
7. Record results.
8. Proceed to step 8 of the Indirect Antiglobulin Test, if IAT is required.

Indirect Anti-Human Globulin Test
1. Prepare a 2-4% suspension of red blood cells in isotonic saline solution (Reagent red blood cells may be used directly from the vial or according to the manufacturer's instructions).
2. Add 1 drop of blood grouping reagent to a glass test tube.
3. Add 1 drop of red blood cell suspension. Steps 2 and 3 may be performed in either order.
4. Mix the contents of the test tube and incubate at 37 ± 1 °C for 15-30 minutes.

Optional Steps
5. **Centrifuge the test tube.**
   NOTE: Suggested centrifugation: 900-1000 g (approx. 3400 rpm) for 10 seconds or a time and speed appropriate for the centrifuge used that produces the strongest reaction of antibody with antigen-positive red blood cells, yet allows easy re-suspension of antigen-negative red blood cells.
6. **After centrifugation, gently shake the tube to dislodge the cell button from the bottom and immediately observe macroscopically for agglutination.**
7. **Record results.**
8. Wash the test 3-4 times with a large excess of isotonic saline (e.g. 4 mL of saline per 10 (or 12) x 75 mm glass test tube).
   NOTE: (i) allow adequate spin time to sediment the red blood cells.
   (ii) make sure that the residual saline is removed at the end of each wash.
9. Add 2 drops of Anti-Human Globulin reagent to each test tube, or follow directions of the Anti-Human Globulin manufacturer.
10. Mix the contents of the test tube and centrifuge.
    NOTE: Suggested centrifugation: 900-1000 g (approx. 3400 rpm) for 10 seconds or a time and speed appropriate for the centrifuge used that produces the strongest reaction of antibody with antigen-positive red blood cells, yet allows easy re-suspension of antigen-negative red blood cells.
11. After centrifugation, gently shake the tube to dislodge the cell button from the bottom and immediately observe macroscopically for agglutination. Negative reactions may be examined with an optical aid.
12. Record results.
13. The validity of all negative tests should be confirmed using IgG sensitized reagent red cells.
    a. Add 1 drop of IgG sensitized reagent red blood cells to each negative antiglobulin test.
    b. Mix the contents of the test tube well and centrifuge.

NOTE: Suggested centrifugation: 900-1000g (approx. 3400 rpm) for 10 seconds or a time and speed appropriate for the centrifuge used that produces the strongest reaction of positive tests, yet allows easy re-suspension of negative tests.

c. After centrifugation, gently shake the tube to dislodge the cell button from the bottom and immediately observe macroscopically for agglutination.
d. Any test which does not show a positive reaction should be considered invalid and repeated.

Slide Technique

1. Add 1 drop of blood grouping reagent to an appropriately prepared area of a glass slide e.g. a wax pencil oval.
2. Add 1 drop of whole blood or 1 drop of red blood cells suspended to approximately 30-45% in group homologous plasma/serum.
3. Mix by rocking the slide for approximately 30 seconds and incubate the test at 18-24 °C for 5 minutes with occasional mixing.
4. After incubation, immediately observe macroscopically for agglutination. This may be facilitated by reading over a diffuse light source.
5. Record results.

Refer to Performance Limitations section for additional guidance on the use of this product.

STABILITY OF REACTION

Test results should be read, interpreted and recorded immediately after centrifugation. Delays may cause dissociation of antigen-antibody complexes resulting in weak positive or false negative reactions.

INTERPRETATION OF RESULTS

Agglutination	=	positive test result
No agglutination	=	negative test result

QUALITY CONTROL

Quality control of reagents is essential and should be performed on each day of use and in accordance with local, state and federal regulations.

RhD(+) red blood cells should be used as a positive control. Suggested phenotype, R_1r.
RhD(-) red blood cells should be used as a negative control. Suggested phenotype, rr.

All negative antiglobulin tests should be controlled using IgG sensitized reagent red blood cells. A positive result indicates the presence of active anti-IgG. A negative result should be considered invalid and repeated if necessary.

PERFORMANCE LIMITATIONS

Some very weak D and/or partial RhD samples may not react with monoclonal Anti-D reagents.

This reagent is potentiated to aid in the detection of weak D and partial D. Very weak agglutination detected at immediate spin ($\leq$1+) should be incubated and read after 37 °C incubation (at minimum) or tested by the Indirect Anti-Human Globulin Test technique (preferably) prior to the final determination of the RhD type.

Certain tests performed on unwashed samples (e.g. cord), direct antiglobulin test positive samples, or samples stored and tested at below 20 °C, may exhibit false positive reactions due to the potentiators used in the formulation of this reagent. AlbaCheck Reagent Control of Anti-D (Z271U) may be used as a control reagent or alternatively by substituting 6-10% BSA in saline for the blood grouping reagent in the procedure chosen for use. If the control test gives a positive reaction, a valid interpretation of the results obtained in red blood cell testing cannot be made. A control test should always be used if a sample groups as AB RhD positive.

Slide techniques are not recommended for the detection of weakened antigen expression. If the detection of antigens exhibiting weakened or modified expression is required, negative slide tests should be confirmed by tube testing.

Any saline present after the completion of the wash phase may dilute the Anti-Human Globulin reagent beyond its optimal working concentration. Therefore, it is important to ensure that the maximum amount of wash solution is removed after each centrifugation step.

Red blood cells that are direct antiglobulin test positive should not be tested using the Indirect Anti-Human Globulin Test.

Heating blocks and waterbaths promote better heat transfer and are recommended for 37 °C tests, particularly where the incubation period is 30 minutes or less.

The expression of certain red blood cell antigens may diminish in strength during storage, particularly in EDTA and clotted samples. Better results will be obtained with fresh samples.

Gently re-suspend tube tests before reading. Excessive agitation may disrupt weak agglutination and produce false negative results.

Excessive centrifugation can lead to difficulty in re-suspending the cell button, while inadequate centrifugation may result in agglutinates that are easily dispersed.

False positive or false negative results can occur due to contamination of test materials, improper reaction temperature, improper storage of materials, omission of test reagents and certain disease states.

Suppressed or weak expression of blood group antigens may give rise to false negative reactions.

SPECIFIC PERFORMANCE CHARACTERISTICS

Prior to release, each lot of ALBAclone® Anti-D *blend* is tested using FDA recommended methods against a panel of antigen-positive and antigen-negative red blood cells to ensure suitable reactivity.

TECHNICAL NOTE

- It is important to note that monoclonal Anti-D reagents vary widely in their ability to detect both partial D and weak D.
- Patients should not be classified as D positive on the basis of a weak reaction with a single anti-D reagent. If clear positive results are not obtained with two monoclonal Anti-D reagents it is safer to classify the patient as D negative.
- Patients of category DVI are the most likely to produce anti-D.
- Reagents used to test patients for the RhD antigen should not detect category DVI, unless tested at IAT.
- Patients with known partial D status should be regarded as D negative.
- Reagents used to test donors for the RhD antigen should detect category DVI.
- Donors with known partial D status should be regarded as D positive.
- If a weak D or partial D is suspected, then further testing/investigation should be performed to determine the D status of the sample.

BIBLIOGRAPHY

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