



GILSON AUTOMATED LIQUID HANDLING

Automation brings Kitos Biotech an edge in competitive, preclinical research

AN INTERVIEW WITH DR. FRANCESCO FIORENTINO, FOUNDER AND CSO OF KITOS BIOTECH

Francesco obtained his Ph.D. in cancer biology at the University of Palermo (Italy). He spent three years at Temple University, Philadelphia (U.S.), training in cancer cell biology and afterwards he was appointed as postdoc at the Italian Society for Studies in Reproductive Medicine, Bologna (Italy), where he spent two years. After four more years as postdoc at the Institute of Predictive and Personalized Medicine in Barcelona (Spain), he went back to Italy and co-founded Kitos Biotech, a CRO providing cell-based assay services for anticancer drug discovery. Francesco also obtained a postdoctoral fellowship by the Umberto Veronesi Foundation to pursue his studies on lung cancer cell biology, that he currently carries out at the Department of Biomedical Sciences, University of Sassari (Italy). Francesco is author of 11 peer reviewed publications and reviewer for Oncogene, Journal of Cellular Physiology and Cytotechnology.

Introduction

Even before earning their advanced degrees in cellular and molecular biology, Dr. Francesco Fiorentino and Dr. Irene Marchesi had each independently developed an entrepreneurial spirit and a strong desire to one day start and lead their own company. Both wisely seeking to first develop a broader background and new contacts, they each invested several years complementing their studies working in positions not only in their home country of Italy, but also in Spain and in the U.S., where they met and started their collaboration. Along the way, they worked together to publish more than 20 papers in prestigious journals including *Cell Research*, *Journal of Cellular Physiology*, *Journal of Medicinal Chemistry* and *Molecular Cancer Research*.

With this extensive experience in place, Dr. Fiorentino and Dr. Marchesi decided the time was right to move forward towards their mutual goal. Together, they applied for—and won—funding from the Italian Ministry of Economic Development through a competitive program providing interest-free loans to promising and innovative technology start-ups. Using this seed money, they soon opened the doors to Kitos Biotech, near Sassari, Italy. Kitos Biotech is a research services company that offers design, execution and analysis of cell-based assays on client-provided compounds (on a contract basis), and then evaluates their efficacy towards developing anti-tumor drugs. Their customers: pharmaceutical companies, small biotech start-ups, and research institutes looking for outsourced research expertise.

Incorporating automation from the start

In the days prior to opening their business, Dr. Fiorentino recognized an opportunity to help Kitos

Biotech more quickly make a name for itself among other companies offering contract research services.

"There are many other groups in Europe who could be potential competitors of our cell-based assay services to anti-tumor drug developers, so we know we needed to differentiate ourselves when outfitting our new lab," explained Dr. Fiorentino, "Labs in Europe don't yet use automation very widely, so we saw a way to gain an immediate advantage."

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One of the strategies involves incorporating an automated liquid handler—basically an “automated pipette”—for performing tasks such as moving cells from the source plate to the experimental plate, serial diluting, and adding compounds to cells for each experiment. For this, says Dr. Fiorentino, Kitos Biotech relies upon PIPETMAX® from Gilson.

"People sometimes view performing cell-based assays as a very easy, very straightforward process. In the classic methodology, the experimenter puts the cells in the culture, adds the compound, and measures the variability,—all by hand," explained Dr. Fiorentino. "But in reality, if you want to deliver highly reproducible results, we think there is a better approach using automation. So, we strategically outfitted our new lab with several pieces of automated equipment, and we use the PIPETMAX® every day to help us deliver faster, more accurate results to our clients."

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Taking liquid handling to a new level

The obvious challenge in cell-based assays—as well as in all research—is that it is vital to maximize consistency among samples to be sure of the results. However, as Dr. Fiorentino explains, there can be an enormous difference in the number of cells placed in each well, depending on such factors as the speed and skill of the technician; when using manual processes for cell-based assays. Picture, he says, a technician trying to quickly and accurately dispense precisely 20 microliters in each of 300 wells in a busy lab. In addition, there can be variance in many protocol steps—for instance, the time that cells remain out of the incubator from when the first well is filled until the last well is filled. For these reasons, he explains, manual-based labs are often forced to perform experiments with a much smaller number of wells to try to keep their standard deviations lower. Of course, this slows down throughput significantly.

“Performing the liquid handling function automatically with PIPETMAX®, we recently, for example, set up an experiment using four plates of 384 wells each, with little or no liquid variability, in a very timely manner,” said Dr. Fiorentino. “Doing a volume this large would simply not be attempted manually. And in addition to providing our clients with this high throughput, the assays also delivered results with high biological and technical reproducibility as well.”

Not surprisingly, Dr. Fiorentino believes that this capability gives Kitos Biotech a strong advantage over competitive labs offering contract cell-based assay services but using a strictly manual approach—and clients seem to agree.

“It is hard to consider the classic labs performing strictly manual cell-based assays as direct competitors of a lab using automated equipment he explained. “Our type of lab can do so many more samples so much faster and at so much lower cost. Although automation like this is somewhat new, its emergence is extremely valuable for cell biologists—and other researchers as well.”

Partnering with automation experts

Dr. Fiorentino notes that he almost missed out on some benefits that could be delivered by an automated liquid handling system—but, fortunately, changed direction in time.

“For our funding proposal, we had to provide a preliminary list of lab equipment, and at first, we specified another brand of automated liquid handling equipment, he explained. “Fortunately, we realized in time that this other machine only dispensed, it did not aspirate, which would have been much less effective for us. We do many serial dilutions in our work, and only PIPETMAX® allows us to automate the aspiration process as well. So, with Gilson, we were able to purchase a machine with this extremely valuable feature at about the same cost as the other machine without it.”

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“For us, every experiment we set up for every client is different. However, Dr. Fiorentino notes that one time there was a procedure that seemed to be beyond the capabilities of his PIPETMAX®. But, what seemed like an initial liability, he notes, ended up demonstrating to him the value of Gilson’s customer support.

“I mentioned the issue to Gilson and they got their technical people on it, and within a couple of weeks they developed this capability just for us. It is a procedure that helped us gain new customers and it’s something we use frequently,” he said. “Frankly, I was surprised—we are a small company asking a lot, but Gilson really came through for us. With their support, they are a very valuable partner for Kitos Biotech as we work to deliver outstanding service to our clients.”