

Anti-Human Globulin

Anti-IgG,-C3d;

Polyspecific

(Rabbit / Murine Monoclonal)

For Tube Technique

REF Z350U (Green)
REF Z351U

- **FOR IN VITRO DIAGNOSTIC USE**
- Meets FDA potency requirements
- Discard if turbid
- Preservative: 0.1% (w/v) sodium azide
- Detects C3b and/or C3d

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

INTERPRETATION OF LABELING SYMBOLS



Batch code



Use by (YYYY-MM-DD)



Product code



Storage temperature limitation (2–8 °C)



In vitro diagnostic medical device



Consult instructions for use

www.quotientbd.com



Manufacturer

INTENDED USE

Anti-Human Globulin Anti-IgG,-C3d; Polyspecific is intended for use in the direct antiglobulin test to detect the *in vivo* coating of human red blood cells with IgG and/or C3b and/or C3d components.
 Anti-Human Globulin Anti-IgG,-C3d; Polyspecific is intended for use in the indirect antiglobulin test to detect the *in vitro* coating of human red blood cells with IgG and/or C3b and/or C3d components.

SUMMARY AND EXPLANATION

The antiglobulin test was first used in blood group serology by Coombs, Mourant and Race in 1945. The serum of animals immunized with human protein was used to detect 'incomplete' antibodies bound to red blood cells. The ability of antiglobulin reagents to detect human complement components bound to red blood cells was reported by Dacie, Crookston and Christensen in 1957.

The direct antiglobulin test will detect IgG antibodies and/or complement component C3 bound to red blood cells *in vivo* in serological conditions such as the presence of autoantibodies, antibodies as a result of a transfusion reaction and hemolytic disease of the fetus and newborn.

The indirect antiglobulin test will detect, after incubation of serum or plasma with red blood cells, IgG antibodies and/or complement component C3 bound to red blood cells *in vitro* in applications including antigen typing, antibody detection, and antibody identification.

PRINCIPLE OF THE TEST

The Anti-Human Globulin Anti-IgG,-C3d; Polyspecific will cause the agglutination of red blood cells sensitized with IgG and/or coated with C3d/C3b complement components. No agglutination will be observed with uncoated red blood cells.

REAGENT DESCRIPTION

The main components of this reagent are rabbit antibody to human IgG and a murine monoclonal IgG antibody to C3d (clone number 3G8).
 The formulation also contains bovine serum albumin, 0.1% (w/v) sodium azide and Tween 80. The Z350U reagent is dyed green by the addition of patent blue and tartrazine.

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.

STORAGE

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

WARNINGS AND PRECAUTIONS

For *in vitro* diagnostic use only.
 Products should be used by qualified personnel.
 Do not use beyond expiration date.
 Do not use if turbid.
 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, therefore care must be taken during use and disposal as there is a potential infection risk. This product has components (dropper bulbs) containing dry natural rubber.

Contains material of murine origin; therefore, handle appropriately as the absence of murine viruses has not been determined.

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. Do not use blood specimens that exhibit contamination. Extreme care should be taken if hemolyzed samples must be tested. 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.

For the Direct Antiglobulin Test it is recommended that testing is performed within 48 hours for blood drawn into EDTA. Blood collected into other anticoagulants may be used (ACD, CPD, CPDA-1, CP2D, CP2D-A53). Clotted specimens should be tested prior to refrigeration to avoid *in vitro* sensitization with complement.

Indirect Antiglobulin tests should ideally be performed within 72 hours of collection. If a plasma sample is used, complement dependant antibodies may not be detected.

MATERIALS

Material provided

- Anti-Human Globulin Anti-IgG,-C3d; Polyspecific

Materials required but not provided

- Isotonic saline
- Reagent red blood cells
- Donor or patient red blood cells/serum
- C3 coated red blood cells

- IgG sensitized red blood cells
- 10 x 75 mm or 12 x 75 mm glass test tubes
- Pipettes
- Centrifuge
- Timer
- Heating block/waterbath
- Optical aid (optional)
- Potentiator of choice (optional)
 - Bovine Serum Albumin
 - LISS Additive
 - PEG

PROCEDURES

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.

Indirect Antiglobulin Test

If an enhancement medium/potentiator or a blood typing reagent is used, please refer to the manufacturer's respective instructions for use.

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 2 drops of the serum or plasma to be tested 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 well and incubate at 37 °C ± 1 °C for 30–60 minutes or according to the manufacturer's instructions if a potentiator is being used.
 5. 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 tubes.)
- 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.
6. Add 2 drops of Anti-Human Globulin Anti-IgG,-C3d; Polyspecific to each test tube.
 7. Mix the contents of the test tube well and centrifuge immediately. 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 positive tests, yet allows easy re-suspension of negative tests.
 8. 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.
NOTE: The Anti-C3 reactivity can be enhanced by incubation at 21 °C ± 3 °C for 5 minutes prior to recentrifugation. However, the results obtained following immediate centrifugation should *not* be ignored because anti-IgG reactions may be adversely affected by incubation.
 9. Record results.
 10. To all negative tests add 1 drop of IgG sensitized red blood cells and follow manufacturer's instructions. Any test which does not show a positive reaction should be considered invalid and repeated.

Direct Antiglobulin Test

1. Add 1 drop of red blood cells suspended to 2–4% in isotonic saline.
 2. 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 tube.)
- NOTE:** (i) allow adequate spin time to sediment the red blood cells.
 (ii) make sure that most of the residual saline is removed at the end of each wash.
3. Add 2 drops of Anti-Human Globulin Anti-IgG,-C3d; Polyspecific to each test tube.
 4. Mix the contents of the test tube well and centrifuge immediately. 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 positive tests, yet allows easy re-suspension of negative tests.
- 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.
NOTE: The Anti-C3 reactivity can be enhanced by incubation at 21 °C ± 3 °C for 5 minutes prior to recentrifugation. However, the results obtained following immediate centrifugation should *not* be ignored because anti-IgG reactions may be adversely affected by incubation.
- 6. Record results.
- 7. To all negative tests add 1 drop of IgG sensitized red blood cells and follow manufacturer's instructions. Any test which does not show a positive reaction should be considered invalid and repeated.

STABILITY OF REACTION

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

INTERPRETATION OF RESULTS

Agglutination of the test red blood cells in either the direct or indirect antiglobulin test indicates a positive test result with detectable IgG and/or C3d/C3b present on the surface of the red blood cells.

No agglutination of the test red blood cells in either the direct or indirect antiglobulin test indicates a negative test result with no detectable IgG and/or C3d/C3b present on the surface of the red blood cells.

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.

All negative antiglobulin tests should be controlled using IgG sensitized reagent red blood cells. A positive result indicates the presence of active anti-IgG. Tests in which negative results are obtained with this procedure should be considered invalid and repeated if necessary.

Routine quality control should confirm that the Anti-Human Globulin contains active anti-IgG and anti-C3. Anti-IgG reactivity can be checked by testing the Anti-Human Globulin reagent with IgG sensitized red blood cells.

Anti-C3 reactivity can be confirmed by testing the Anti-Human Globulin reagent with C3 coated red blood cells. Any reagent red blood cell with a negative direct antiglobulin test may be used as a negative control, if desired.

LIMITATIONS

NOTE: Any saline present after the completion of the wash phase may dilute the Anti-Human Globulin Anti-IgG,-C3d; Polyspecific 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.

Heating blocks and waterbaths promote better heat transfer and are recommended for 37 °C tests.

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.

SPECIFIC PERFORMANCE CHARACTERISTICS

Comparator Study Results

(data on file at Alba Bioscience Limited), blood samples were tested with Anti-Human Globulin Anti-IgG-C3d; Polyspecific as follows:

- Indirect Antigliobulin Test

Anti-IgG,-Anti-C3d	Comparator Reagent		One-sided 95% Exact lower confidence limit
	Positive	Negative	
Positive	1894	6	1900
Negative	3	4598	4601
Total	1897	4604	6501
Positive Percent Agreement*			99.84
Negative Percent Agreement*			99.87

* Indicates agreement between the Anti-Human Globulin Anti-IgG, C3d; Polyspecific and comparator reagent only and does not indicate which reagent gave the correct result(s).

In performance evaluation studies, 6501 samples were tested with Anti-Human Globulin Anti-IgG,-C3d; Polyspecific. The positive percent agreement at the one-sided 95% exact lower confidence limit was 0.99 for agglutination tests based on a comparison of interpreted results. The negative percent agreement at the one-sided 95% exact lower confidence limit was 0.99 for agglutination tests based on a comparison of interpreted results.

Results were evaluated against comparable FDA approved products using the appropriate methods for the comparators. Further comparator tests were performed using Anti-Human Globulin Anti-IgG,-C3d; Polyspecific Z351U as the test reagent and Anti-Human Globulin Anti-IgG,-C3d; Polyspecific Z350U (Green) as the comparator reagent.

In total 100 indirect antigliobulin tests were performed as follows:

Anti-IgG,-Anti-C3d	Comparator Reagent		Total
	Positive	Negative	
Positive	20	0	20
Negative	0	80	80
Total	20	80	100
Positive Percent Agreement*			100
Negative Percent Agreement*			100

* Indicates agreement between the Anti-Human Globulin Anti-IgG,-C3d; Polyspecific and comparator reagent only and does not indicate which reagent gave the correct result(s).

- Antibody Identification Process

Anti-IgG,-Anti-C3d	Comparator Reagent		Total
	Positive	Negative	
Positive	421	1	422
Negative	0	408	408
Total	421	409	830
Positive Percent Agreement*			100.00
Negative Percent Agreement*			99.76

* Indicates agreement between the Anti-Human Globulin Anti-IgG,-C3d; Polyspecific and comparator reagent only and does not indicate which reagent gave the correct result(s).

Of the 6501 IAT samples tested in performance evaluation studies with Anti-Human Globulin Anti-IgG,-C3d; Polyspecific, 830 samples were tested for antibody

identification. The positive percent agreement at the one-sided 95% exact lower confidence limit was 0.99 for agglutination tests based on a comparison of interpreted results. The negative percent agreement at the one-sided 95% exact lower confidence limit was 0.99 for agglutination tests based on a comparison of interpreted results. Both the positive and negative percent agreement met the acceptance criteria of 0.99 at the one sided 95% lower confidence limit.

Results were evaluated against comparable FDA approved products using the appropriate methods for the comparators.

- ABO Cross-Match

Anti-IgG,-Anti-C3d	Comparator Reagent		One-sided 95% Exact lower confidence limit
	Positive	Negative	
Positive	119	0	119
Negative	0	221	221
Total	119	221	340
Positive Percent Agreement*			100.00
Negative Percent Agreement*			0.98

* Indicates agreement between the Anti-Human Globulin Anti-IgG,-C3d; Polyspecific and comparator reagent only and does not indicate which reagent gave the correct result(s).

Of the 6501 IAT samples tested in performance evaluation studies with Anti-Human Globulin Anti-IgG,-C3d; Polyspecific, 340 samples were tested for ABO cross-match. The positive percent agreement at the one-sided 95% exact lower confidence limit was 0.98 for agglutination tests based on a comparison of interpreted results. The negative percent agreement at the one-sided 95% exact lower confidence limit was 0.99 for agglutination tests based on a comparison of interpreted results. The positive percent agreement did not meet the acceptance criteria of 0.99 at the one sided 95% lower confidence limit due to the low frequency of positive samples encountered during the study and not due to discordant results.

Results were evaluated against comparable FDA approved products using the appropriate methods for the comparators.

- Non-ABO Cross-Match

Anti-IgG,-Anti-C3d	Comparator Reagent		Total
	Positive	Negative	
Positive	302	0	302
Negative	1	543	544
Total	303	543	846
Positive Percent Agreement*			99.67
Negative Percent Agreement*			100.00

* Indicates agreement between the Anti-Human Globulin Anti-IgG,-C3d; Polyspecific and comparator reagent only and does not indicate which reagent gave the correct result(s).

Of the 6501 IAT samples tested in performance evaluation studies with Anti-Human Globulin Anti-IgG,-C3d; Polyspecific, 846 samples were tested for non-ABO cross-match. The positive percent agreement at the one-sided 95% exact lower confidence limit was 0.98 for agglutination tests based on a comparison of interpreted results. The negative percent agreement at the one-sided 95% exact lower confidence limit was 0.99 for agglutination tests based on a comparison of interpreted results. The positive percent agreement did not meet the acceptance criteria of 0.99 at the one sided 95% lower confidence limit due to the low frequency of positive samples encountered and also one discordant result.

Results were evaluated against comparable FDA approved products using the appropriate methods for the comparators.

- Direct Antigliobulin Test

Anti-IgG,-Anti-C3d	Comparator Reagent		One-sided 95% Exact lower confidence limit
	Positive	Negative	
Positive	355	0	355
Negative	2	2666	2668
Total	357	2666	3023
Positive Percent Agreement*			99.44
Negative Percent Agreement*			100.00

* Indicates agreement between the Anti-Human Globulin Anti-IgG,-C3d; Polyspecific and comparator reagent only and does not indicate which reagent gave the correct result(s).

In performance evaluation studies, 3023 samples were tested with Anti-Human Globulin Anti-IgG,-C3d; Polyspecific. The positive percent agreement at the one-sided 95% exact lower confidence limit was 0.98 for agglutination tests based on a comparison of interpreted results. The negative percent agreement at the one-sided 95% exact lower confidence limit was 0.99 for agglutination tests based on a comparison of interpreted results. The positive percent agreement did not meet the acceptance criteria of 0.99 at the one sided 95% lower confidence limit due to the low frequency of positive samples encountered and also two discrepant results which included a sample from a patient historically presenting with a positive DAT.

Results were evaluated against comparable FDA approved products using the appropriate methods for the comparators. Further comparator tests were performed using Anti-Human Globulin Anti-IgG,-C3d; Polyspecific Z351U as the test reagent and Anti-Human Globulin Anti-IgG,-C3d; Polyspecific Z350U (Green) as the comparator reagent.

In total 25 direct antigliobulin tests were performed as follows:

Anti-IgG,-Anti-C3d	Comparator Reagent		Total
	Positive	Negative	
Positive	5	0	5
Negative	0	20	20
Total	5	20	25
Positive Percent Agreement*			100
Negative Percent Agreement*			100

* Indicates agreement between the Anti-Human Globulin Anti-IgG,-C3d; Polyspecific and comparator reagent only and does not indicate which reagent gave the correct result(s).

Precision Study Results

As part of the performance evaluation, precision and lot to lot studies were performed using multiple operators, days and runs to confirm repeatability and reproducibility of test results in the same run, day and with the same operator and between runs, days and operators. The study took account of variables such as days of the week, times of day and supplementary reagents used in testing.

There were no discordant results; all expected positive test outcomes generated unequivocal positive reactions and all expected negative test outcomes generated unequivocal negative reactions.

Prior to release, each lot of Anti-Human Globulin Anti-IgG,-C3d; Polyspecific is tested using FDA recommended methods against IgG sensitized and complement coated red blood cells to ensure suitable reactivity.

BIBLIOGRAPHY

- Combs RRA, Mourant AE, Race RR: A new test for the detection of weak and incomplete Rh agglutinins. *Brit J Exp Path*, 1945; 26: 265-266
- Combs, RRA., Mourant, AE, Race RR: *In vivo* iso-sensitization of red cells in babies with haemolytic disease. *Lancet* 1946; 247: 264-266
- Dacie JV, Cookston JH, Christensen WN : Incomplete cold antibodies: role of complement in sensitization to antiglobulin serum by potentially hemolytic antibodies. *Br J Haem*, 1957; 3:77-87
- Garratty G, Peitz LD: The Significance of Red Cell Bound Complement Components in Development of Standards and Quality Assurance for the Anti-Complement Components of Antigliobulin Sera. *Transfusion* 1976; 16: 297-306
- Moore JA, Chaplin Jr H: Anti-C3d Antigliobulin Reagents. II. Preparation of an Antigliobulin Serum Monospecific for C3d. *Transfusion* 1974; 14: 416-424
- Howard JE, Winn LC, Gottlieb CE, et al.: Clinical significance of the anti-complement component of antigliobulin antisera. *Transfusion* 1982; 22: 269-272
- Roback JD, Grossman BJ, Harris T, et al.: AABB Technical Manual, 18th ed. AABB, 2014

DATE OF ISSUE

2020-01-15

US Distributor

Quotient
3011 South State Street
S-204
Newtown
PA 18940
USA

Customer Service Tel: 1-888-284-1901
Product Technical Support Tel: 1-888-228-1990
Customer Service Fax: 1-888-694-5208
E-Mail: customer.service.us@quotientbd.com
Web: www.quotientbd.com



Alba Bioscience Limited
James Hamilton Way
Penicuik
EH26 0BF
UK

Tel: +44 (0) 131 357 3333
Fax: +44 (0) 131 445 7125
E-mail: customer.service.ceEU@quotientbd.com

US License 1807

© Alba Bioscience Limited 2020 Z350U/Z351U/PI01

