TECO DIAGNOSTICS
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INFECTIOUS MONONUCLEOSIS (IM) LATEX TEST

INTENDED USE
The Infectious Mononucleosis (IM) Latex Test is intended to be used for the qualitative and semi-quantitative determination of human heterophile antibodies associated with IM.

INTRODUCTION
Paul and Bunnell[1] were the first to report that serum from a patient with IM contained heterophile antibodies that agglutinated sheep erythrocytes. These heterophile antibodies react with an antigen that apparently is not responsible for their production. However, it was soon discovered that the test lacked specificity because the naturally occurring Forssman antibody found in serum from some individuals who apparently have not had recent infectious mononucleosis agglutinates unmodified sheep or horse erythrocytes[2]. In 1937, Davidsohn[3] employed a different absorption procedure that removed the Forssman antibody but retained the heterophile agglutination characteristic of IM. The Davidsohn modification added distinction but made the test time-consuming and cumbersome to perform. Therefore, the Davidsohn test has been relegated to the role of a reference method for diagnosis of IM. Attempts to find a suitable alternative were made by Bailey and Raffel,[4] and they discovered that bovine erythrocytes were more sensitive than sheep or horse erythrocytes for detecting IM heterophile antibodies. Since that time, antigens that have been extracted from bovine red cell walls and have been used in various enzyme immunoassays which are both highly sensitive and specific for heterophile antibodies associated with IM[5].

PRINCIPLE
The IM Latex test provides a suspension of polystyrene latex particles that have been coated with partially purified glycoprotein from bovine red blood cells. The heterophile antibody associated with IM bind to the corresponding antigenic determinants on the glycoprotein coated latex. This binding is evident by rapid agglutination of the latex. As a result of the purification of the bovine red cell glycoprotein, the coated latex particles are not agglutinated by Forssman or serum sickness antibodies at levels normally encountered in the U.S. population. Thus, no differential absorption is required.

MATERIALS AND REAGENTS PROVIDED
1. *IM Latex:* suspension of polystyrene latex particles coated with partially purified glycoprotein from bovine red cells.
2. *IM Positive Control:* Human serum containing 0.1% sodium azide as preservative.
3. *IM Negative Control:* Human serum containing 0.1% sodium azide as preservative.
4. Stir sticks
5. Glass Slide

MATERIALS REQUIRED BUT NOT PROVIDED
Timer, physiological saline, serological pipettes, and test tubes.

STORAGE AND STABILITY
The IM Latex Test is to be stored at a temperature range of 2-8°C. DO NOT FREEZE. Prior to use, allow reagent and controls to warm up to room temperature.
Indication of deterioration: lack of agglutination with the Positive Control or agglutination with the Negative Control or extreme turbidity in either control are signs of deterioration and test kit should be discarded. Use of Positive and Negative Controls will permit monitoring of reagent performance.

WARNINGS AND PRECAUTIONS
This product is for *in vitro* diagnostic use only. Read instructions carefully before using this product. Do not use product beyond its indicated expire date. Sodium azide may react with metal plumbing to form explosive metal oxides. In disposal, flush with a large amount of water to prevent metal azide build up. Each donor unit used in the preparation of this product has been tested by an FDA approved method and found non-reactive for the presence of HBsAg and antibody to HTLV-III. Because no known test method can offer complete assurance that Hepatitis B virus, human T-lymphotropic virus type III or other infectious agents are absent, all human blood based products should be handled in accordance with good laboratory practices using appropriate precautions as detailed in Centers for Disease Control/National Institute of Health Manual "Biosafety in Microbiological and Biomedical Laboratories," 1984.

SPECIMEN COLLECTION AND PREPARATION
Only serum specimen should be used. In the event that test cannot be performed immediately, refrigerated specimens can be tested up to 24 hours following collection. Any further delay requires freezing the specimen.

PROCEDURE
Qualitative:
1. Bring reagents and specimens to room temperature before use.
2. Place one drop each of the IM Positive and Negative Control onto separate test wells. Using a pipette, transfer one drop of patient specimen into a separate well.
3. Resuspend the IM Latex and add one drop to each test well containing specimens or controls.
4. Mix and spread the resulting mixture over the entire area of the well with the paddle end of the stir sticks. Use a new stir stick with each test well.
5. Rotate glass slide for 3 minutes and read results immediately under direct light.

Semi-Quantitative:
1. Bring reagents and specimens to room temperature before use.
2. Using physiological saline, prepare serial dilutions of specimens 1:2, 1:4, 1:8, 1:16, 1:32 or as needed.
3. Place one drop of each dilution onto separate test well.
4. Follow Steps 3 to 5 under the Qualitative procedure above.

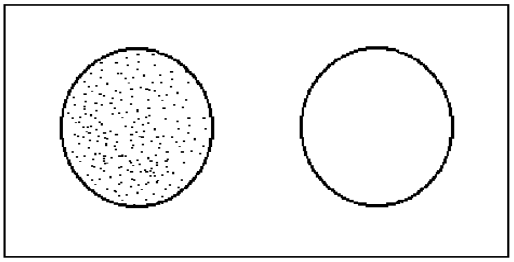
NOTE: To wash the glass slide, apply soap uniformly on the test fields with something that will not scratch the circles, such as a lint-free microfiber towel. Rinse the slide using DI water, blot with a paper towel and air dry. Please wash the glass slide after each use.

QUALITY CONTROL
IM Positive and Negative Control should be included in each test series. The Positive Control should produce strong agglutination and the Negative Control should yield a smooth suspension with no agglutination.

RESULTS

1. Qualitative Test:

Agglutination indicates the presence of the heterophile antibody associated with IM. The lack of agglutination indicates the absence of the heterophile antibody associated with IM.



Positive Negative

Figure 1.

2. Semi-Quantitative Test:

The titer of IM heterophile antibody is the reciprocal of the highest dilution that exhibits a positive reaction. The actual titer of the antibody has not been related to the stage or severity of the disease[7,8]. However, an increase in IM heterophile agglutination titer may be clinically significant in the early stages of the disease and may assist in the diagnosis of IM.

PERFORMANCE CHARACTERISTICS

Serum and plasma specimens from 285 individuals that had been submitted to clinical laboratories by physicians for IM testing were examined. The IM Latex and another commercial Red Cell IM Test Kit were used to evaluate the specimens. One hundred thirty-two (132) specimens were found positive by both assays. The remaining 153 specimens gave negative results using both products. These data indicate that both sensitivity and specificity of the IM Latex are 100%. In a study on precision, a panel of 10 serum samples with IM heterophile antibody titers from 1 to 256 were tested 10 consecutive days by the Quantitative Method (100 determinations). No determinations gave more than a 2-fold difference from the mean titer for a sample.

LIMITATIONS

Although the IM Latex is highly sensitive and specific, a diagnosis of IM should not be made on the basis of a positive test result without support of patient history and hematological or other clinical evidence. Similarly, a negative test result cannot completely rule out IM. Incubation of the test for longer than the recommended time or microbial contamination may cause false positive reactions. Apparent false positive reactions have been associated with sera from patients with other disease such as rheumatoid arthritis, certain respiratory infections, leukemia, Burkitt's lymphoma and serum sickness[9-13].

Although most patients develop heterophile antibodies within 3 weeks after the onset of symptoms, occasional patients may take several months to develop detectable levels. If the IM Latex is negative in the presence of strong evidence of suggesting a diagnosis of IM, repeat testing on samples obtained at intervals of several days will generally reveal development of the heterophile agglutinin. Some patients with hematological and clinical evidence of IM remain persistently negative.[12,14,15] A single heterophile antibody titer cannot be interpreted as an indication of the stage or severity of the disease[7,8]. However, titrations on sequential samples may be useful in following the course of the disease in an individual patient.

REFERENCES

1. Paul, J.R. and W.W. Bunnell, Am. J. Med. Sci., 183, 90, 1932.
2. Beer, P.J. Clin. Invest., 15, 591, 1936.
3. Davidsohn, I., Am. J.A.M.A., 108, 289, 1937.
4. Bailey, G.H., and Raffel, S., Hemolytic Antibodies for Sheep and Ox Erythrocytes in Infectious Mononucleosis, J. Clin. Invest., 14, 228-244, 1935.
5. Fletcher, M.A., and B.J. Woolfolk, Immunochemical Studies of Infectious Mononucleosis: Isolation and Characterization of Heterophile Antigens from Hemoglobin-Free Stroma, J. Immunol., volume 107.
6. Davidsohn, I. and C.L. Lee, Med. Clin. N. Am., 46, 225, 1962.
7. Baehner, R.L. and S.E., Shuler, Clin. Pediat., 6, 393, 1967.
8. Horwitz, C.A., H. Polesky, T. Stillman, P.C.J. Ward, G. Henle and W. Henle, Brit. Med. J., 1, 591, 1973.
9. Bender, C.E., Ann. Intern. Med., 49, 652, 1958.
10. Carpenter, G., J. Kahler and E.B. Reiley, Am. J. Med. Sci., 220, 195, 1950.
11. Henle, G., W. Henle and V. Diehl, Proc. Natl. Acad. Sci., 220, 195, 1950.
12. Davidsohn, I., J. Immunol., 16, 259, 1929.
13. Penman, H.C., J. Clin. Path., 21, 50, 1968.
14. Henle, W. and G. Henle, New Engl. J. Med., 288, 263, 1973.

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