Strep B

Product-#: 0545_K20

Rapid test for the qualtitative detection of group B streptococcal antigen

INTENDED USE

The DIMA® Strep B Rapid Test Device is a rapid visual immunoassay for the qualitative detection of Group B Streptococcal antigen in female vaginal swab. This kit is intended to be used as an aid in the diagnosis of Group B Streptococcal infection.

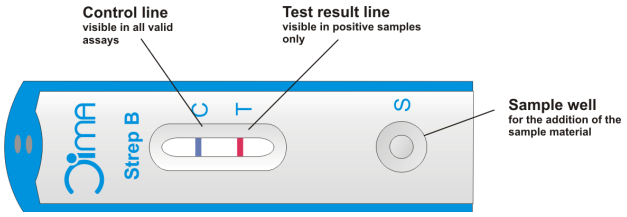
INTRODUCTION

Group B Streptococci (GBS) or *Streptococcus agalactiae* are Gram-Positive bacteria and are among the most frequent causes of life-threatening infectious in neonates. Between 5% and 30% of all pregnant women are colonized with GBS.[1] Several recent studies have shown that the intrapartum treatment of GBS-colonized women significantly reduces the incidence of GBS-caused sepsis. [2-4] Therefore, Guidelines recommended by the Center for Disease Control and Prevention (CDC) and some European countries, such as Spain and Belgium, are very similar and do recommend a routine GBS screening test between the 35th and 37th week of pregnancy.
A CDC study results that routine examinations is 50% more effective than the use of antibiotics for pregnant women with clinical risk factors.
Standard culture methods require 24 to 48 hours, and the results may not be available soon enough for efficient treatment. Also PCR may be used to diagnose a GBS infection however this is a long lasting and costly method as well. Thus, methods utilizing more rapid screening techniques are required.
The DIMA® Strep B Rapid Test Device is a simple, rapid and sensitive immunochromatographic assay for screening of GBS antigen from patient vaginal or cervical swab specimens. The test procedure takes less than 20 minutes and does not require special instrumentation. Therefore, it can be used to screen pregnant women in real time during labor which is of a great advantage as GBS is a transient infection which means that a pregnant woman tested negative during the 35-37th week may be tested positive during labor and vice versa.

TEST PRINCIPLE

The DIMA® Strep B Rapid Test Device has been designed to detect Group B Streptococcal antigen through visual interpretation of color development in the internal strip of the test device. The membrane was immobilized with Rabbit anti Strep B antibody on the test region. During the test, the specimen is allowed to react with conjugates of another rabbit anti-Strep B antibody and pink colored particles, which were precoated on the sample pad of the test. The mixture then moves on the membrane by a capillary action, and interact with reagents on the membrane. If there were enough Strep B antigens in specimens, a pink colored line will form at the test region of the membrane. Presence of this colored line indicates a positive result, while its absence indicates a negative result. Appearance of a blue colored line at the control region serves as a procedural control. This indicates that proper volume of specimen has been added and membrane wicking has occurred.

Set-up of the test Device



REAGENTS AND MATERIALS SUPPLIED

20 test devices packed in single pouch with dessicant bag	Each device contains a strip with colored conjugates and reactive reagents pre-coated at the corresponding regions.
1 bottle of Extraction Buffer A – 5 ml (T Toxic R25: Toxic if swallowed)	Buffer solution containing 1.0 M Sodium Nitrite with yellow cap.
1 bottle of Extraction Buffer B - 5ml	Buffer solution containing 0.4 M Acetic Acid with white cap.
1 bottle of Extraction Buffer C - 5ml	Buffer solution containing 0.3 M sodium hydroxide with green cap.
20 Extraction tubes with dropper caps	For specimens preparation use.
1 Package insert	For operation instruction.
20 swabs	For specimen collection and storage.
1 Workstation	For standing up Extraction tubes

MATERIAL REQUIRED BUT NOT PROVIDED

Timer	For timing use.

PRECAUTIONS

- For professional IN VITRO DIAGNOSTIC USE ONLY!
- For single use only
- Do not use after stated expiration date.
- The test device should remain in the sealed pouch until use, because it is humidity sensitive!
- Therefore do not use test if pouch is damaged!
- Do not mix reagents from different lots.
- Do not mix reagent bottle caps.
- Do not use more than the required amount of liquid.
- Bring all reagents to room temperature (15-30°C) before use.
- Do not spill the specimens into the reaction zone.
- Avoid cross-contamination of specimens by using new extraction tubes and specimen pipettes for each specimen.
- Do not touch the reaction zone of the device to avoid contamination.
- Store and transport the test device always at 2-30°C (36°-86°F)
- Humidity and high temperature can adversely affect results.
- Use only the Polyester tipped sterile swabs with plastic shafts (Pur-Wraps, REF 25-806 1PD, Puritan Medical Products Company LLC) such as those provided in the kit. The test has not been validated with other types of swabs.
- Do not eat, drink or smoke in the area where the specimens or kits are handled.
- Wear protective clothing such as laboratory coats, disposable gloves and eye protection when specimens are being tested.
- Extraction Reagent A is toxic at swallowing.
- Extraction Reagents A&B are slightly caustic. Avoid contact with eyes or mucous membranes. In the event of accidental contact, wash thoroughly with water.
- This kit contains products of animal origin. Certified knowledge of the origin and/or sanitary state of the animals does not totally guarantee the absence of transmissible pathogenic agents. It is therefore, recommended that these products be treated as potentially infectious, and handled observing the usual safety precautions (do not ingest or inhale).
- Standard guidelines for handling infectious agents and chemical reagents should be observed throughout all procedures. When the assay procedure is completed, dispose the swabs carefully after autoclaving them at 121°C for at least 20 minutes. Alternatively, they can be treated with 0.5% sodium hypochloride (or house-hold bleach) for one hour before disposal. The used testing materials should be discarded in accordance with local, state and/or federal regulations.
- **Do not use cytology brushes with pregnant patients.**

STORAGE AND STABILITY

- The kit should be stored at 2-30°C until the expiry date printed on the box.
- 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.

SPECIMEN COLLECTION AND STORAGE

- Use only Polyester tipped sterile swabs with plastic shafts supplied in the kit (Pur-Wraps, REF 25-806 1PD, Puritan Medical Products Company LLC).
- Insert the swab into the inside of the vagina, and rotate for 20 sec. Pull the swab out carefully!
- Do not place the swab in any transport device containing medium since transport medium interferes with the assay. Viability of the organisms is not required for the assay. If immediate testing is not possible, the swab should be placed in a dry recipient for storage or transport. The swabs may be stored for 24 hours at room temperature (15-30°C) or 1 week at 4°C or 6 months at -20°C. All specimens should be allowed to reach room temperature of 15-30°C before testing.

TEST PROCEDURE

Bring tests, specimens, buffer and/or controls to room temperature (15-30°C) before use.

Extraction

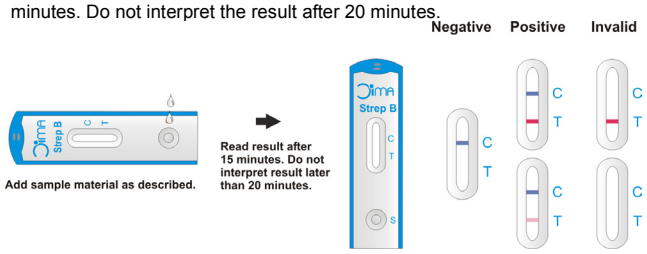
1. Provide 3 drops of Extraction Buffer A to the extraction tubes.
2. Add 3 drops of Extraction Buffer B to the tube and mix the liquids thoroughly.
3. Immediately place the swab specimen in the tube. Use a circular motion to roll the swab against the side of the Extraction Tube so that the liquid is squeezed out from the swab and reabsorb again for 2 minutes.
4. Add 3 drops of Extraction Buffer C to the tube. Squeeze the swab firmly against the tube and let reabsorb again.
5. At the end of the extraction the swab should be squeezed totally to remain as much liquid as possible in the extraction tube. The swab must be disposed according the local guidelines for handling infectious agents and chemical reagents.
6. Close the tube with the dropper cap.

Test Procedure

7. Remove the test from its sealed pouch and place it on a clean, level surface. Label the device with patient or control identification. For best results, the assay should be used within one hour.
8. Add 3 drops (approximately 100 µl) of extracted solution from the extraction tube to the sample well on the test device.

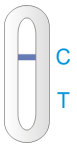
   Avoid trapping air bubbles in the specimen well (S), and do not add any solution to the result window.

   As the test begins to work, color will migrate across the membrane.
9. Wait for the colored line(s) to appear. The result should be read at 15 minutes. Do not interpret the result after 20 minutes.



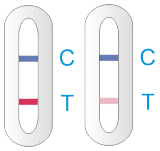
INTERPRETATION OF RESULTS

Negative Result:



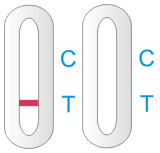
Only one blue colored line appears, in the control region (C). No colored line appears in the test region (T). A negative result indicates that the specimen contains no Strep B antigen.

Positive Result:



Two colored lines appear on the membrane. One blue line appears in the control region (C) and another pink line appears in the test region (T). A positive result indicates that Strep B Antigen has been detected.

Invalid Result:



Control line fails to appear. Results from any test which has not produced a control line at the specified reading time must be discarded. Please review the procedure and repeat with a new test. If the problem persists, discontinue using the kit immediately and please contact the local distributor.

NOTE:

1. The intensity of color in the test region (T) may vary depending on the concentration of analytes present in the specimen. Therefore, any shade of color in the test region (T) should be considered positive. Note that this is a qualitative test, and cannot determine the concentrations of analytes in specimens.
2. Insufficient specimen volume, incorrect operating procedure or expired tests are the most likely reasons for control line failure.

QUALITY CONTROL

- Internal procedural controls are included in the test. A colored line appearing in the control region (C) is considered as internal positive procedural control. It confirms sufficient specimen volume and correct procedural technique.
- External procedural controls ensure that the tests are functioning properly. Also, Controls may be used to demonstrate proper performance by the test operator. To perform a positive or negative control test, complete the steps in the Test Procedure section in the same manner as a real sample.

LIMITATIONS OF PROCEDURE

1. The DIMA® Strep B Rapid Test Device is for professional *in vitro* diagnostic use, and should be used for the qualitative detection of Group B Streptococcal only. There is no meaning attributed to line color intensity or width.
2. Some local used vaginal drugs may contain viscous components that can bind to the swab tip and generate light grey test line. If this happens, test should be repeated with a new swab. In any case, a grey colored test line shouldn't be considered as positive.
3. Detection of Group B Streptococcal is dependent on the number of organisms present in the specimen. This may be affected by specimen collection methods and patient factors such as age, history of sexual transmitted diseases (STD), presence of symptoms, etc. The minimum detection level of this test may vary according to serovar.
4. As with all diagnostic tests, a definitive clinical diagnosis should not be based on the results of a single test, but should only be made by the physician after all clinical and laboratory findings have been evaluated.
5. The accuracy of the test depends on the quality of the swab sample. False negatives may result from improper sample collection or storage. A negative result may be obtained from patients with low antigen concentration. Therefore, when a patient suspected of having *streptococcus agalactiae* (Strep B) has a negative test result, additional testing using the culture method is required.

PERFORMANCE CHARACTERISTICS

Analytical Sensitivity

In a sensitivity study it could be shown that the sensitivity of the assay varied in dependence of the strain used in the assay. The study showed that the strain-specific sensitivities ranged between $1.0x10^5$ and $2.0x10^5$ org/swab.

Clinical Sensitivity and Specificity

Table: Strep B Rapid Test vs. Culture

			Culture		
Relative Sensitivity: 87.3% (76.5%-94.3%)* **Relative Specificity:** 99.4% (97.8%-99.9%)* **Overall Agreement:** 97.5% (95.4%-98.8%)* ***95% Confidence Interval**			**+**	**-**	**Total**
	***DIMA*® Strep B Test**	**+**	55	2	57
		-	8	328	336
			63	330	393

Specificity

Cross-reactivity studies were performed with a variety of non-GBS microorganisms. The microorganisms listed below tested negative at 1.0×10^7 organisms/swab:

Organisms	**Organisms**
Achinetobacter spp	*Listeria spp*
Acholeplasma laidlawii	*Mycoplasma spp*
Aeromonas spp	*Neisseria gonorrhoeae*
Bacteroides spp	*Peptococcus spp*
Campylobacter spp	*Peptostreptococcus spp*
Candida spp	*Proteus spp*
Chlamydia trachomatis	*Pseudomonas spp*
Citrobacter spp	*Salmonella spp*
Clostridium spp	*Serratia spp*
Cytomegalovirus	*Shigella spp*
Enterobacter spp	*Staphylococcus aureus (cowan 1 strain)*
Epstein Barr Virus	*Staphylococcus spp (coag.neg)*
Escherichia coli	*Staphylococcus spp (coag.pos)*
Gardnerella spp	*Streptococcus spp*
Group A Streptococcus	*Trichomonas spp*
Group C Streptococcus	*Ureaplasma urealyticum*
Haemophilus influenzae	*Varicella zoster virus*
Klebsiella spp	*Veillonella spp*
Lactobacillus spp	

LITERATURE

1. Finch, R.G., French, G.L., and Phillips, I.; Group B streptococci in the female genital tract; *Br. Med. J.*, **1** (6020) 1245-1247, 1976
2. You, M.D., Mason, E.O., Leeds, L.J., Thompson, P.K., Clark, D.J. and Gardner, S.E.; Ampicilin prevents intrapartum transmission of group B streptococcus; *JAMA* **241** (12) 1245-1247 ,1979
3. Boyer, K.M., and Gotoff, S.P.; Prevention of early-onset neonatal group B streptococcal disease with selective intrapartum chemotaxis; *N. Eng. J. Med.* **314** 1665-1669, 1986
4. Lim, D.V., Morales, W.J., Walsh, W.J. and Kazanis, D.; Reduction of morbidity and mortility rates for neonatal group B streptococcal disease through early diagnosis and chemoprophylaxis; J. *Clin. Microbiol.* **23** 489-492, 1986

SYMBOLS

IVD	For *in-vitro* diagnostic use only		For single use only
Σ	Content		Expiry date
LOT	Lot number		Storage temperature
	Manufacturer		Carefully read package insert
CE	CE marked according to IVD Medical Devices Directive 98/79/EC		

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