

# Bacto™ Todd Hewitt Broth • Todd Hewitt Broth Todd Hewitt Broth with Gentamicin and Nalidixic Acid

## Intended Use

Todd Hewitt Broth is a general-purpose medium, which primarily is used for the cultivation of beta-hemolytic streptococci, especially for serological studies.

Todd Hewitt Broth with Gentamicin and Nalidixic Acid is used for the selective enrichment of group B streptococci (*Streptococcus agalactiae*), especially from genital specimens.

## Summary and Explanation

Todd Hewitt broth originally was developed for use in the production of streptococcal hemolysin.<sup>1</sup> The modification of Updyke and Nickle<sup>2</sup> is used for the growth of beta-hemolytic streptococci for use in fluorescent antibody test procedures<sup>3</sup> and for serological typing based on the production of type-specific M protein.<sup>4</sup>

Since its emergence in the 1970s, neonatal group B streptococcal disease has become the major infectious cause of illness and death among newborns. Prior to 1994, an estimated 7,600 episodes of invasive group B streptococcal disease, primarily sepsis and meningitis, occurred in newborns each year in the United States, with approximately 80% of those episodes representing early-onset disease occurring within the first week of life.<sup>5</sup> The disease is spread to newborns through vertical transmission from a mother who carries group B streptococci in her anorectum or genital tract.

The Centers for Disease Control and Prevention (CDC) has published guidelines for screening and use of intrapartum chemoprophylaxis for prevention of neonatal group B streptococcal disease.<sup>6</sup> The use of Todd Hewitt Broth with Gentamicin and Nalidixic Acid (or Lim Broth) is recommended to maximize the likelihood of recovering group B streptococci upon plating on sheep blood agar.

Group B streptococci have also been found in cases of sepsis in nonparturient women and in men and in joint infection, osteomyelitis, urinary tract infection and wound infection. They are associated with endocarditis, pneumonia and pyelonephritis in immunosuppressed patients.<sup>7</sup>

## Principles of the Procedure

Todd Hewitt Broth is highly nutritious due to its content of peptones, dextrose and salts. Dextrose stimulates hemolysin production. Sodium phosphate and sodium carbonate provide buffering action to counteract the acidity produced during fermentation of dextrose, thereby protecting the hemolysin from inactivation by the acid.<sup>4</sup>

Selectivity for group B streptococci is obtained by the inclusion of gentamicin and nalidixic acid in the medium. Selective enrichment broths include the advantages of both enrichment and selection by providing conditions conducive to the growth of group B streptococci while inhibiting the growth of contaminants.

## Formula

### Bacto™ Todd Hewitt Broth

Approximate Formula* Per Liter	
Heart, Infusion from 500 g.....	3.1 g
Neopeptone.....	20.0 g
Dextrose .....	2.0 g
Sodium Chloride .....	2.0 g
Disodium Phosphate .....	0.4 g
Sodium Carbonate.....	2.5 g

\*Adjusted and/or supplemented as required to meet performance criteria.

## Directions for Preparation from Dehydrated Product

1. Dissolve 30 g of the powder in 1 L of purified water.
2. Autoclave at 121°C for 15 minutes.
3. Test samples of the finished product for performance using stable, typical control cultures.

## User Quality Control

### Identity Specifications

#### Bacto™ Todd Hewitt Broth

Dehydrated Appearance:	Light beige, free-flowing, homogeneous.
Solution:	3.0% solution, soluble in purified water. Solution is light to medium amber, clear.
Prepared Appearance:	Light to medium amber, clear.
Reaction of 3.0% Solution at 25°C:	pH 7.8 ± 0.2

### Cultural Response

#### Bacto™ Todd Hewitt Broth

Prepare the medium per label directions. Inoculate and incubate at 35 ± 2°C for 18-48 hours.

ORGANISM	ATCC™	INOCULUM CFU	RECOVERY
<i>Neisseria meningitidis</i>	13090	10 <sup>2</sup> -10 <sup>3</sup>	Good
<i>Staphylococcus aureus</i>	25923	10 <sup>2</sup> -10 <sup>3</sup>	Good
<i>Streptococcus pneumoniae</i>	6303	10 <sup>2</sup> -10 <sup>3</sup>	Good
<i>Streptococcus pyogenes</i>	19615	10 <sup>2</sup> -10 <sup>3</sup>	Good

## Procedure

Incubate throat swabs in loosely-capped tubes of Todd Hewitt Broth at 35 ± 2°C in an aerobic atmosphere with or without added carbon dioxide for 2-5 hours prior to use in fluorescent antibody procedures for the identification of group A streptococci. Incubation may be continued for approximately 24 hours prior to streaking for isolation on blood agar plates. Pure cultures of streptococci may be cultured in Todd Hewitt Broth prior to the preparation of extracts for serological typing.

Consult appropriate references for specific serological test procedures.<sup>2,8</sup>

Incubate tubes of Todd Hewitt Broth with Gentamicin and Nalidixic Acid in an aerobic atmosphere with or without added carbon dioxide. If turbidity is observed, subculture from the broth culture to a sheep blood agar plate; otherwise, incubate an additional 24 hours before discarding.<sup>9</sup>

## Expected Results

Growth in broth medium is indicated by the presence of turbidity compared to an uninoculated control.

Subculture to a **Trypticase™** Soy Agar with 5% Sheep Blood (TSA II) plate and incubate for 18-24 hours, or up to 48 hours if necessary. Identify organisms suggestive of group B streptococci ( $\beta$ - or non-hemolytic, gram-positive and catalase negative). Specific identification may be performed; e.g., using streptococcal grouping sera, the CAMP test or other procedures.

## References

1. Todd and Hewitt. 1932. J. Pathol. Bacteriol. 35:973.
2. Updyke and Nickle. 1954. Appl. Microbiol. 2:117.
3. Jones, Hebert and Cherry. 1978. Fluorescent antibody techniques and bacterial applications, HEW Publication (CDC) No. 78-8364. Center for Disease Control, Atlanta, Ga.
4. MacFaddin. 1985. Media for isolation-cultivation-identification-maintenance of medical bacteria, vol. 1. Williams & Wilkins, Baltimore, Md.
5. Federal Register. 1994. Prevention of group B streptococcal disease: a public health perspective. Fed. Regist. 59:64764.
6. Centers for Disease Control and Prevention. 2002. Morbid. Mortal. Weekly Rep. 51(No. RR-11): 1.
7. Forbes, Sahm and Weissfeld. 2007. Bailey & Scott's diagnostic microbiology, 12th ed. Mosby, Inc., St. Louis, Mo.
8. Facklam and Washington II. 1991. In Balows, Hausler, Hermann, Isenberg and Shadomy (ed.), Manual of clinical microbiology, 5th ed. American Society for Microbiology, Washington, D.C.
9. Isenberg (ed.). 1992. Clinical microbiology procedures handbook, vol. 1. American Society for Microbiology, Washington, D.C.

## Availability

### Bacto™ Todd Hewitt Broth

Cat. No.	249240	Dehydrated – 500 g
	249210	Dehydrated – 2 kg
	249220	Dehydrated – 10 kg

### BBL™ Todd Hewitt Broth

Cat. No.	297778	Prepared Tubes (K Tubes), 0.5 mL – Pkg. of 10
	221713	Prepared Tubes (K Tubes), 5 mL – Pkg. of 10
	221714	Prepared Tubes (K Tubes), 5 mL – Ctn. of 100

### BBL™ Todd Hewitt Broth with Gentamicin and Nalidixic Acid

Cat. No.	299486	Prepared Tubes (K Tubes) – Ctn. of 100*
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\*Store at 2-8°C.