Trends in microbiology

From manual to auto processes

"Over the next decade, microbiology labs will see a significant transformation from discrete manual processes to fully automated systems, allowing labs to increase throughput, enhance traceability, reduce costs, and, ultimately, improve patient care. The evolutionary pattern is already mimicking what has been seen in the clinical chemistry area over the past 30 years. Large micro labs are making significant capital investments to build custom systems that automate their current workflows. These custom systems will eventually prove to be inflexible, costly to maintain, and expensive to upgrade. IVD manufacturers will address the market need with task specific automation products that can easily be integrated with one another via data concentrators, workflow-management software, and decision-support systems. Standards will follow which will allow improvements in interoperability of competing systems. The integration model will prevail as it provides the best flexibility for labs to upgrade specific segments of their automation as the technologies evolve. The focus interest for laboratories will be on the vendors that do not just automate an existing manual process but, instead, drive automation with new methods that create added value."

Doug Flammang, Vice President, Program Management
Microbiology and Lab Automation
bioMérieux
Maker of VITEK 2, BacT/ALERT, VIDAS, and other automated in vitro diagnostic testing systems

Solving two micro problems

"Cost saving is the No. 1 issue facing microbiology laboratories today. Our country's laboratories are under increasing pressure to save money, resulting in the need for inexpensive, yet effective, rapid manual microbiology tests. Automated microbiology is fast, but the costs per test, and initial capital investment is quite high. Our research and development laboratory is developing fast, easy-to-use, rapid tests for pathogens such as *Candida*, *Streptococcus*, *Nieseria*, and MRSA, and has also developed a line of inexpensive, easy-to-use chromagenic culture media for MRSA, *Candida* spp., *Staph aureus*, *Salmonella*, and common urinary-tract pathogens. The No. 2 issue facing the laboratory today is an aging workforce, with more microbiologists retiring than entering the field. This has been an emerging problem, but with the efforts of organizations such as the American Society for Microbiology, we are doing a good job of attracting young scientists to this important field."

Christopher Catani, MT(ASCP), RM(ACM)
Director of Sales, Marketing & Customer Service
Hardy Diagnostics
Maker of HUrBi (Hardy Urine Biplate)

Automation in specimen processing

"A key trend in microbiology is in automation of the pre-analytical phase of the clinical laboratory path of workflow. Traditionally, automation in specimen setup of microbiology, unlike chemistry and hematology, has not been fully explored, largely, in part, because it had been impossible to replicate, with an instrument, the physical rolling of swabs onto culture plates. Swabs account for a high percentage of the samples received in a clinical lab, and the challenge of trying to automate the planting and streaking of swabs had prevented automation in an area that requires speed and precision. Now, with a transport system that automatically elutes the specimen into liquid phase, swabs can be processed as easily as urines. Our invention of a new swab has opened the door for fully automated systems to process liquid-based samples in microbiology, because it has transformed one of the major specimen types received into microbiology to liquid phase. The specimen process automatically plants and streaks bacteriology specimens, despite the type or container size. Automation in the receiving area of microbiology comes at a crucial time when there is a shortage of qualified staff and an increase in workloads driven by more surveillance for healthcare-associated infections and emerging drug-resistance bacteria. This is a viable solution to real challenges encountered today by the clinical laboratory."

Norman Sharples
Executive Vice President
Copan Diagnostics Inc.
Maker of Flocked Swabs, ESwab, and WASP: Walk-Away Specimen Processor

Detection is key

"With microbial resistance to antibiotics on the rise, laboratories are faced with new challenges. Rapid detection of resistance is critical to the proper treatment of patients. I think we will continue seeing medical-device manufacturers developing new and sophisticated technology for the rapid detection of antibiotic-resistant bacteria. Consequently, this will place additional emphasis on quality-control testing. In order to ensure the accuracy of tests being performed, laboratories must use biological reference materials that are authentic, traceable and reliable. Even more importantly, they need to be readily accessible in a convenient format, and acquired and distributed on a global basis."

Brad Goskowicz
Chief Marketing Officer
MicroBioLogics Inc.
Maker of KWIK-STIK and LYFO DISK lyophilized microorganism preparations

The modernized petri plate

"Rather than reflect on futuristic musings to discern trends in microbiology, my task falls in the 'can you teach an old dog new tricks' category. In this case, the 'old dog' is the ubiquitous petri plate. It has been around for more than 100 years and still has a purpose and a use. The 'new trick' is the application of novel technology to enhance the function of the petri plate to grow microorganisms; not just any microorganism, but those that will not grow in air — the anaerobes — independent of special apparatus, such as jars or chambers. We did this by improving on old technology (the Brewer Lid) and combining it with new technology (an enzymatic system that efficiently removes oxygen), Oxyrase. We redesigned and modernized the dish lid so that it could be mass produced. Then we had to standardize the enzyme system and formulate a product to perform under conditions needed to grow anaerobes. The result is a self-contained, anaerobic chamber that regenerates and maintains the anaerobic environment. The anaerobic plate separates the dependence of microbial growth from that of the apparatus needed to create anaerobic conditions — liberating for microbiologists. The anaerobic plate has a place in labs working with clinical anaerobes, regardless of the means to grow primary isolates. The product is suited for subbing, which entails picking and transferring isolates from the primary plate to a secondary plate to confirm that its an anaerobe and to purify it for further identification and for determining antibiotic sensitivity. This anaerobic plate puts the microbiologist in control of 'working up' the specimen. Each isolate can be handled independently and worked with optimally, depending on its rate of growth."

James C. Copeland, PhD
President
Oxyrase Inc.
Maker of the OxyPlate

Today's susceptibility test needs

"Growing antimicrobial-resistance concerns dictate the increased need to test isolates against antimicrobics that were previously assumed effective agents. As international travel and immigration spreads disease, it is imperative that global surveillance programs accurately monitor Mycobacterium tuberculosis (MTB) strains with multiresistant-drug patterns. It is equally important that laboratories collect accurate epidemiologic data for Gram-negative bacilli. Over the last several years, it has been increasingly apparent that many Gram-negative bacilli are also displaying resistance to the remaining antimicrobics available for treatment. The availability of reliable automated and manual test methods for MIC determination are critical to understanding antimicrobial-resistance mechanisms and the spread of deadly diseases. In addition to utilizing accurate test methods, surveillance initiatives should also include software capabilities to appropriately share collected data efficiently." □

Roger Grist
Director, R&D
TREK Diagnostic Systems
Maker of Sensititre AST/ID products and VersaTREK product