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BioRad's CFX384™ automates high-throughput qPCR in 96 and 384-well formats.

Automate That!

Developments in Laboratory Automation

Manufacturers of life science equipment are harnessing the power of automation to provide scientists with tools capable of providing greater experimental precision and throughput. Molecular biology, cell biology+ and microbiology techniques are being revolutionized by the development of automated assays. From liquid handling and flow cytometry to nucleic acid analysis and the testing of antibiotics, automation is making every facet of the lab a lot easier for scientists.

With **Eppendorf AG's** introduction of PC software called epBlueID™ for its **epMotion** automated pipetting system, researchers can track samples using barcodes in a secure process. The epBlueID™ software makes liquid handling more convenient by simplifying operating and programming procedures. Researchers can execute complex experiments in minutes by taking advantage of intuitive menus and streamlined navigation. The epBlueID software includes a labware database, the ability to recognize pipetting patterns and liquid classes and is compatible with all five epMotion systems. According to Jamie Grossi, Automation Product Manager for Eppendorf North America, "the barcode management functionality of the epBlue ID software will benefit human and veterinary clinical diagnostics, medical research, pharmaceutical development and the forensic sciences that require an automated pipetting system that meets GMP and GLP requirements while being flexible enough for every day liquid handling tasks."

The microfluidics applications of automation extend beyond basic pipetting needs. Increasing sample throughput of analytical laboratories without compromising quality is a constant challenge for contract research organizations as well as the pharmaceutical and food industries. **Agilent's 1290 Infinity LC Injector** HTS/HTC sample injection system extends sample capacity to 24 cooled microwell plates or 648 cooled 2-mL vials. Overlapping injection and wash steps during runs allow for ultra-fast injection times of less than five seconds without compromising carryover. The new injector system is compatible with Agilent's software programs ChemStation, MassHunter and EZChrom. "Our 1290 Infinity LC customers are impressed by

the outstanding reproducibility and limits of detection," said Patrick Kaltenbach, Agilent General Manager of Liquid Chromatography. "Agilent's proprietary 1200 bar valve technology is a game-changing improvement for robust and reliable operation in a high-throughput environment. Our injector makes it a complete high sample capacity solution for LC and LC/MS users."

Flow Cytometry Applications

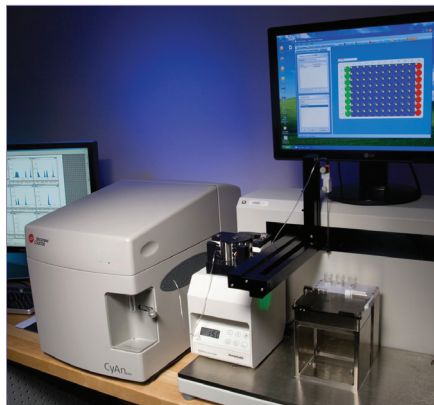
The ability to rapidly and accurately measure fluorescence among large cell populations without any decrease in cell viability is an ongoing challenge in flow cytometry. **Beckman Coulter** has interfaced its **CyAn™** flow cytometer with **IntelliCyt's HyperCyt** system to create a configuration that offers researchers faster flow cytometric analysis. The CyAn provides acquisition rates of up to 70,000 events per second, which, combined with the continuous, rapid sampling capabilities offered by the HyperCyt Autosampler and HyperView™ Data Analysis Software, enables 384-well plates to be processed in as little as 10 minutes. This permits high-speed processing to be used in cell-surface and intracellular flow cytometric applications. "The combination of these products will provide the capability for flow cytometry to reach an entirely new market segment where high-throughput is essential," said Brad Calvin, Vice President of Beckman Coulter's Flow Cytometry Business Center. "When the multi-dimensional cellular analysis capabilities of flow cytometry combine with high-throughput processing, more information can be generated from a single analysis than can be obtained with the drug discovery tools that are currently available."

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The CyAn™ flow cytometer from Beckman Coulter offers high-throughput cell sorting and acquisition rates of 70,000 events per second.

While the demand for high throughput flow cytometric assays is on the rise, so are concerns about how best to preserve cell integrity during experimentation. Traditionally, a liquid stream transports cells during flow analysis, **Applied Biosystems**, part of **Life Technologies**, has developed the **Attune Acoustic Focusing Cytometer** which relies on sound waves to sort cells. This method preserves cell viability and enables scientists to accurately control cell movement. This system offers improved sample throughput and sorting accuracy across a range of cell biology applications. Time needed to sort cells is reduced by at least one order of magnitude. Scientists can use the Attune Acoustic Focusing Cytometer to quantitate molecular phenotypes at the single cell level. According to Mike Olszowy, Head of Flow Cytometry at Life Technologies, "Acoustic focusing enables both longer transit times and higher throughput, which simultaneously permits better interrogation of every cell in a sample as well as the analysis of much larger numbers of cells."

Once certain cell populations are isolated, scientists can perform further procedures, such as the isolation of nucleic acids and subsequent amplification to study particular genes of interest. **Bio-Rad's CFX96™** and **CFX384™** real-time PCR detection systems allow researchers to perform automated, high-throughput qPCR in 96 and 384-well formats. Both systems offer improved performance while reducing the time required during the amplification process. The CFX systems are equipped with bench-top plate handlers capable of analyzing up to twenty 384-well plates or 7,680 samples in a single run. Besides taking advantage of improved workflow automation, the CFX platforms rapidly amplify and analyze large nucleic acid libraries while the automation control software manages the configuration and operation of either system to ensure maximum productivity. Users gain the flexibility to implement one protocol across



The ProtoCOL 2 from Synbiosis measures zones of inhibition during antibiotic and vaccine testing.

several plates or assign specific protocols to individual plates during more complex assays. "The time needed to run multiple PCR plates is one of the major bottlenecks in generating real-time PCR data," said Richard Kurtz, Marketing Manager, Amplification, Bio-Rad Laboratories. "The CFX automation platform eliminates the need for a researcher to be present to load the PCR plate and start each run individually. Now all they need to do is load the stacker, set up the runs and walk away."

Antibiotic and Vaccine Testing

Just as molecular and cell biology applications are frequently augmented by automation, common microbiology assays can also be improved. **Synbiosis** has developed an automated zone measuring system, called the **ProtoCOL 2**, to improve testing of antibiotics and vaccines. The ProtoCOL 2 measures a zone of inhibition that begins as close as 0.05 mm to the antibiotic disc. If the boundaries of the zone of clearing are ambiguous or if the antibiotic has cleared the majority of a plate, the ProtoCOL 2 obtains precise readings. In addition, the ProtoCOL 2 generates results from a 16-zone SRD (Single Radial Immunodiffusion) plate of H1N1 swine flu vaccines in minutes. The ProtoCOL 2 features sliding doors that eliminate interference from ambient light and a tricolored LED lighting that evenly illuminates antibiotic susceptibility and SRD plates. Results are reproducible and can be automatically transferred into a built-in statistical analysis module and image library. "Microbiologists want to rapidly count colonies or accurately size zones with affordable, yet simple to program equipment," said Martin Smith, Sales Manager at Synbiosis. "This is technically challenging and the lighting and software in the ProtoCOL 2 could significantly improve results for applications as diverse as counting *E. coli* colonies through to testing flu vaccines."

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- Richard Kurtz

*Marketing Manager, Amplification,
Bio-Rad Laboratories*



Sound waves gently transport cells in the Attune Acoustic Focusing Cytometer from Applied Biosystems.

Companies mentioned in this Product Focus:

Eppendorf - www.eppendorf.com

Agilent - www.agilent.com

Beckman Coulter - www.beckmancoulter.com

Bio-Rad Laboratories - www.bio-rad.com

Applied Biosystems - www.appliedbiosystems.com

Synbiosis - www.synbiosis.com

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