Detection Of *S. agalactiae* From Group B Streptococcal Broth-Enriched Swabs

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Overview

Purpose: To compare the use of Thermo Scientific™ *Brilliance*™ GBS Agar (Thermo Fisher Scientific), and chromID™ StreptoB Agar (bioMérieux) following an enrichment step using Oxoid™ Group B Streptococcal Broth; (Trans Vag Broth (Todd Hewitt Broth & gentamicin and nalidixic acid); Thermo Fisher Scientific) enrichment for detection of *Streptococcus agalactiae* (Lancefield group B Streptococcus, GBS).

Methods: Three hundred and sixty one swabs were enriched in Oxoid Group B Streptococcal Broth. Following enrichment, broths were subcultured onto *Brilliance* GBS Agar and chromID StreptoB Agar. GBS colonies were confirmed using group B latex.

Results: Sensitivity, NPV and percentage inhibition of non-target organisms on *Brilliance* GBS Agar was greater than chromID StreptoB Agar.

Introduction

During the last few decades, neonatal group B streptococcal (GBS) disease has been associated with significant rates of morbidity and mortality in the perinatal period. Maternal streptococcal colonisation is also associated with increased risk of urinary tract infection and pregnancy complications such as endometriosis, chorioamnionitis, premature delivery and intrauterine death[1]. The screening approach to prevention of GBS infection is challenging because it requires screening women at 35 to 37 weeks' gestation, having test results available at the time of labour, and making provisions for appropriate clinical management in the case of women whose group B streptococcal colonization status is unknown[2].

Brilliance GBS Agar (see figure 1.) is a transparent screening media specifically designed for the isolation and presumptive identification of GBS. GBS will grow as pink-coloured colonies on the medium. The inclusion of the Inhibigen™ technology enhances the plate by allowing inhibition of non-target organisms without affecting the growth of GBS. This propriety technology works by targeting organism-specific enzymatic reactions through the uptake and cleavage of inhibitory agents, leading to cell lysis[3].

Methods

Three hundred and sixty one swabs (including low vaginal swabs (LVS), high vaginal swabs, (HVS), vaginal or recto-vaginal) taken from pregnant women, women undergoing antenatal screening, women presenting with premature rupture of membrane (PROM) or early deliveries were collected from four SA Pathology laboratories in South Australia (Flinders Medical Centre, Lyell McElwin Hospital, Royal Adelaide Hospital and Adelaide Women's and Children's Hospital) were enriched in Oxoid Group B Streptococcal Broth.

Broths were incubated at 36±1°C for 24 hr.; if broths showed visible turbidity after 24 hr. incubation, the broth was subcultured onto *Brilliance* GBS Agar and chromID StreptoB Agar. If broths were not visibly turbid after 24 hr. incubation they were re-incubated for a further 24 hr. After 48 hr. incubation broths were subcultured onto *Brilliance* GBS Agar and chromID StreptoB Agar regardless of turbidity. All plates were incubated at 36±1°C for 18-24 hr. Presumptive positive colonies on both *Brilliance* GBS Agar (pink) and chromID StreptoB Agar (pink-red) were confirmed using either Phadebact® Strep B test (Launch Diagnostics) or Oxoid™ Streptococcal Grouping B latex (Thermo Fisher Scientific).

Sensitivity and negative predictive value (NPV) were calculated for each individual hospital and the four SA Pathology laboratories combined. Percentage inhibition of non-target organisms (i.e. organisms other than GBS) on both plates was also calculated.

Results

Sensitivity and negative predictive values for the four SA Pathology laboratories combined are summarised in table 1. Sensitivity and negative predictive values for each individual laboratory are summarised in table 2.

TABLE 1. Performance of *Brilliance* GBS Agar and chromID StreptoB Agar at the four SA Pathology laboratories combined

Performance	*Brilliance* GBS Agar	chromID StreptoB Agar
Sensitivity	100%	81.7%
NPV	100%	96.5%

Brilliance GBS Agar showed 100% sensitivity and NPV at all four SA Pathology sites. Sensitivity and NPV of chromID StreptoB Agar was lower than *Brilliance* GBS Agar at three of the four SA Pathology sites and when data was combined, with sensitivity of chromID StreptoB Agar ranging from 40% to 81.3% and NPV ranging from 93.8% to 96.6%.

Overall, chromID StreptoB Agar failed to detect 11 GBS that *Brilliance* GBS Agar did detect.

FIGURE 1. GBS isolated from the study on *Brilliance* GBS Agar

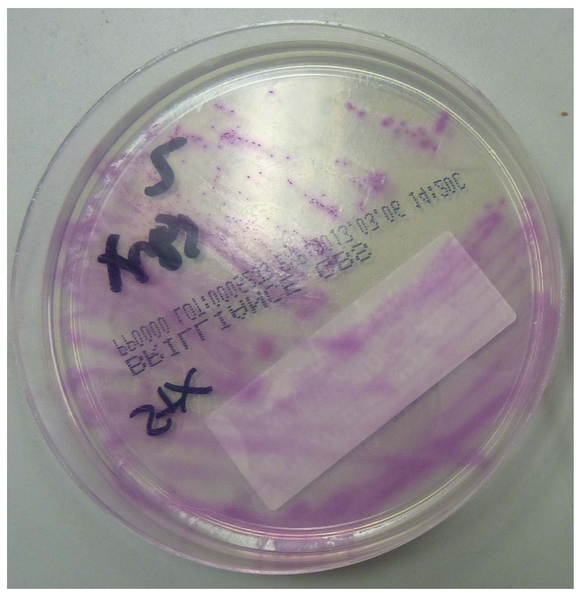

TABLE 2. Performance of *Brilliance* GBS Agar and chromID StreptoB Agar at each SA Pathology laboratory

Laboratory	Performance	*Brilliance* GBS Agar	chromID StreptoB Agar
Flinders Medical Centre (n=92)	Sensitivity	100%	81.3%
	NPV	100%	96.2%
Lyell McElwin Hospital (n=97)	Sensitivity	100%	75.0%
	NPV	100%	93.8%
Royal Adelaide Hospital (n=81)	Sensitivity	100%	100%
	NPV	100%	100%
Adelaide Women's and Children's Hospital (n=91)	Sensitivity	100%	40.0%
	NPV	100%	96.6%

Brilliance GBS Agar also inhibited the growth of far more non-target organisms compared to chromID StreptoB Agar with *Brilliance* GBS Agar showing complete inhibition of non-target organisms on 39% of all samples tested compared to 16% on chromID StreptoB Agar.

Conclusion

Sensitivity and NPV of *Brilliance* GBS Agar was greater than chromID StreptoB Agar, as was the percentage inhibition of non-target organisms.

Acknowledgments

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References

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