Key Code TSMX7709B
www.oxoid.com/ifu

Europe + 800 135 79 135
CA 1 855 805 8539

US 1 855 236 0910
ROW +31 20 794 7071

Wellcogen H. influenzae b.

REF ZL21/R30858801 .....30 Tests **EN**

1 INTENDED USE

Wellcogen™ H. influenzae b is a rapid latex test for use in the qualitative detection of antigen from Haemophilus influenzae type b, present in body fluids as a consequence of infection or in blood cultures.
NOTE: Tests performed directly on clinical specimens are intended for screening purposes and should augment, not replace, culture procedures. Results must be used in conjunction with other data; eg symptoms, results of other tests, clinical impressions etc.

2 SUMMARY

H. influenzae type b infections are of major significance in infants and young children and also occur in older patients. Meningitis is the most common manifestation, but the organism also causes a variety of other diseases including pneumonia, epiglottitis, and cellulitis[2]. The infecting organisms carry type-specific polysaccharide surface antigen, polyribose phosphate, a quantity of which diffuses into body fluids such as serum, pleural fluid and cerebrospinal fluid (CSF), and is excreted in the urine. The antigen in these body fluids can be detected by sensitive immunological methods including counterimmuno-electrophoresis and latex agglutination[4,5,6,7,8,9,12].

3 PRINCIPLE OF THE TEST

The Wellcogen H. influenzae b reagent consists of polystyrene latex particles which have been coated with antibodies specific to H. influenzae type b antigen. These latex particles agglutinate in the presence of sufficient homologous antigen.

Some body fluid samples cause non-specific aggregation of latex particles, and a Control Latex preparation is provided in order to identify these samples.

4 SYMBOL DEFINITIONS

REF	Catalogue Number
IVD	In Vitro Diagnostic Medical Device
Σ	Contains sufficient for <n> tests
	Consult Instructions for Use
	Temperature Limitation
LOT	Batch Code
	Use By
	Manufacturer
	Add water

5 KIT CONTENTS, PREPARATION FOR USE AND STORAGE

The Wellcogen H. influenzae b kit includes sufficient reagents to perform Σ 30 tests.

See also **Precautions,** section **6**.

All components should be stored at 2 to 8°C under which condition they will retain their activity until the expiry date of the kit.

Before use, bring all reagents to room temperature (18 - 30°C) and mix. Return the unused reagents to the refrigerator after use.

Instructions for Use
Disposable Reaction Cards (1 pack)
Disposable Mixing Sticks (2 bundles)
Disposable Droppers (1 container)
Black rubber teat (1)

TEST LATEX

Test Latex

One dropper bottle (pale blue cap) containing a 0.5% suspension of polystyrene latex particles in glycine-buffered saline, pH 8.2, with 0.1% sodium azide as preservative. The latex particles are coated with rabbit antibody to H. influenzae type b antigen.

CONTROL LATEX

Control Latex

One dropper bottle (dark blue cap) containing a 0.5% suspension of polystyrene latex particles in glycine-buffered saline, pH 8.2, with 0.1% sodium azide as preservative. The latex particles are coated with non-immune rabbit globulins.

The latex suspensions are provided ready for use and should be stored at 2 to 8°C in an upright position, until the expiry date of the kit. After prolonged storage some aggregation or drying of the latex may have occurred around the top of the bottle. Under these circumstances the bottle of latex should be shaken vigorously for a few seconds until resuspension is complete. DO NOT FREEZE.

CONTROL +

Polyvalent Positive Control

One bottle (blue cap) containing freeze-dried bacterial extracts including antigen from a representative strain of H. influenzae type b. Contains 0.01% bronopol before reconstitution and 0.004% when reconstituted.

Reconstitute using 3.6 ml of sterile distilled water. After the addition of water allow the bottle to stand for a few minutes and then swirl to mix. Store reconstituted antigen at 2 to 8°C for up to 6 months.

CONTROL −

Negative Control

One dropper bottle (white cap) containing Glycine saline buffer, pH 8.2, with 0.05% Bronidox® as preservative.

6 PRECAUTIONS

IVD

The reagents are for in vitro diagnostic use only.
For professional use only.

Please refer to the Safety Data Sheet (SDS) and product labelling for information on potentially hazardous components.

HEALTH AND SAFETY INFORMATION

6.1 The Test and Control Latex contain 0.1% sodium azide. Azides can react with copper and lead used in some plumbing systems to form explosive salts. The quantities used in this kit are small; nevertheless when disposing of azide-containing materials they should be flushed away with large volumes of water.

6.2 In accordance with the principles of Good Laboratory Practice it is strongly recommended that body fluids should be treated as potentially infectious and handled with all necessary precautions.

6.3 When handling radiometric blood culture medium, the basic rules of radiation safety should be followed. These include:

a) Radioactive material should be stored in a designated area in an approved container.
b) Handling of radioactivity should take place in a designated area.
c) No mouth pipetting of radioactive material should be carried out.
d) No eating, drinking or smoking should take place in the designated area.
e) Hands should be washed thoroughly after using radioactive material.
f) The local Radiation Safety Officer should be consulted concerning disposal requirements.

6.4 Non-disposable apparatus should be sterilised by any appropriate

procedure after use, although the preferred method is to autoclave for 15 minutes at 121°C. Disposables should be autoclaved or incinerated. Spillage of potentially infectious materials should be removed immediately with absorbent paper tissue and the contaminated areas swabbed with a standard bacterial disinfectant or 70% alcohol. Do NOT use sodium hypochlorite. Materials used to clean spills, including gloves, must be disposed of as biohazardous waste.

6.5 Do not pipette by mouth. Wear disposable gloves and eye protection while handling specimens and performing the assay. Wash hands thoroughly when finished.

6.6 When used in accordance with the principles of Good Laboratory Practice, good standards of occupational hygiene and the instructions stated in these Instructions for Use, the reagents supplied are not considered to present a hazard to health.

ANALYTICAL PRECAUTIONS

6.7 Do not use the reagents beyond the stated expiry date.

6.8 Latex reagents should be brought to room temperature (18 to 30°C) before use. Latex reagents which show signs of aggregation or 'lumpiness' before use may have been frozen and must not be used.

6.9 It is important when using dropper bottles that they are held vertically and that the drop forms at the tip of the nozzle. If the nozzle becomes wet an incorrect volume will form around the end and not at the tip; if this occurs dry the nozzle before progressing.

6.10 The reagents provided with each kit are matched in performance and should not be used in conjunction with reagents from a kit having a different lot number.

6.11 Do not touch the reaction areas on the cards.

6.12 Mechanical rotators may be used in this assay. The following characteristics have been found to be satisfactory:

i) Orbital rotators (also known as dimensional rotators) operating at 25 rpm with approximate rotating angle of 9 to 10.5 degrees or operating at 18 rpm with a rotating angle of 16 to 17.5 degrees.

6.13 Avoid microbial contamination of reagents as this may lead to erroneous results.

7 SPECIMEN COLLECTION AND STORAGE

7.1 **Body fluid samples** (e.g. CSF, serum, urine) should be tested as soon after collection as possible. If the fluid cannot be tested immediately it may be stored overnight at 2 to 8°C, or for longer periods frozen at –15 to –25°C. If bacteriological analyses are required on the sample, these should be set up prior to performing the latex test, to avoid contaminating the sample.

7.2 **Blood cultures** may be sampled and tested after 18 to 24 hours incubation at 37°C and/or as soon as bacterial growth is observed.

8 TEST PROCEDURE

REQUIRED MATERIALS PROVIDED

See **Kit Contents**, section **5**.

MATERIALS REQUIRED BUT NOT PROVIDED

Boiling water bath
Laboratory centrifuge or membrane filters (0.45 µm)
Rotator (optional – refer to **Precautions**, section **6**)

PREPARATION OF CLINICAL SPECIMENS

8.1 **Body fluid samples** must be heated[3] before testing by the Wellcogen procedure to minimise non-specific reactions. The following procedures are recommended:

a) For CSF and urine, heat the sample for 5 minutes in a boiling water bath. Cool the sample to room temperature (18 to 30°C) and clarify by centrifugation or membrane filtration (0.45 µm) prior to testing. For maximum sensitivity urine samples may be concentrated up to 25-fold in a Minicon® B-15 concentrator. Clarify as above before testing.

b) For serum, add 3 volumes 0.1 M disodium ethylenediaminetetra-acetate (EDTA) pH 7.4 per 1 volume serum, heat the sample for 5 minutes in a boiling water bath, cool to room temperature (18 to 30°C) and clarify as above[10]. A suitable EDTA solution (10 ml) is available (Code No. ZL29/R30164501).

8.2 **Blood cultures**. Centrifuge a 1 to 2 ml sample to pellet the red blood cells, for example at 1000 g for 5 to 10 minutes. Perform the latex test on the supernatant.

If a non-specific reaction occurs with a blood culture supernatant (see **Interpretation of Results**, section **10**), heat the sample in a boiling water bath for 5 minutes, cool to room temperature (18 to 30°C), clarify by centrifugation and repeat the test.

PROCEDURE

It is recommended that the section on **Precautions**, section **6**, is read carefully before performing the test.

NOTE: If there is only a limited volume of test sample available, it should be used with the Test Latex first and if a positive result is obtained the sample should be tested with the Control Latex. If sufficient sample is available, it should be tested against both the Test and Control Latexes simultaneously.

Step 1	Process the sample as described under **Preparation of Clinical Specimens**, section **8**.	
Step 2	Shake the latex reagents.	
Step 3	For each test sample place 1 drop of **Test Latex** in one circle on a Reaction Card and 1 drop of **Control Latex** into a separate circle. Ensure that the dropper bottles are held vertically to dispense an accurate drop. (See **Precautions**, section **6**).	**1 drop**
Step 4	Using a Disposable Dropper, dispense 1 drop (approximately 40 µl) of **Test Sample** next to each drop of latex.	**1 drop**
Step 5	**Mix** the contents of each circle with a Mixing Stick and spread to cover the complete area of the circle. Use a separate stick for each circle and discard it for safe disposal after use.	
Step 6	**Rock** the card slowly and **observe** for agglutination for 3 minutes, holding the card at normal reading distance (25 to 35 cm) from the eyes. Do not use a magnifying lens. Mechanical rotation (3 minutes) may be used (see **Precautions**, section **6**). The patterns obtained are clear cut and can be recognised under all normal lighting conditions.	**3 mins**
Step 7	Discard the used Reaction Card for safe disposal.	

9 QUALITY CONTROL

The following procedures should be carried out initially with each shipment of test kits and with each run of test samples. In practice, a run may be defined as a testing period of up to 24 hours. Any departure from the expected results indicates there may be a problem with the reagents, which must be resolved before further use with clinical samples.

VISUAL INSPECTION

The latex suspensions should always be inspected for aggregation as they are dropped onto the test card and if there is evidence of clumping before addition of the test sample, the suspension must not be used. After prolonged storage some aggregation or drying may have occurred around the top of the bottle. If this is observed, the bottle should be shaken vigorously for a few seconds until resuspension is complete.

POSITIVE CONTROL PROCEDURE

The reactivity of the test can be confirmed by adding Polyvalent Positive Control to a reaction circle in which the test sample has not agglutinated the Test Latex after 3 minutes rotation.

Step 1	Use a Disposable Dropper to add 1 drop of Positive Control to the circle containing Test Latex and specimen.	**1 drop**
Step 2	Mix using a Mixing Stick and discard it for safe disposal.	
Step 3	Rock the card manually or by a rotator for a further 3 minutes. After this time, definite agglutination should be visible in the Test Latex.	**3 mins**
Step 4	Discard the used Reaction Card for safe disposal.	

NEGATIVE CONTROL PROCEDURE

If at least one test sample within a run gives a negative result with Test and Control Latexes (or Test Latex only where no Control Latex has been used), this constitutes a valid negative control for the reagents and no further testing is necessary.

If a test sample gives agglutination with the Test Latex and no agglutination with the Control Latex then the Test Latex should be tested with the Negative Control or uninoculated blood culture medium, as appropriate (see below).

Step 1	Place 1 drop of Test Latex in one circle on a Reaction Card.	**1 drop**
Step 2	Dispense 1 drop of Negative Control or uninoculated blood culture medium next to the Test Latex.	**1 drop**
Step 3	Mix using a Mixing Stick and discard it for safe disposal.	
Step 4	Rock the card manually or by a rotator for a further 3 minutes. After this time, there should be no significant agglutination in the Test Latex.	**3 mins.**
Step 5	Discard the used Reaction Card for safe disposal.	

For tests with body fluid samples, the Negative Control provided with the kit should be used.

For tests with blood cultures, a sample of uninoculated blood culture medium from the same source as the specimen should be used as a negative control. Note: testing uninoculated media is important as false-positives can occur with some formulations of blood culture media.

NOTE: Previously assayed positive and negative samples aliquoted and stored frozen at –15 to –25°C or below, may be used as positive and negative controls respectively, if desired. The Positive Control can also be used in place of test sample.

10 RESULTS

READING OF RESULTS

A **positive** reaction is indicated by the development of an agglutinated pattern within 3 minutes of mixing the latex with the test sample, showing clearly visible clumping of the latex particles (Figure 1).

The speed of appearance and quality of agglutination depend on the strength of the antigen, varying from large clumps which appear within a few seconds of mixing, to small clumps which develop rather slowly.

Figure 1

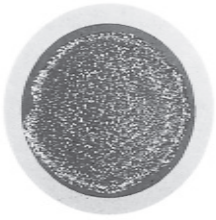

Figure 2

In a **negative** reaction the latex does not agglutinate and the milky appearance remains substantially unchanged throughout the test (Figure 2). Note, however, that faint traces of granularity may be detected in negative patterns, depending on the visual acuity of the operator.

INTERPRETATION OF RESULTS

Positive Result

Clear agglutination of the Test Latex accompanied by a lack of agglutination of the Control Latex indicates the presence of H. influenzae type b antigen in the body fluid or blood culture supernatant.

Negative Result

Lack of agglutination in both reagents means that no H. influenzae type b antigen is detectable in the test fluid – it does not eliminate the possibility of H. influenzae type b infection, and if symptoms persist it may be desirable to perform the test on subsequent or alternative specimens, or after concentration of the urine specimens.

Non-interpretable Result

Visible agglutination of the Control Latex, whether stronger or weaker than the Test Latex, indicates a non-specific reaction. In most cases, non-specific reactions with body fluids may be eliminated by heating and clarifying the sample (see **Preparation of Clinical Specimens**, section **8**). If a non-specific reaction occurs with a blood culture supernatant, heat the sample in a boiling water bath for 5 minutes, cool to room temperature (18 to 30°C), clarify by centrifugation and repeat the test.

11 PERFORMANCE LIMITATIONS

11.1 A positive result in the test depends on the presence of a detectable level of antigen in the body fluid or blood culture medium.

11.2 A few examples have been reported of unrelated bacteria which possess common antigens and, as with any immunological test system, the possibility of cross reactions occurring in the latex test can not be ruled out[1,11].

12 EXPECTED RESULTS

Samples containing a detectable level of H. influenzae type b antigen will give an agglutination reaction with the Test Latex.

13 PERFORMANCE CHARACTERISTICS

Clinical studies were carried out in hospital laboratories using body fluid samples (fresh and stored frozen) and supernatants from aerobic and anaerobic blood cultures. Both traditional and radiometric cultural techniques were used in the blood culture studies. Stored body fluid samples were not heat treated as described under **Preparation of Clinical Specimens**, section **8**. Extensive laboratory testing has shown no significant loss of antigen after heating by this procedure.

SENSITIVITY

The sensitivity of Wellcogen H. influenzae b was established from tests on samples found to be culture positive for the homologous organism. Wellcogen H. influenzae b detected 97% (117/121) culture positive body fluid samples and 100% (54/54) positive blood culture samples (Table 1).

SPECIFICITY

The specificity of Wellcogen H. influenzae b was evaluated using 632 body fluid (fresh and frozen) and 1566 blood culture samples from patients with bacterial or aseptic meningitis and other unrelated conditions.

The organisms isolated from the infected body fluid samples were Streptococcus pneumoniae, N. meningitidis groups A, C, Y, E. coli, Staphylococcus aureus, Mycobacterium tuberculosis, Enterobacter aerogenes, Streptococcus group B and a coliform bacterium.

The specificity of Wellcogen H. influenzae b in detecting bacterial antigen in all the body fluids tested was 99.7% (630/632). Two CSF samples tested gave positive reactions with Wellcogen H. influenzae b; one sample was aseptic and E. coli was isolated from the other.

The specificity of Wellcogen H. influenzae b in tests on blood culture was 99.7% (1561/1566) (Table 1). The bacteria isolated from the 5 positive blood cultures were: Staph. aureus, E. coli plus Staph. epidermidis, Klebsiella oxytoca and α-haemolytic streptococcus.

Non-specific reactions were obtained with one additional CSF and three additional serum samples (which had not been heat treated as directed). Nine blood culture supernatants gave non-specific reactions on initial testing and all but one of those was removed by heat treatment of the sample as described under **Preparation of Clinical Specimens**, section **8**.

Table 1

Results of clinical studies on Wellcogen H. influenzae b

	Sensitivity[a]		Specificity[b]	
Sample	No. tested	No. positive	No. tested	No. positive
CSF	90	87	375[c]	2[d]
Serum	21	20	21	0
Urine	10	10	236	0
Blood Culture	54	54	1566[e]	5[f]

[a] H. influenzae type b isolated.
[b] Bacteria other than H. influenzae type b/no growth.
[c] One additional CSF sample gave a non-specific reaction.
[d] Aseptic CSF; E. coli isolated.
[e] Two additional blood culture supernatants gave non-specific reactions.
[f] One sample aseptic. Other samples grew Staph. aureus; E. coli + Staph. epidermidis; Klebsiella oxytoca; α-haemolytic streptococcus.

14 BIBLIOGRAPHY

1 **Argaman, M., Liu, T.Y., et al (1974).**
Polyribitol-phosphate: an antigen of four gram-positive bacteria cross-reactive with the capsular polysaccharide of Haemophilus influenzae type b.
J. Immunol., 112, 649.

2 **Dajani, A.S., Asmar, B.I., et al (1979).**
Systemic Haemophilus influenzae disease: an overview.
J. Pediatr., 94, 355.

3 **Doskeland, S.O. and Berdal, B.P. (1980).**
Bacterial antigen detection in body fluids: methods for rapid antigen concentration and reduction of nonspecific reactions.
J. Clin. Microbiol., 11, 380.

4 **Feigin, R.D., Wong, M., et al (1976).**
Countercurrent immunoelectrophoresis of urine as well as of CSF and blood for diagnosis of bacterial meningitis.
J. Pediatr., 89, 773.

5 **Holsclaw, D.S. and Schaeffer, D.A. (1980).**
Counterimmunoelectrophoresis in the diagnosis of Hemophilus influenzae pleural effusion.
Chest, 78, 867.

6 **Kaldor, J., Asznowicz, R.,** et al (1977).
Latex agglutination in diagnosis of bacterial infections, with special reference to patients with meningitis and septicemia.
Amer. J. Clin. Path., 68, 284.

7 **Kaldor, J., Asznowicz, R.,** et al (1979).
Haemophilus influenzae type b antigenuria in children.
J. Clin. Path., 32, 538.

8 **Leinonen, M. and Käyhty, H.** (1978).
Comparison of counter-current immunoelectrophoresis, latex agglutination, and radioimmunoassay in detection of soluble capsular polysaccharide antigens of Haemophilus influenzae type b and Neisseria meningitidis of groups A or C.
J. Clin. Path., 31, 1172.

9 **O'Reilly, R.J., Anderson, P.,** et al (1975).
Circulating polyribophosphate in Hemophilus influenzae, type b meningitis. Correlation with clinical course and antibody response.
J. Clin. Invest., 56, 1012.

10 **Smith, L.P., Hunter, K.W.,** et al (1981).
Antigen from small amounts of serum.
Abst. Ann. Mtg. A.S.M., 286.

11 **Whang, H.Y., Goldhar, J.,** et al (1977).
Effect of heat on antigenicity and immunogenicity of the antigenic determinant shared by Haemophilus influenzae type b and Escherichia coli K100.
Inf. Immun., 18, 68.

12 **Whittle, H.C., Tugwell, P.,** et al (1974).
Rapid bacteriological diagnosis of pyogenic meningitis by latex agglutination.
Lancet, ii, 619.

CE

Remel Europe Ltd
Clipper Boulevard West, Crossways
Dartford, Kent, DA2 6PT
UK

For technical assistance please contact your local distributor.

IFU X7709B Revised June 2014. Printed in the UK