Rapid Response®

Mononucleosis Test Cassette
(Whole Blood/Serum/Plasma)
REF MON-13C15 Product Insert

A rapid test for the diagnosis of Infectious Mononucleosis (IM) detecting Infectious Mononucleosis heterophile antibodies qualitatively in whole blood, serum or plasma.
For laboratory *in vitro* diagnostic use only.

Intended Use

The Rapid Response® Mononucleosis Test Cassette is a rapid chromatographic immunoassay for the qualitative detection of Infectious Mononucleosis heterophile antibodies in whole blood, serum or plasma as an aid in the diagnosis of Infectious Mononucleosis.

Summary

Infectious Mononucleosis (IM) is caused by the Epstein-Barr virus, which is a member of the herpesvirus family. Symptoms of IM are fever, sore throat, and swollen lymph glands. In very rare cases, heart or central nervous system problems may occur. Diagnosis of IM is made based on the presence of heterophile antibodies. Infectious Mononucleosis heterophile antibodies belong to the IgM class. They are present in 80-90% of acute IM cases and can be detected in 60-70% of patients during the first week of clinical illness.[1,2,3,4]
The Rapid Response® Mononucleosis Test Cassette is a simple test that utilizes an extract of bovine erythrocytes to qualitatively and selectively detect Infectious Mononucleosis heterophile antibodies in whole blood, serum or plasma in minutes.

Principle

The Rapid Response® Mononucleosis Test Cassette is a qualitative, lateral flow immunoassay for the detection of IM heterophile antibodies in whole blood, serum or plasma. In this test, bovine erythrocyte extracted antigen is immobilized in the test line region of the test. During testing, the specimen reacts with bovine erythrocyte extracted antigen coated particles that have been applied to the label pad. This mixture migrates chromatographically along the length of the test and interacts with the immobilized bovine erythrocyte extracted antigen. If the specimen contains IM heterophile antibodies, a colored line will appear in the test line region, indicating a positive result. If the specimen does not contain IM heterophile antibodies, a colored line will not appear in this region indicating a negative result. To serve as a procedural control, a colored line will always appear in the control line region indicating that proper volume of specimen has been added and membrane wicking has occurred.

Reagents

The test contains bovine erythrocyte extracted antigen-coated particles and bovine erythrocyte extracted antigen-coated membrane.

Precautions

- For laboratory *in vitro* diagnostic use only.
- Do not use after the expiration date indicated on the package. Do not use the test if the foil pouch is damaged. Do not reuse tests.
- This kit contains products of animal origin. Certified knowledge of the origin and/or sanitary state of the animals does not completely guarantee the absence of transmissible pathogenic agents. It is therefore recommended that these products be treated as potentially infectious, and handled by observing usual safety precautions (e.g., do not ingest or inhale).
- Read the entire procedure carefully prior to testing.
- Do not eat, drink or smoke in any area where specimens and kits are handled.
- Handle all specimens as if they contain infectious agents. Observe established precautions against microbiological hazards throughout the procedure and follow standard procedures for the proper disposal of specimens. Wear protective clothing such as laboratory coats, disposable gloves and eye protection when specimens are assayed.
- Humidity and temperature can adversely affect results.
- The used test should be discarded according to local regulations.
- Human plasma used in the Positive and Negative Controls was tested by ELISA for the presence of antibodies to human immunodeficiency virus type HIV-1/HIV-2, as well as Hepatitis B surface antigen (HBsAg) and anti-HCV, and found to be negative. Nevertheless, caution should be used in handling and disposing of these items.

Materials

Materials provided

- Test cassettes
- Buffer
- Negative control (Diluted human plasma, 0.09% sodium azide)
- Droppers
- Package insert
- Positive control (Diluted human plasma containing IM heterophile antibodies, 0.09% NaN_3)

Materials required but not provided

- Timer
- Specimen collection container (for venipuncture whole blood)
- Lancet (for fingerstick whole blood only)
- Heparinized capillary tubes and dispensing bulb (for fingerstick whole blood only)
- Centrifuge

Storage and Stability

- The kit should be stored at 35.6-86°F (2-30°C) until the expiry date printed on the sealed pouch.
- The test must remain in the sealed pouch until use.
- **Do not freeze.**
- Care should be taken to protect components in this kit from contamination. Do not use if there is evidence of microbial contamination or precipitation. Biological contamination of dispensing equipment, containers or reagents can lead to false results.

Collection and Storage of Specimens

The Rapid Response® Mononucleosis Test Cassette can be performed using whole blood (from venipuncture or fingerstick), serum or plasma.

Venipuncture Whole Blood Specimens:

1. Collect anti-coagulated blood specimen (sodium or lithium heparin, potassium or sodium EDTA, sodium oxalate, sodium citrate) following standard laboratory procedures.
   - Whole blood collected by venipuncture should be stored at 35.6-46.4°F (2-8°C) if the test is to be run within 2 days of collection. Do not freeze whole blood specimens.

Fingerstick Whole Blood Specimens:

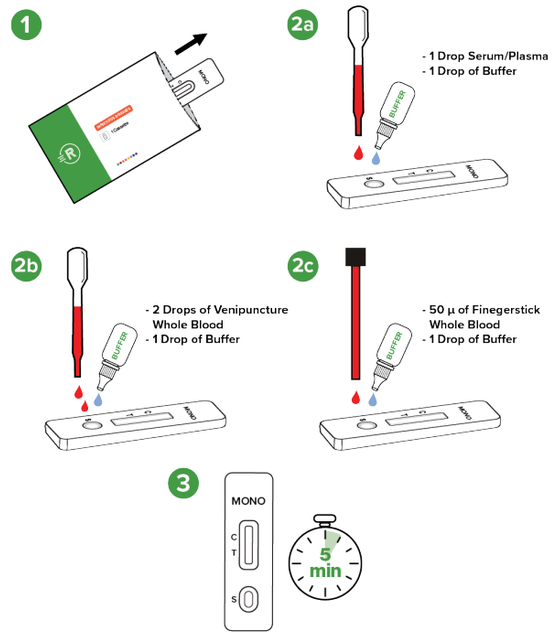
1. Wash the patient's hand with soap and warm water or clean with an alcohol swab. Allow to dry.
2. Massage the hand without touching the puncture site by rubbing down the hand towards the fingertip of the middle or ring finger.
3. Puncture the skin with a sterile lancet. Wipe away the first sign of blood.
4. Gently rub the hand from wrist to palm to finger to form a rounded drop of blood over the puncture site.
5. Add the Fingerstick Whole Blood specimen to the test by using a capillary tube:
   - i) Touch the end of the capillary tube to the blood until filled to approximately 50 µL.
   - ii) Avoid air bubbles when drawing blood.
   - iii) Place the bulb onto the top end of the capillary tube, then squeeze the bulb to dispense the whole blood to the specimen well (S) of the Test Cassette.
   - Whole blood collected by fingerstick should be tested immediately.

For Serum or Plasma Specimens:

1. Separate serum or plasma from blood as soon as possible to avoid hemolysis. Use only clear, non-hemolyzed specimens.
   - Testing should be performed immediately after specimen collection. Do not leave the specimens at room temperature for prolonged periods. Serum and plasma specimens may be stored at 35.6-46.4°F (2-8°C) for up to 3 days. For long-term storage, specimens should be kept below -4°F (-20°C).
- Bring specimens to room temperature prior to testing. Frozen specimens must be completely thawed and mixed well prior to testing. Specimens should not be frozen and thawed repeatedly.
- If specimens are to be shipped, they should be packed in compliance with local regulations covering the transportation of etiologic agents.

Test Procedure

Allow the test, specimen, buffer, and/or controls to equilibrate to room temperature 59-86°F (15-30°C) prior to testing.



1. Remove the Test Cassette from the foil pouch and use it as soon as possible. Best results will be obtained if the assay is performed within one hour. (See illustration 1).
2. Place the Test Cassette on a clean and level surface.
   a. **For Serum or Plasma specimens:**
   Hold the dropper vertically and transfer 1 drop of serum or plasma (approximately 25 µL) to the specimen well (S) of the test cassette, and add 1 drop of buffer (approximately 55 µL), then start the timer. (See illustration 2a).
   b. **For Venipuncture Whole Blood specimens:**
   Hold the dropper vertically and transfer 2 drops of whole blood (approximately 50 µL) to the specimen well (S) of the Test Cassette, and add 1 drop of buffer (approximately 55 µL), then start the timer. See illustration below. (See illustration 2b).
   c. **For Fingerstick Whole Blood specimens:**

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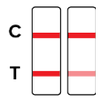
To use a capillary tube: Fill the capillary tube and transfer approximately 50 µL of fingerstick whole blood specimen to the specimen well (S) of the Test Cassette, then add 1 drop of buffer (approximately 55 µL) and start the timer. (See illustration 2c).

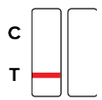
3. Wait for the colored line(s) to appear. **Read results at 5 minutes.** Do not interpret the result after 10 minutes.

Results Interpretation



POSITIVE: Two colored lines appear. One line should be in the control line region (C) and another line should be in the test line region (T).

NEGATIVE: One colored line appears in the control line region (C). No apparent colored line appears in the test line region (T).



INVALID: Control line fails to appear. Insufficient specimen volume or incorrect procedural techniques are the most likely reasons for control line failure. Review the procedure and repeat the test with a new test. If the problem persists, discontinue using the test kit immediately and contact your local distributor.

NOTE: The intensity of color in the test line region (T) may vary depending on the concentration of IM heterophile antibodies present in the specimen. Therefore, any shade of color in the test line region (T) should be considered positive.

Quality Control

A procedural control is included in the test. A colored line appearing in the control line region (C) is considered an internal procedural control. It confirms sufficient specimen volume, adequate membrane wicking and correct procedural technique. In addition to your laboratory's standard quality control procedures, it is recommended that a positive and negative external control be tested at least once within each test kit and by each operator performing testing within a kit. This will verify that the reagents and test are working properly and the operator is able to correctly perform the test procedure. External positive and negative controls are supplied in the kit.

Procedure for External Quality Control Testing

1. Holding the bottle vertically, add 1 full drop (approximately 40 µL) of positive or negative control solution to the specimen well (S) of the Test Cassette, and add 1 drop of buffer (approximately 55 µL).
2. Continue with Step 3 of Test Procedure.
3. If the controls do not yield the expected results, do not use the test results. Repeat the test or contact your distributor.

Limitations

1. The Rapid Response® Mononucleosis Test Cassette is for laboratory *in vitro* diagnostic use only. The test should be used for the detection of Infectious Mononucleosis antibodies in whole blood, serum or plasma specimens only. Neither the quantitative value nor the rate of increase in Infectious Mononucleosis antibody concentration can be determined by this qualitative test.
2. The Rapid Response® Mononucleosis Test Cassette will only indicate the presence of Infectious Mononucleosis antibodies in the specimen and should not be used as the sole criteria for the diagnosis of Infectious Mononucleosis infection.
3. As with all diagnostic tests, all results must be interpreted together with other clinical information available to the physician.
4. If the test result is negative and clinical symptoms persist, additional testing using other clinical methods is recommended. A negative result does not at any time preclude the possibility of Infectious Mononucleosis infection.

Expected Values

Epstein-Barr virus (EBV) infection during adolescence or young adulthood causes Infectious Mononucleosis in 35% to 50% of reported cases.[1,5]
The incidence of EBV-associated Infectious Mononucleosis in the USA has been estimated at 45 per 100,000 and is highest in adolescent and young adults - about 2 out of 1,000. No seasonal pattern of EBV infection exists. The incubation period is 10 to 60 days, though 7 to 14 days is common for children and adolescents.

Performance Characteristics

Sensitivity

The Rapid Response® Mononucleosis Test Cassette has been evaluated with specimens confirmed positive or negative by a leading commercial slide agglutination test. The slide agglutination test served as the reference method for the Rapid Response® Mononucleosis Test Cassette. The result shows that the sensitivity of the Rapid Response® Mononucleosis Test Cassette is 97.6% relative to the slide agglutination test.

Specificity

The Rapid Response® Mononucleosis Test Cassette uses an antigen that is highly specific for IM antibodies in whole blood, serum or plasma. The results show that the specificity of the Rapid Response® Mononucleosis Test Cassette is 97.8% relative to the slide agglutination test.

Rapid Response® Mononucleosis Test vs. Slide Agglutination

Method		Slide Agglutination		Total Results
Rapid Response® Mononucleosis Test	Results	Positive	Negative	
	Positive	122	4	126
	Negative	3	176	179
Total Results		125	180	305

Relative Sensitivity: 97.6% (95%CI*: 93.1%-99.5%)*
Relative Specificity: 97.8% (95%CI*: 94.4%-99.4%)*
Overall Accuracy: 97.7% (95%CI*: 95.3%-99.1%)*
*Confidence Intervals

Precision

Intra-Assay
Within-run precision has been determined by using 3 replicates of three specimens: a negative, a low positive and a middle positive. The negative, low positive and middle positive values were correctly identified >99% of the time.

Inter-Assay
Between-run precision has been determined by 10 independent assays on the same three specimens: a negative, a low positive and a middle positive. Three different lots of the Rapid Response® Mononucleosis Test Cassette have been tested using negative, low positive and middle positive specimens. The specimens were correctly identified >99% of the time.

Cross-Reactivity

The Rapid Response® Mononucleosis Test Cassette has been tested with RF, HBsAg, HBeAg, HBcAb, HBeAb, HCV, TB, HIV and Syphilis positive specimens. No cross-reactivity was observed, indicating that the Rapid Response® Mononucleosis Test Cassette has a high degree of specificity for human antibodies to IM.

Bibliography

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4. Papesch M, Watkins R. Epstein-Barr virus infectious mononucleosis. Clin Otolaryngol. 2001; 26(1): 3-8
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Glossary of Symbols

Consult instructions for use		Test per Kit		EC REP	Authorized Representative
Store between 35.6°F to 86°F		Use by			Do Not Reuse
LOT	Lot Number	IVD	For *in vitro* diagnostic use only	REF	Catalogue #
	Manufacturer		Do not use if package is damaged		

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