

Evaluation of the Σ -VCM™ (Virus, Chlamydia, Mycoplasma) universal transport system for the storage and recovery of *Neisseria gonorrhoeae*

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The Σ -VCM™ transport device from Medical Wire has been developed to enable the collection, transport and preservation of viruses, mycoplasma, ureaplasma and chlamydia. Studies have shown that the Σ -VCM™ media does not interfere with molecular testing and could potentially be used to recover viable *Neisseria gonorrhoeae* (GC).

The aim of the study was to look into the rates of recovery of viable GC from Σ -VCM™ over a 96 hour period to ascertain if the transport system could be a useful tool for the storage and recovery of GC. If viable GC can be preserved in this transport system for up to 4 days then there is potential for this Σ -VCM™ to be used at genito urinary medicine (GUM) clinics or elsewhere in healthcare as a complete swab for sexually transmitted infection screening. The ability to culture GC from a stored transport swab following positive molecular test results could be very useful for both microbiology and GUM clinics as it would prevent the need for further samples to be taken for culture of GC if sensitivity tests are required.

Method

A total of 14 GC isolates were used for this study and comparison was made between storage of the Σ -VCM™ at fridge temperature against room temperature. Σ -VCM™ spiked with GC were sub cultured at 0, 24, 48, 72 and 96 hours to assess survival rates.

A Mcfarland of 0.5 was used to make up GC suspensions which equated to approximately 10^7 orgs/ml. Serial dilutions were then performed and the

Neat suspension (N), 1:100 and 1:1000 dilutions were used for the study. For each isolate a Σ -VCM™ was labelled according GC isolate ID (A to N) to dilution, storage temperature and time period. GC was spiked in to the Σ -VCM™ media by dipping the Σ -VCM™ swab into the MRD suspensions then placing the swab in to the appropriately labelled Σ -VCM™ container.

Within 15 minutes of inoculation, Miles Misra was performed on each Σ -VCM™ using Columbia Chocolate agar to determine an initial cfu/ml prior to storage.

The Σ -VCM™ was then stored at either fridge temperature (4.5 - 5.5°C) or room temperature (20.0 - 21.0°C) monitored by Tutela™ temperature monitoring systems. Miles Misra was then performed at 24 hour intervals using Columbia Chocolate agar from the related Σ -VCM™ tube. The Columbia chocolate agar was incubated for 48 hours to allow for the GC to grow then colony counts performed where possible.

Results

Out of 14 GC isolates 2 were non viable at day 0.

Based on the 12 viable GC isolates where growth was observed on chocolate agar following subculture at day 0, the following conclusions were made:

- It is possible to recover live GC from the Σ -VCM™ for up to 4 days following inoculation but this could depend on how the Σ -VCM™ was stored and what the initial cfu/ml was on day one.
- Irrespective of the initial cfu/ml observed from Σ -VCM™ at day 0 there appears to be an obvious benefit to storage of the containers at fridge temperature *i.e.* all 12 isolates could still be recovered from fridge temperature 1 to 3 days later than room temperature.
- These results correlate with a previous unreported study based on the same methodology at our laboratory. In this study 5 GC isolates were tested and no growth was observed from subcultures at 72 hours onwards at room temperature but growth was observed at 72 hours onwards at fridge temperature.
- There is an observable decline in recovery rate over 4 days at fridge temperature and room temperature although fridge temperature does appear to preserve the GC for longer

- The use of non selective Columbia Chocolate agar gave a higher yield of GC than GC selective agar with VCNT. However if this was a clinical sample using a GC selective media may be beneficial.

Discussion

There is potential for the Σ -VCM™ transport system to be used as a storage system for GC isolates in the clinical laboratory setting whilst molecular tests/identification tests are ongoing. This could enable the laboratory to return back to the Σ -VCM™ to recover the GC for antimicrobial sensitivity tests or to send to a reference laboratory. The transport system could be a useful tool for transport of this fastidious bacterium between centres for further work/epidemiology and is already being used for this scenario in the United Kingdom.

We are unable to say if the retrieval of GC from clinical samples would correlate with our results as other environmental factors could influence GC preservation such as proteinaceous material, pH, and other microbes collected during sampling. However, the results of this study and our previous research could be used as evidence to recommend the storage of Σ - VCM™ at fridge temperature as this appears to aid the preservation of GC. Concurrently, it could be argued that the components of the Σ - VCM are also better preserved at fridge temperature.