BIOTECHNOLOGY SPECIAL

CIO Review

The Navigator for Enterprise Solutions

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COMPANY OF THE MONTH

Sujay Jadhav,
CEO, goBalto

IN MY OPINION

Nicholas Ventresca,
SVP & CIO,
ARIAD Pharmaceuticals, Inc.

Labcyte

Enhancing BioTech Experiments with Acoustics

Mark Fischer-Colbrie,
President & CEO
Liquid handling plays an integral part in the Biotechnology industry, since a major part of daily lab operations for testing, research, or production relies on the efficient transfer of samples and reagents to designated containers. Traditional liquid handling approaches that use pipettes often cannot achieve required levels of miniaturization, precision, and accuracy, and introduce chances of contamination. Headquartered in Sunnyvale, CA, Labcyte is stirring a revolution in this space with its incredible invention—the Echo® liquid handler, a robust liquid handling solution that uses only sound to move liquids. This system enables customers to enhance personalized medicine programs, streamline DNA/RNA diagnostic testing, optimize drug discovery pipelines, and accelerate life science research. Headed by Mark Fischer-Colbrie, who has more than 30 years of experience in launching novel diagnostics, medical devices, therapeutics, and high technology for growth companies, Labcyte is truly an innovator in the space with 58 U.S. patents to its name. The system literally turns the world
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Various market research studies have pegged the value of the global synthetic biology market at about $5 billion, with compound annual growth expected to be as much as 35 percent for the next several years. Labcyte’s product paves the way for a high-throughput, fully automated system, pooling oligonucleotides, assembling constructs, and spotting colonies—accelerating the DNA assembly for gene synthesis and saving up to 10-15 hours of time in a high-throughput setting. Validation of the gene sequences can now be done with 1/100th of the cost, as miniaturization results in using just a fraction of the expensive chemistries that are required. In addition, the Echo liquid handler is facilitating Next-Generation Sequencing, RT-qPCR, and genotyping, along with protein/peptide arrays, biomarkers, and protein crystallography.

Our technology enables miniaturization with unparalleled throughput and accuracy in both biochemical and cell-based assays

Making an Impact
Numerous companies have adopted the Echo liquid handler as their preferred liquid handling solution. For instance, CardioDx—a molecular diagnostics company specializing in cardiovascular disease—decided to scale up its operations and selected the Echo system for liquid handling because of its speed, accuracy, and ease of use. The Echo liquid handler provided a much quicker process for CardioDx to load patient samples onto the PCR plates used to generate gene expression results, which translated into real cost savings. It trimmed down the time taken by the process from six hours to one hour. But most importantly, the Echo system made the data tighter and reduced the day to day variation seen in the daily processing.

The Echo liquid handler’s ability to transfer as many as 750,000 samples a day without touching them is benefitting laboratory operations of all sizes. Making the solution more efficient is another innovation by Labcyte—Dynamic Fluid Analysis™ technology, which guarantees precise transfers across a range of fluids such as dimethyl sulfoxide (DMSO), buffers, nucleic acids, proteins, glycerol, and a broad range of crystallography solutions. Most liquid handlers are passive and require the operator to determine a way to overcome surface tension and viscosity—two key fluid properties, for their specific reagents, requiring the operator to calibrate the instrument to transfer the reagent. Echo liquid handlers overcome this challenge by using sound energy to transfer reagents in drop increments on a 2.5nL or 25nL scale—with hundreds of identical drops being transferred every second when larger volume transfers are required. Dynamic Fluid Analysis uses signals from the sound reflections bouncing back from the top layer of the surface to create the power-adjustment needed to automatically transfer a wide variety of fluids, DNA, RNA, or cells. The technology enables Echo liquid handlers to adapt easily to different types of fluids even if it has never previously transferred that reagent. The result of the Dynamic Fluid Analysis process is that no operator calibrations are required.

Reaching New Horizons with Unique Approach
With its innovative technology, Labcyte is partnering with industry leaders to open up...
new horizons. For instance, the company is working in collaboration with AstraZeneca, a biopharmaceutical company, to use acoustic dispensing combined with mass spectrometry to greatly advance drug discovery applications. Mass spectrometry is a way to measure the mass of ions, and understand fundamental atomic and molecular processes. Labcyte is developing techniques for the direct loading of samples into mass spectrometers creating the potential for high-throughput, low cost, label-free analysis. Data-rich, label-free assays and broader phenotypic analyses are critical requirements to ensure future success of drug discovery programs. “The potential for this breakthrough is yet another example of the incredible impact that acoustic dispensing is having in all areas of life sciences,” expresses Fischer-Colbrie. “This work has the possibility to dramatically increase throughput while lowering costs and providing improvements in experimental results.”

Labcyte takes a unique approach towards introducing products into the market, which is unconventional to many. The company provides researchers with application solutions, but it also supports researchers who want to direct the technology in new ways that help them solve problems and alleviate bottlenecks. For instance, the initial discussions that led to the collaboration with AstraZeneca started because AstraZeneca wanted to know if injecting liquids directly into a mass spectrometer was feasible. Since loading samples traditionally consumes a lot of time and is very expensive, Labcyte found a way to directly inject a small amount of liquid into the system and get a direct read-out, leading to huge cost savings. Additionally, the time taken by the client to develop an assay went down from four months to four days, hugely impacting the drug development cycle. On another occasion, one of the genome institutes working on bacterial studies approached Labcyte to perform multiple displacement amplification with the Echo system. Once applied, the system yielded great results, reducing the volume of reagents and generating better data, as less stray bacteria could enter the experiment from the reagents themselves. The institute multiplied the number of Labcyte’s systems and further eliminated pipette tips while benefitting from the ease of moving from one experiment to another without the risk of contamination.

Modernizing the World of Biotechnology

Having ensured a global presence with offices in Europe, Japan, and Asia supporting all of the top biopharmaceutical firms, Labcyte is focusing on continued commercialization of lower cost genomics applications and the ability to interface directly with mass spectrometry systems, which is expected to be a large opportunity. The company is a part of a development program working on the use of acoustics to shoot biological samples out of tubes in addition to the life science standard of microwell plates. It is part of a compact, state-of-the-art pharmaceutical compound management system that will be fully automated—producing assay-ready plates from acoustic storage tubes. The system in development will integrate the tubes into the compound plating part of the drug screening workflow, making the entire process from storage to screening driven by acoustic energy. This initiative is also in partnership with Brooks Automation and Titian Software and will be deployed at AstraZeneca’s new facility—the AstraZeneca MRC UK Centre for Lead Discovery in Cambridge. The system will provide unmatched capabilities that can enhance any compound management and drug discovery pipeline. “We are excited that our systems are a game changer. By enabling researchers to create new drugs, re-purpose other therapeutics, create new diagnostics, and advance science faster with better data and at a lower cost, the Echo liquid handler is already having a big impact in life sciences,” concludes Fischer-Colbrie. CR
The biotech industry might have had a rough patch in terms of investment previously because of spiraling opioid epidemic across the U.S., but today, it is on the precipice of change. With the advent of bio-analytical services and clinical trial management systems, biotech industry and pharmaceuticals are able to optimize drug development and drive quality and business performance across value chain.

Innovative biotech is drifting away from the traditional ways of garnering data. This facilitates healthcare institutions with a broader platform to collect and track data while also paving way for physicians to discover better means of treatment. Alongside, the introduction of CRISPR gene editing tool has disrupted the biotech world with its ability to genetically reprogram any cell during gene therapy. Importantly, recent technological advancements in bio-energy, bioremediation, synthetic biology, DNA computers, virtual cell, genomics, and bio-nanotechnology have made the biotechnology landscape rich and full of new opportunities.

Over the past few months, we have analyzed scores of biotech solution providers and shortlisted the companies that are at the forefront of tackling challenges in the arena. A distinguished panel comprising CEOs, CIOs, VCs, Analysts and the editorial board of CIOReview has selected the final 20 biotech solution providers.

The companies featured in this issue exhibit extensive business process knowledge, along with in-depth, integrated, and innovative strategies in the biotech space. The listing provides a look into how these solutions work in the real world so that organizations can gain a comprehensive understanding of the available technologies and how they add value to your enterprise.

We present to you 20 Most Promising Biotech Technology Solution Providers 2017.