EVALUATION OF COPAN UNIVERSAL TRANSPORT MEDIUM IN COMBINATION WITH THE FLOCKED SWAB FOR THE COLLECTION AND PRESERVATION OF RESPIRATORY VIRUSES

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Abstract

Background: Accurate detection of respiratory viruses, by culture or direct antigen detection, is dependent on proper collection and transport of the clinical specimen. Nasopharyngeal aspirates or washes are the preferred specimen but are not always feasible. The use of standard rayon or dacron minitip swabs often yields poor quality specimens. A new type of swab has been developed; the "flocked" swab (Copan Diagnostics Inc., Corona, CA) has been introduced as a collection device for virology specimens. Its design offers the potential to collect and release more clinical specimen than does the common polyester swab. The flocked swab combined with Copan's universal transport medium (UTM) offers a flexible system for collection and transport of clinical specimens.

Objective: The goal of this study was to evaluate the flocked swab/UTM combination for the collection and preservation of seven respiratory viruses: Influenza A (FA), Influenza B (FB), Parainfluenza 1 (P1), Parainfluenza 2 (P2), Parainfluenza 3 (P3), Respiratory Syncytial Virus (RSV), an Adenovirus (AD).

Methods: The study used standardized stocks of the seven viruses to represent clinical specimens. A viral concentration was chosen that allowed for accurate quantification of test results. The swabs compared in the study were the customary polyester minitip versus the nylon flocked NP swab. Each swab type was tested in triplicate for each virus. The "specimen" was collected by placing the swab into the standardized suspension. The swab was twirled for 5 seconds to allow any air pockets to be dispelled. The swab was then placed into a 3 mL UTM vial. The vial was vortexed for 5 seconds and placed at 2 to 8° C. Each of these seeded UTM vials were inoculated into an R-Mix shell vial (Diagnostic Hybrids [DHI], Inc. Athens, OH) at the following time points: 1, 24, 48 hours post-inoculation. After 20 hours of incubation at 35° C, the shell vial cultures were stained with the D3 Respiratory Virus Detection kit (DHI). The cover slips were examined at 100x magnification and the infected cells counted.

Results: On the fluorescent D3 Respiratory Virus Detection slides, the flocked swab specimens yielded a substantial increase in infected cells for all viruses when compared to the minitip swab. The increases ranged from 5x (RSV) to 10x (FA). The stability of the viruses in the UTM, when stored at 2 to 8°C, was consistent with the claim in the UTM package insert.

Conclusions: The flocked swab exhibited a dramatic increase in the collection and release of the respiratory viruses when compared to the minitip swabs. The combination of the flocked swab and the UTM provides the laboratory with a markedly improved system for the detection of respiratory viruses.

Background

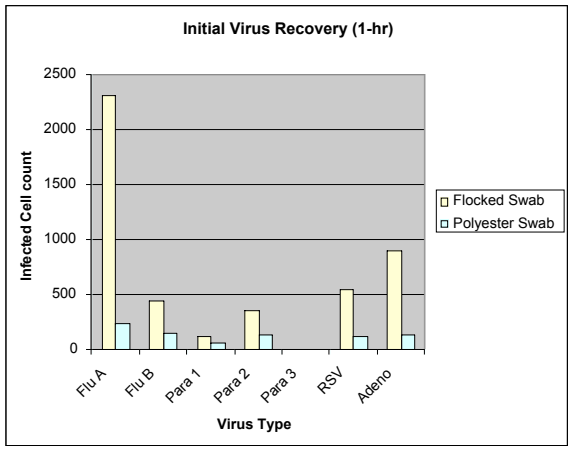
Accurate detection of respiratory viruses, by culture or direct antigen detection, is dependent on proper collection and transport of the clinical specimen. Nasopharyngeal aspirates or washes are the preferred specimen but are not always feasible. The use of standard rayon or dacron minitip swabs often yields poor quality specimens. A new type of swab has been developed; the "flocked" swab (Copan Diagnostics Inc., Corona, CA) has been introduced as a collection device for virology specimens. Its design offers the potential to collect and release more clinical specimen than does the common polyester swab. The flocked swab combined with Copan's universal transport medium (UTM) offers a flexible system for collection and transport of clinical specimens.

Methods:

1. 10-mL of standardized virus stock suspensions were prepared for each of seven viruses: Influenza A, Influenza B, Adenovirus, Parainfluenza 1, Parainfluenza 2, Parainfluenza 3, and Respiratory syncytial virus. A viral concentration was chosen that allowed for accurate quantification of test results.
2. The swabs used in the study were a polyester minitip swab and the nylon flocked NP swab.
3. Each swab type was tested in triplicate for each virus.
4. The swabs were inoculated as follows:
   a) The suspensions were mixed.
   b) A swab was placed perpendicularly into the suspension to al level approximately 2-mm beyond the polyester or nylon.
   c) The swab was twirled for 5-seconds to remove any air pockets.
   d) The swab was removed from the suspension and placed immediately into a 3.0-mL UTM vial.
   e) The UTM was capped and vortexed for 15-seconds.
   f) The inoculated UTM was stored at 2 to 8°C.
5. Each of these seeded UTM vials were inoculated into an R-Mix shell vial (Diagnostic Hybrids [DHI], Inc. Athens, OH) at the following time points: 1, 24, 48 hours post-inoculation.
6. After 20 hours of incubation at 35° C, the shell vial cultures were stained with the D3 Respiratory Virus Detection kit (DHI).
7. The cover slips were examined at 100x magnification and the infected cells counted

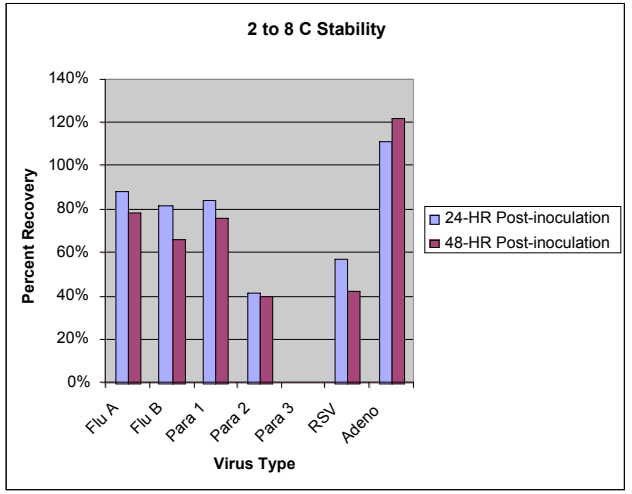
Results

On the fluorescent D3 Respiratory Virus Detection slides, the flocked swab specimens yielded a substantial increase in infected cells for all viruses when compared to the minitip swab. The increases ranged from 5x (RSV) to 10x (FA).



Results (Cont.)

The stability of the viruses in the UTM, when stored at 2 to 8°C, was consistent with the claim in the UTM package insert.



Results (Cont.)

The Parainfluenza 3 virus infected the R-Mix in a manner that made counting individual cells unreliable. The infected cells formed multi-cell plaques which varied in size and cell number.

Conclusion:

The flocked swab exhibited a dramatic increase in the collection and release of the respiratory viruses when compared to the minitip swabs. The combination of the flocked swab and the UTM provides the laboratory with a markedly improved system for the detection of respiratory viruses.