Σ-Swabs® & Σ-Transwabs®

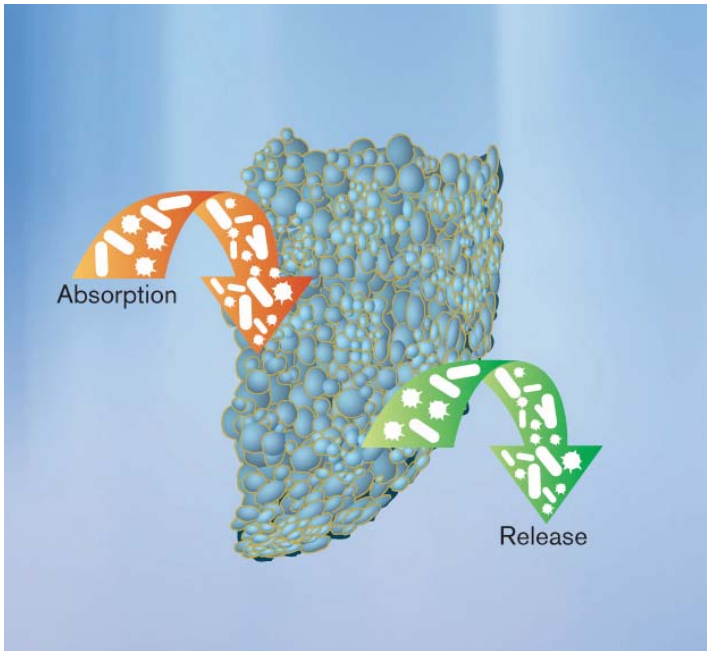
A material improvement for the new generation of preanalyticals

Medical Wire has for almost 60 years been a pioneer in the world of microbiology specimen collection and transport, taking advantage of new technologies, and making devices which are both simple and practical for the health care professional collecting the specimen, and effective at delivering a viable specimen to the laboratory, however long the journey.

In 1975 Medical Wire launched Transwab®, the first commercially produced ready to use gel transport system. Using inorganically buffered Amies medium, in semi-solid temperature stable format, and with a two-year shelf life, it freed laboratories from having to provide weekly supplies of autoclaved bijoux of transport media to their users, and made it possible for them to offer a full microbiology service, even to remote locations. Thus in 2006, after exhaustive studies, Transwab® was selected as the transport device for the transport of Streptococcus pneumoniae specimens from the remote regions of Bolivia to a Scottish laboratory for an epidemiological study. It had been shown to maintain Streptococcus pneumoniae for over 30 days[1].

Other innovations have followed, but in 2008 Medical Wire launched Σ-Swab®, the dry swab that maintains many microorganisms, including MRSA, certain anaerobes, viruses, and even mycoplasma at stable numbers for 48 hours! This was followed in 2009 with Σ-Transwab®, our new liquid Amies transport device specifically designed for the automated processing systems being introduced in many larger laboratories.
Already Σ-Transwab® is also proving to provide exceptional performance and reliability. Both these and other recent new products from Medical Wire maintain our philosophy of ease of use for the health care worker collecting the specimen, and of delivering a reliable and relevant specimen to the laboratory.

Key to Σ-Swab® and Σ-Transwab® is our new open-cell foam bud swab, which combines high absorbency and quick release and availability of specimen, with a unique ability to maintain many microorganisms in a viable condition for extended periods.
Of course, foam budded swabs have been around for some time. In the past, however, the foam available has been slightly hydrophobic, and sometimes rather thin, being supplied as a kind of sock over a standard cotton bud. Medical Wire did not use them because of the inadequate sample, typically less than 50µl, and the risk of interference from the underlying cotton fibre which releases antimicrobial fatty acids into any medium. CLSI's M40-A standard also recognises this in setting a 50µl inoculum for foam-tip swabs, and allowing a double-strength concentration of bacteria[2].



In recent years new advanced grades of polyurethane foam have become available which are not hydrophobic and

which will absorb a much larger sample, typically 70-80µl, similar to a standard fibre bud. Indeed the latest material can absorb more than 125µl, while retaining the ability to maintain microorganisms in a viable condition for at least 48 hours (and in practice much more). Our own, and independent studies have shown these new materials to be entirely suitable for specimen collection and transport, and it is on the basis of these developments that we have launched both Σ-Swabs® & Σ-Transwabs®.

Medical Wire has also investigated flock swabs. We do have access to flock, but feel there are issues which mean it is not yet ready to use for specimen collection, not least of which is the issue of patient and healthcare worker safety. Flocking technology has been around for many years. You may be familiar with it in as the lining of your car glove box, or on expensive wallpaper. The problem is that many of the microfibers are not captured by the underlying layer of glue, and remain loose. These microfibers are of respirable size, and can present a hazard, even on their own[3]. The manufacturers take care to remove as many of these microfibers as possible, but some remain. If you have some flock swabs you can demonstrate this by rubbing or gently flicking them over a glass surface. It is particularly noticeable on the coated flock swabs supplied with some transport swab devices. The risk of disease (Flock Worker's Lung) is known within the flocking industry, although it can take some years to become manifest. But the combination of loose, respirable microfibers and particles, and infectious pathogens creates a new potential hazard which has yet to be accounted for.

Flock swab surface

Performance, too, has some questions. We have all heard the myth of the neatly arranged perpendicular fibers. The reality is somewhat different, as can be seen in the photograph. There is no doubt that the flocking creates a large surface area, and that the swab picks up a large specimen. But the coating apparent on the flock fibers in certain transport devices seems to contribute to overgrowth when samples are carried at ambient temperatures.

In a new study[4], polyurethane foam tipped swabs (Σ-Swabs®) recovered significantly more bacteria of all types than nylon-fibre flocked swabs (Copan).

For now, advanced hydrophilic polyurethane foams, as used on Σ-Swabs® & Σ-Transwabs®, are the best material for the collection and integrity of the specimen, and optimum performance in the laboratory, whether automated or conventional.

Results (independent) for MRSA release & recovery using advanced polyurethane foam tipped swabs with standard size buds (Sigma Dry Swab)
Average swab absorption (microlitres of saline) 125.6

	0h	24h	48h
MRSA RT	$3.86x10^6$cfu/ml	$2.99x10^7$cfu/ml	$4.21x10^7$cfu/ml
MRSA 4^{O}C	$3.86x10^6$cfu/ml	$9.08x10^6$cfu/ml	$7.86x10^6$cfu/ml

Results are within the parameters of CLSI M40, with limited loss or growth, even at ambient temperature.

References

1. Inverarity, D., M. Diggle, G. Edwards, & T. Mitchell, 2006, An Evaluation of Media Suitable for the Transportation by Air of *Streptococcus pneumoniae*. Federation of Infection Societies Conference, Cardiff
2. CLSI, 2003, Quality Control of Microbiological Transport Systems: Approved Standard CLSI Document M40-A
3. Kern, D.G. et al, 1998, Flock Worker's Lung: Chronic Interstitial Lung Disease in the Nylon Flocking Industry, *Annals of Internal Medicine (American College of Physicians)*, 129, 261-272
4. Turner, J., et al, 2010, The Characterization of the Absorption and Release Properties of Various Clinical Swab Types. Poster T89, 26th Clinical Virology Symposium, Daytona Beach, US.

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Don't just go with the flock!