

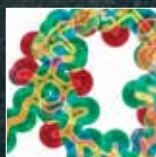
Tecan Journal

Life Sciences and Partnering Business

Edition 3/2013

A turnkey solution for
forensic identification

Uruguay, Latin America
pages 24-25



Enhancing clinical
diagnostics in Turkey
pages 12-13



Meeting the demands
of mass spectrometry
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CRIME SCENE DO NOT CROSS CRIME SCENE DO NOT CROSS

Welcome



Welcome to the latest Tecan Journal

This June was an exciting time for Tecan with the successful completion of the OEM development of the Dako Omnis, the latest major project for our Partnering Business. The Dako Omnis, a fully automated tissue-based cancer diagnostics platform, was co-developed with our OEM partner Dako, an Agilent Technologies Company, and is manufactured by Tecan. It sets new standards in advanced tissue staining, automating both immunohistochemistry (IHC) and *in situ* hybridization (ISH) processes, offering hospitals and clinical laboratories greater flexibility, efficiency and traceability than ever before.

Another important event this summer was the annual AACC Clinical Lab Expo, held from the 30th of July to the 1st of August in Houston, Texas. Tecan's booth generated enormous interest, with visitors seeing at first hand the many reasons why the Company is the partner of choice in key areas of clinical diagnostics. Highlights included the state-of-the-art Dako Omnis system and a focus on Tecan's OEM

dedicated system development capabilities, complemented by the Tecan Cavo[®] brand components range. A Freedom EVO[®] platform for mass spectrometry sample preparation completed the picture, ensuring that customers headed home from Houston knowing that they could have confidence in Tecan's 30 years of expertise, global coverage and proven reputation for quality and innovation.

In this issue, we learn more about the benefits of automated mass spectrometry sample preparation, discover how the HP D300 Digital Dispenser is enhancing drug discovery experiments, and hear from students of the Tecan Academy. Finally, no edition would be complete without the usual array of stories describing some of the innovative and interesting applications that our customers around the world have for their Tecan equipment.

I hope you enjoy the journal,
David Martyr, CEO

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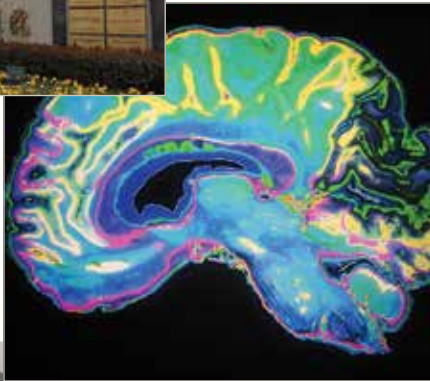
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Shanghai's Changhai Hospital has successfully evaluated Tecan's HS 400™ Pro hybridization station



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Researchers at McMaster
University's Biointerfaces
Institute rely on the
flexibility and modularity
of their Tecan workstations

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Contents

Automation doesn't get easier than this!

Tecan's Smart Automation solutions offer straightforward liquid handling for new users

Tecan is launching a range of benchtop solutions designed to provide fast, simple and cost-effective automation of liquid handling tasks. Based on the Freedom EVO® 75 platform, these preconfigured systems are designed to eliminate tedious manual liquid handling tasks without the need for previous automation experience.

Each Smart Automation solution is supplied with optimized, ready-to-run protocols, and includes all of the modules and ancillary devices necessary to automate your manual processes.

The first Smart Automation solutions to be launched are:

Pickolo™ colony picking; for fully automated colony picking

NucleoSpin® purification; for fully automated, vacuum-based nucleic acid extraction using MACHEREY-NAGEL NucleoSpin kits

NucleoMag® purification; for fully automated, magnetic bead-based nucleic acid separation using MACHEREY-NAGEL NucleoMag kits.



A dedicated user interface and easy-to-follow application guide ensure that even inexperienced users can get their systems up and running quickly, with touchscreen operation also available for some applications. These complete solutions provide an ideal introduction to the throughput, precision and reproducibility offered by Tecan's liquid handling systems, with the flexibility to expand and adapt as your laboratory needs change.

To find out more on Tecan's Smart Automation solutions, visit www.tecan.com/smartautomation

Tecan and Promega offer real-time cytotoxicity analysis

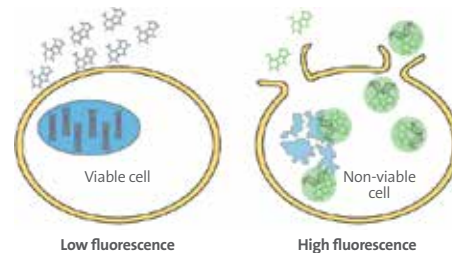


Tecan has worked with Promega to demonstrate the suitability of the Infinite® 200 PRO and HP D300 Digital Dispenser for real-time kinetic investigation of cytotoxicity using Promega's CellTox™ Green Dye.

The CellTox Green Cytotoxicity Assay measures changes in membrane integrity that occur as a result of cell death. This non-toxic dye allows real-time fluorescence-based measurements for up to 72 hours, and is ideally suited to mode-of-action studies. Combining the CellTox Green assay with the advanced environmental control and cell biology

oriented functions of the Infinite 200 PRO – including the Gas Control Module (GCM™), Optimal Read (OR), linear and orbital shaking, temperature control and automated z-focusing – offers an unparalleled solution for long-term kinetic studies of cytotoxicity. By providing stable culture conditions within the reader chamber, this set-up allows continuous measurement over the duration of the experiment, ensuring high quality data without the need for manual intervention or transfer of microplates between an incubator and the reader.

The assay workflow can be further improved by use of the HP D300 Digital Dispenser to provide on-demand assay plate set-up. Offering non-contact dispensing from 13 pl to 10 µl, this innovative instrument allows small molecules in DMSO to be dispensed directly into the assay plate, eliminating the need for time-consuming and wasteful serial dilutions. With a range of features specifically tailored towards cell-based and drug discovery applications – including plate shaking to



The CellTox Green Dye is excluded from viable cells, but binds to DNA from cells with compromised membrane integrity, resulting in an increase in fluorescence

prevent a bolus of DMSO from sinking onto plated cells, automatic plate randomization and straightforward generation of drug-drug interaction studies – the HP D300 is designed to increase productivity with minimal set-up time for cell-based and biochemical studies.

To find out more on Tecan's Infinite 200 PRO and GCM, visit www.tecan.com/gcm

To learn more about Direct Digital Dispensing, go to www.tecan.com/digitaltitration

Automated mass spectrometry sample preparation; the key to an efficient workflow

In recent years, monumental advances have been made in mass spectrometry (MS) instrumentation, but sample preparation has not enjoyed the same rate of development, making it a major bottleneck in the laboratory workflow. The issues associated with manual processing have hindered the uptake of MS innovation in the life science industry. To help overcome these limitations, Tecan offers Freedom EVO-based end-to-end process automation solutions for even the most challenging sample preparation protocols, liberating scientists from the tedium of manual sample preparation.

A wide range of protocols – ranging from the low complexity 'dilute and shoot' and protein crash methods used in toxicology workflows, to the more complex solid phase (SPE), liquid-liquid (LLE) extraction or protein purification/digestion techniques – are routinely used for MS sample preparation. Automation of these processes is key to meeting the high throughput and quality demands of customers. Tecan's freely-configurable, automated extraction and purification platforms eliminate manual errors, allowing staff to focus on downstream MS analysis, streamlining laboratory workflows

and enhancing productivity. For common MS sample preparation applications, the easy-to-use TouchTools™ interface places solutions at customers' fingertips, making automation easier than ever before.

To discover how automated MS sample preparation is benefitting ADPEN Laboratories, see pages 16-17.

To find out more on Tecan's MS sample preparation solutions, visit www.tecan.com/lcms

Go configure! Receive a customized quote fast!

Customers can now plan and create over 100 different designs of Cavro® Omni Robot using Tecan's new online graphical Cavro Omni Robot Configurator. This straightforward, web-based application – available for PCs or iPads® – provides laboratory instrument designers with a quick and easy way to explore the various options available for the Cavro Omni Robot, helping to accelerate their product development.

The Cavro Omni Robot Configurator details the complete range of standard options for the Cavro Omni Robot, including the various axis sizes and arrangements, arm functions and liquid handling configurations, as well as a number of finishing features, such as covers and end caps. Users can generate an interactive 3D model of a selected Cavro Omni Robot specification that updates immediately as different options are chosen, and the image can be rotated on the screen to help visualize the finished robot from different perspectives. This provides engineers with a visual confirmation of how the selected

configuration will fit, as well as quick and easy verification of the dimensions that might affect instrument design. Once the required specification has been selected, the Cavro Omni Robot Configurator generates a complete parts list which can be printed or e-mailed directly to the Tecan sales team for a quote.

To build your Cavro Omni Robot now, go to www.tecan.com/cavroomniconfigurator



Tecan Academy offers web-based training for new users

The recently launched Tecan Academy is already proving a valuable learning tool for Tecan customers in North America, helping to provide an overview of the capabilities of Tecan's liquid handling systems and multimode readers.

Tecan's new online training tool – the Tecan Academy – makes it easier than ever before for customers to optimize their instrument use. Currently available in Europe, the USA and Canada, it provides the ideal bridge between an initial introduction in the laboratory and Tecan's broad range of in-depth classroom training options, with new content continually being added as the Academy grows.

Customers from a number of sites across the USA are already benefitting from the accessible training provided by the Tecan Academy. The Open-Source Robotic Biorepository and Informatics Technology (ORBIT) Program at the Aurora Research Institute in Milwaukee – part of Aurora Healthcare – was one of the first to take advantage of this web-based portal. Natalie Polinske, Manager of the ORBIT Program, explained: "We have had our Freedom EVO® workstation since 2008, and I did a number of training courses at Tecan's North Carolina facility when it was first introduced, which I found very helpful. When a new member of staff, Anne-Marie Baumhofer, joined the laboratory, I looked at the training options

available to give her an introduction to the system. The Tecan Academy was perfect for our needs, allowing Anne-Marie to cost-effectively learn about the instrument at her own pace."

Anne-Marie added: "I completed both the Freedom EVO Operator and Absorbance Reader Operator training and certification modules, and found they gave a really useful overview. I use the Freedom EVO system every day, and the course is a nice tool to expand my knowledge, learning about the different modules on the deck and why tasks are done a certain way within the software. Although I do not use our Tecan absorbance reader as part of my daily work, the training gave me a good understanding of the system, allowing me to help other users get the most out of the instrument. The layout of both modules was easy to understand, and the interactive aspects – simulating what you will see on your own system – were very good. I also appreciated that I could complete the training at my own pace, meaning that I could use my time effectively on days when I was not as busy in the laboratory."

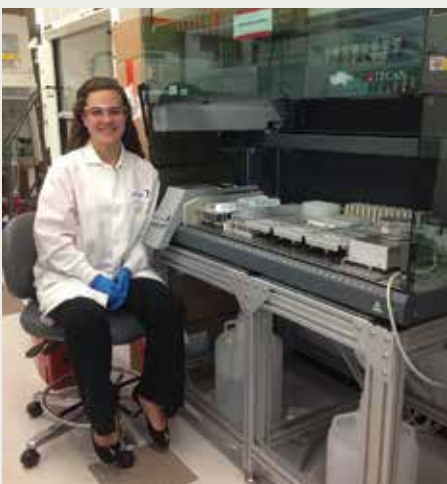
Morgan Stoessel, a cooperative education student at the Rochester Institute of Technology in New York State, also believes the Tecan Academy provides a good basic introduction to the Freedom EVO system: "When I first started using the platform, I spent a lot of time calling the Tecan helpdesk to understand how the instrument worked. They suggested that the Tecan Academy could be useful to give me an overview of the basics. It was really easy to use, and was set at a good level for new users. Having completed the course, I feel I can troubleshoot more easily, and can go back and re-check things in the module if I'm having any issues. Overall, I would say it's really good for beginners."

"It was really easy to use, and was set at a good level for new users."



Natalie Polinske and Anne-Marie Baumhofer with the Aurora Research Institute's Freedom EVO workstations

To find out more about the Tecan Academy or request a quote, visit www.tecan.com/academy



The Tecan Academy offered Morgan Stoessel a useful introduction to the Freedom EVO



Anne-Marie Baumhofer found the Tecan Academy easy to use

Automation helps to improve *in situ* hybridization protocols

The pathology laboratory at Shanghai's Changhai Hospital has successfully evaluated Tecan's HS 400™ Pro hybridization station for the analysis of breast and lung cancers.

Changhai Hospital in Shanghai, China, is a large general teaching hospital affiliated with the Second Military Medical University, and has a long history of combining medical practice with teaching and scientific research. Its pathology department receives between 80 and 90 samples a day from patients suffering from lung, gastric, pancreatic, intestinal and breast cancers, generating more than 1,000 slides for histological testing. Mr Ni Chanrong, the Department's Technical Leader, Vice Chairman of the Technical Committee of the China Medical Association Pathology Branch, and Senior Specialist of the Quality and Control ICH Group affiliated to the Ministry of Health of the People's Republic of China, is responsible for the hospital's *in situ* hybridization (ISH) project, focusing on the detection of breast carcinomas and lung cancers. He discussed the Department's recent evaluation of the HS 400 Pro hybridization station: "Breast cancers can be categorized as either HER2-negative or HER2-positive. Herceptin® – also known as trastuzumab – is an effective treatment for HER2-positive early stage breast cancers and metastatic breast cancers, prolonging the survival time of these patients. However, it is not effective against

"Automation of our ISH protocols on the HS 400 Pro is an effective alternative to manual hybridization techniques for both diseases."



Changhai Hospital is one of the top 100 national hospitals in China

HER2-negative breast cancers, and so there is a need to distinguish between these two forms of the disease."

"ISH techniques are commonly used to test the HER2 status of breast cancers, and we wanted to evaluate the application of an automated hybridization station to this work, enabling us to standardize and normalize our protocols. Tecan provided an HS 400 Pro for us to evaluate, which we really appreciate. We investigated 10 cases of breast carcinoma, five HER2-positive and five HER2-negative. Sections of paraffin-embedded tissues were prepared and stained with hematoxylin and eosin to clearly define the location of the tumor, then dewaxed and dehydrated, and uploaded to the HS 400 Pro for processing. DIG- and fluorescently-labeled probes were diluted 1:40 with hybridization buffer, and hybridization was performed at 37 °C for 12 hours."

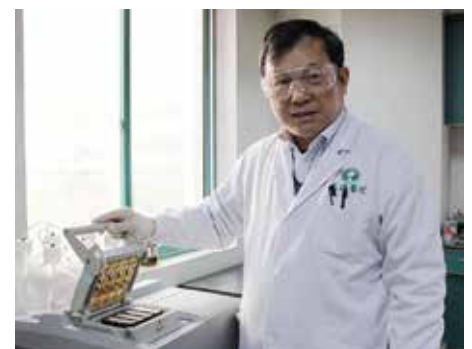
Mr Ni continued: "The HS 400 Pro gives very good, stable test results; the results obtained were consistent with those obtained using manual hybridization at 37 °C for 18 hours. It is easy to use – both system operation and program definition were simple to learn – and it took just two days to establish protocols for our work. The system's agitation hybridization technology increases the effectiveness of hybridization and helps us to reduce the concentration of probes used, improving efficiency enormously. We can complete an ISH test that would take about four hours to perform manually – excluding

the hybridization time – in just 90 minutes using the HS 400 Pro, significantly increasing sample throughput. Normalization and repeatability are improved, and the potential for manual errors is minimized, considerably enhancing the quality control process."

"We have also tested a number of lung cancer cases, and have been able to show that automation of our ISH protocols on the HS 400 Pro is an effective alternative to manual hybridization techniques for both diseases. We are now planning to expand the sample size and carry out further studies to determine the optimal hybridization conditions," Mr Ni concluded.

To find out more about Tecan's microarray solutions, visit www.tecan.com/microarray

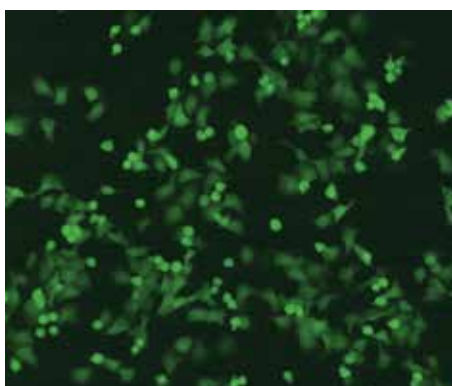
To find out more about Changhai Hospital, visit www.smmu.edu.cn/english/SMMU_Hospital_chhai.htm



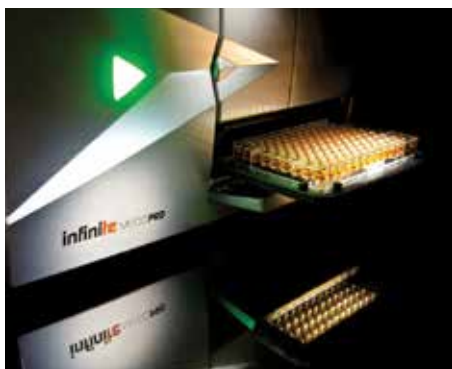
Mr Ni demonstrates the use of the HS 400 Pro hybridization station

Shining a light on novel cancer drugs

Researchers at the Lyon Neuroscience Research Center are benefitting from the flexibility and user-friendly design of the Infinite® 200 PRO multimode reader, and have developed a unique cell migration assay to help identify novel biotherapeutics for the treatment of glioblastoma.



Human squamous epithelial carcinoma cells



The Infinite 200 PRO is helping research into the treatment of glioblastoma

The Lyon Neuroscience Research Center (Centre de Recherche en Neurosciences de Lyon, CRNL) is a multidisciplinary facility bringing together expertise from across academia, industry and clinical research to provide a greater understanding of brain function and disease. Created in 2011, the CRNL investigates a wide range of basic cognitive functions – including sleep cycles, olfactory processes, nociception, auditory cognition and memory – as well as neurological disorders and diseases, such as epilepsy and cancer.

Dr Emmanuel Sotirakis, a researcher in the CRNL's neuro-oncology and neuro-inflammation group, explained: "We have a very strong interaction between academic research, clinical research and industry, gathering expertise from across different research environments to better understand brain-related functions and diseases. Within my group, we are strongly focused on translational research, working closely with local hospitals and drug discovery companies to try and develop new therapeutic agents which will improve the prognosis of glioblastoma patients. This type of malignant tumor is very aggressive, and there is currently a lack of effective therapeutic strategies to improve outcomes for these patients."

"We work closely with a local industry partner that specializes in drug discovery for cancers. We develop a range of assays to characterize the effect of these novel therapeutics on glioma cells, and one of the studies we were interested in performing was a cell migration assay. Traditional manual methods

for performing this type of investigation are laborious and time consuming, requiring complex cell handling and fluorescence microscopy techniques. We wanted to develop a more automated technique that would allow higher throughput. We began looking at microplate-based assays using FluoroBlok™ cell culture inserts and, as a very new center, we had the advantage of being able to choose a microplate reader to suit our assay requirements."

"It was vital for the system to have bottom reading optics for the cell migration assay, and sensitivity was also a major consideration. We looked at multimode readers from several manufacturers, and the Infinite 200 PRO seemed the best match for our needs. We also wanted a system capable of performing everything from basic colorimetric or fluorimetric measurements to ELISAs and rapid kinetic assays. All of our cell-based assays use the system's temperature control function to avoid causing unnecessary stress to the cells during data acquisition. We also use the injector module for a number of kinetic studies, particularly calcium signaling assays."

"For the cell migration assay using the FluoroBlok inserts, we have been able to achieve very good results for both dye-stained and GFP-tagged cell lines, thanks to the system's excellent signal-to-noise ratio and adjustable z-focus. A single 96-well plate can be scanned in under two minutes, minimizing the time the cells spend out of the incubator. Alternatively, for experiments where the maximum signal output is unknown, we can perform multiple



acquisitions for each well at varying gain settings, then identify the optimal gain setting once the experiment is complete. This is a great time-saving feature, and still takes less than five minutes for a 96-well plate.”

“Because we needed a system that could be used across multiple projects, flexibility was a key factor, and my colleagues have been very happy with the versatility and ease-of-use of the Tecan instrument. The system’s dual software packages are also well suited to our needs. i-control™ allows rapid data acquisition and export, while Magellan™ provides advanced data interpretation and

statistical analysis for more advanced users. Data security is also an important consideration, as we work with a number of industrial partners, and the ability to control access and permissions gives us complete peace of mind. Finally, the support of Tecan’s applications team has been a real benefit. When we first looked at investing in a reader, our local representative was very helpful in ensuring we got the best system for our needs, and the Tecan team has always been available to answer our questions and provide expert support for specific applications.”

To find out more on Tecan’s Infinite 200 PRO, visit www.tecan.com/infinite200pro

To learn more about CRNL, go to crnl.univ-lyon1.fr

“Data security is also an important consideration... the ability to control access and permissions gives us peace of mind.”

Pushing back boundaries with ultra-low volume pipetting

The Novartis Animal Health Research Center has invested in an automated compound logistics system to aid drug discovery, taking advantage of the exceptional pipetting capabilities of the MultiChannel Arm™ 384.



Vincent Beuret with the Center's Freedom EVO system

“We can pipette down to 0.1 µl of compound with a CV of 10 %, which is impressive.”

The Novartis Animal Health Research Center in Saint-Aubin, Switzerland, is engaged in developing anti-parasitic and therapeutic products for veterinary use. The Company has automated picking, distribution and dissolution of compounds on a Freedom EVO® system, enabling the pre-discovery screening group to benefit from the extremely low volume pipetting offered by the MultiChannel Arm 384 (MCA 384). Scientist Vincent Beuret explained: “Our group screens potential candidates against a range of parasites, such as filarial and gastric parasites, fleas, ticks and flies, and tests hundreds of thousands of compounds a year. The initial *in vitro* testing allows us to determine whether a compound is active on a particular parasite, and to get an indication of the dose that is required. We can then pre-select suitable candidates to undergo further studies to establish the activity and toxicity *in vivo*. To help with this work, a new automated compound logistics system was installed last year. A Freedom EVO 150 platform with an eight-channel Liquid Handling (LiHa) Arm is linked to a customized LiCONic StoreX Kiwi TubeStore. A Te-Link™ module connects the

Freedom EVO 150 to a second liquid handling platform, a Freedom EVO 200 equipped with an MCA 384, allowing plates to be transferred between the workstations. Each Freedom EVO platform is controlled independently by Tecan's Freedom EVOware® software, which gives us the option to use either platform in isolation if necessary.”

“Mother solutions – 10 mg/ml or 10,000 ppm solutions in DMSO of all the compounds that we are interested in – are pre-selected for screening tests. The chosen mother solutions are stored in the Kiwi unit until needed, then transferred to the Freedom EVO 150, where the LiHa prepares 96-well daughter plates containing suitable dilutions of these compounds. The Te-Link module moves the daughter plates across to the Freedom EVO 200, where the MCA 384 allows us to generate 96- and 384-well test plates, according to the size of the parasite. This is an important stage, as we are often pipetting extremely small volumes of compound; we can pipette down to 0.1 µl of compound with a CV of 10 %, which is impressive.”



Vincent continued: "I attended a Tecan training course for the MCA, and this helped me to establish the best parameters for different liquid classes and find the ideal settings for reproducible, accurate pipetting."



The Novartis team has achieved reliable pipetting down to 0.1 μ l using the MCA 384

"The latest edition of the Freedom EVOware is also a real step forward for us."

"To perform such low volume pipetting, we initially draw up 4.9 μ l of media, followed by 0.1 μ l of compound, and then dispense the entire 5 μ l volume so that the media flushes the entire compound from the tip. We noticed differences in the results depending on the media used, and optimized our procedures to account for this. We discovered that optimal pipetting quality is achieved when water containing a small percentage (0.05 %) of Tween 20 is used. This also promotes greater interaction between the candidate compounds and the parasite, further enhancing assay performance."

"We were able to move from our old Tecan system directly to the new platform without a break in our screening investigations. As the LiHa handles the largest volumes of mother solution, which is where there is the greatest risk of contamination, its liquid displacement pipetting system is important, giving us the capability to thoroughly flush the system. The MCA 384 was chosen for its flexibility; although we use 96-well daughter plates at the moment, with the MCA we have the

option to move to 384-well plates in the future. This would save time, as we could transfer compounds from daughter plates to 384-well test plates in one procedure, rather than the current four-step protocol. The latest edition of Freedom EVOware is also a real step forward for us; it is very robust, and we can certainly see the benefits of 10 years of development."

Vincent concluded: "We receive good support from Tecan, and are very happy with the implementation of the compound logistics system, as well as how the project has progressed; it is always nice when you find something that works well, and that lasts a long time without the need for constant modifications. It is really nice to know that your work is going to last."

To find out more on Tecan's MCA 384, visit www.tecan.com/mca384

To find out more about Novartis Animal Health, visit www.ah.novartis.com

Enhancing clinical diagnostics

Turkish company Zivak Technologies develops analytical kits and instrumentation for use in the food, healthcare and environmental sectors, and relies on Tecan's Cavro® Omni Robot for its automated HPLC and LC-MSMS systems.

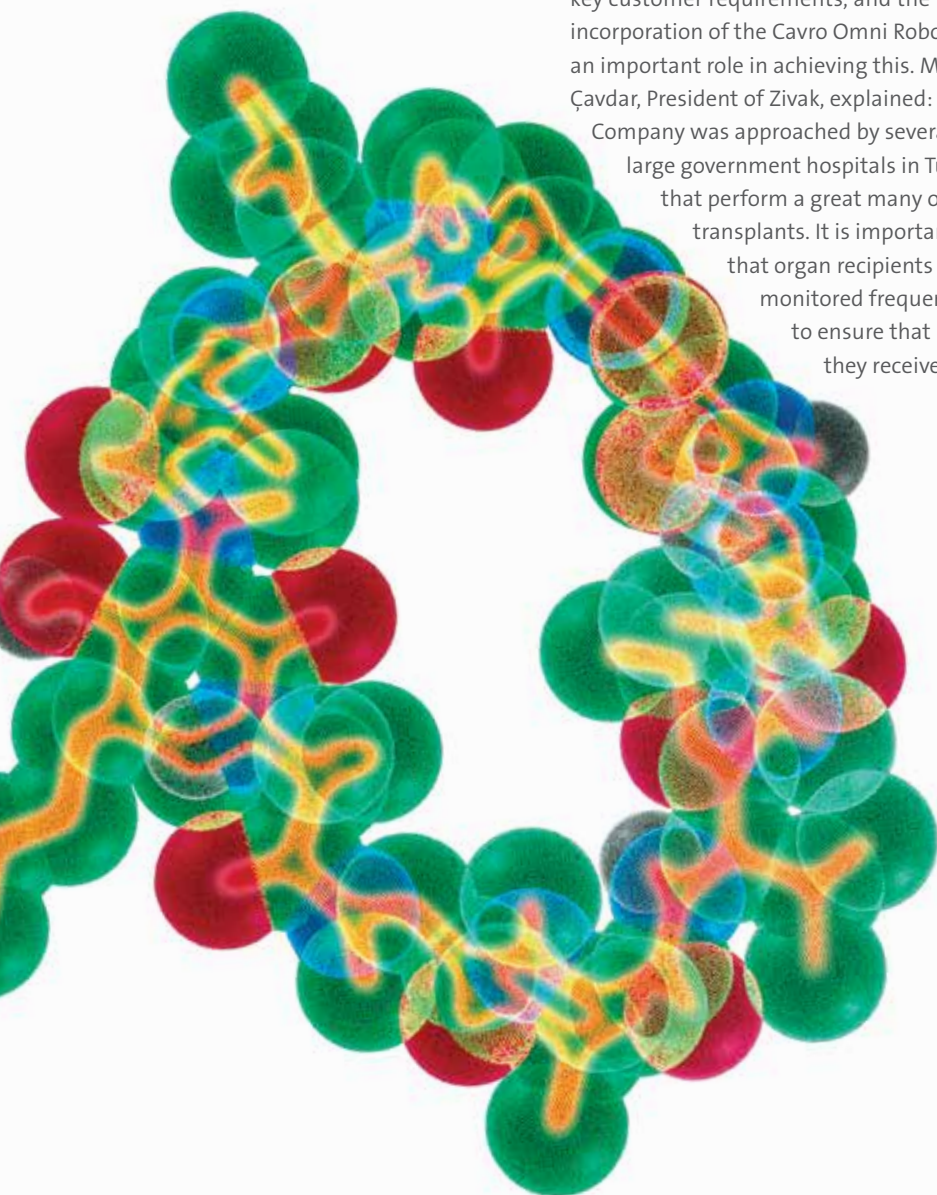


Zivak Technologies, based in Istanbul, Turkey, was established with the principal aim of developing and manufacturing assay kits targeted at commonly measured analytes in the clinical diagnostics, food, environmental and forensic arenas, as well as the production of HPLC and LC-MSMS instrumentation for assay automation. Analytical precision and ease of use are key customer requirements, and the incorporation of the Cavro Omni Robot plays an important role in achieving this. Mr Avni Çavdar, President of Zivak, explained: "Our Company was approached by several large government hospitals in Turkey that perform a great many organ transplants. It is important that organ recipients are monitored frequently to ensure that they receive the

appropriate dose of immunosuppressant drugs; patients may wait years before a donor is found, and it is vital to administer the correct dose to minimize the chance of an organ being rejected. Obtaining rapid, accurate results is crucial, and the hospitals needed an automated mass spectrometry-based method for monitoring immunosuppressants. When the level of immunosuppressant in a patient's blood is monitored by immunoassay, it may be two or three hours before the result is available. The consequence of this is that any medication prescribed is based on the level of immunosuppressant present several hours previously, and this may have changed. If the assay also has a high error, this has a huge impact on the medication prescribed and, potentially, on the success of the transplant."

Mr Çavdar continued: "Historically, HPLC and LC-MS have not been used in clinical diagnostics, and there are a number of reasons for this: it must be possible to run the instrument 24 hours a day; a great deal of sample preparation is necessary; and the interpretation of the results, particularly for LC-MSMS, requires highly trained scientific staff. In 2005, when the pharma industry was specifying a results bias of $\pm 0.1\%$, the clinical diagnostics field was working to a bias of ± 25 to 30% , and we foresaw a future for the gold standard techniques of HPLC and LC-MS. In addition to validated assay kits and reagents, we decided to develop and manufacture automated LC and LC-MSMS analyzers for the clinical diagnostics market."

"Hospitals need straightforward clinical analyzers that simply require the samples – blood, plasma, serum or urine – to be loaded, and then automatically carry out all the preparation and analysis, generating





Kübra Balyemez shows how the Cavro Omni Robot has been incorporated into Zivak's 25-OH Vitamin D₂-D₃ HPLC Analyzer

results in a user-friendly format that confirms whether a patient sample is positive or negative, and that control samples are within limits. To enable the sample preparation stages to be performed, we needed to integrate a precise and reliable liquid handling system – the Cavro Omni Robot. Combining the Cavro Omni Robot with our technologies – including PC-controlled vortexers and centrifuges, online SPE and shaker/heater units, as well as in-house developed software – has enabled us to produce a series of fully automated HPLC and LC-MS/MS based analyzers that can measure 25-OH metabolites of vitamin D₂ and vitamin D₃, immunosuppressants, amino acids and organic acids in minutes, rather than the hours that may be required for other assay types. The Cavro Omni Robot is very versatile, offering flexible sample handling for up to 180 samples per run, and can accommodate a range of different sample formats, from vacutubes and vials to microplates, as well as allowing us to integrate a variety of

modules. Reliability and accuracy are crucial. Thousands of analyses were performed prior to going to market to ensure the robustness and accuracy of the analyzers, and we have demonstrated errors as low as 1 %.

“The Tecan staff are very honest and open, which is important because it is the people that show you what a company and its management are like.”

“When you plan to develop a lot of things, you recognize that you will be spending large sums of money, and you have to know that you are working with a company that you can trust. The Tecan staff are very honest and open, which is important because it is the people that show you what a company and its management are

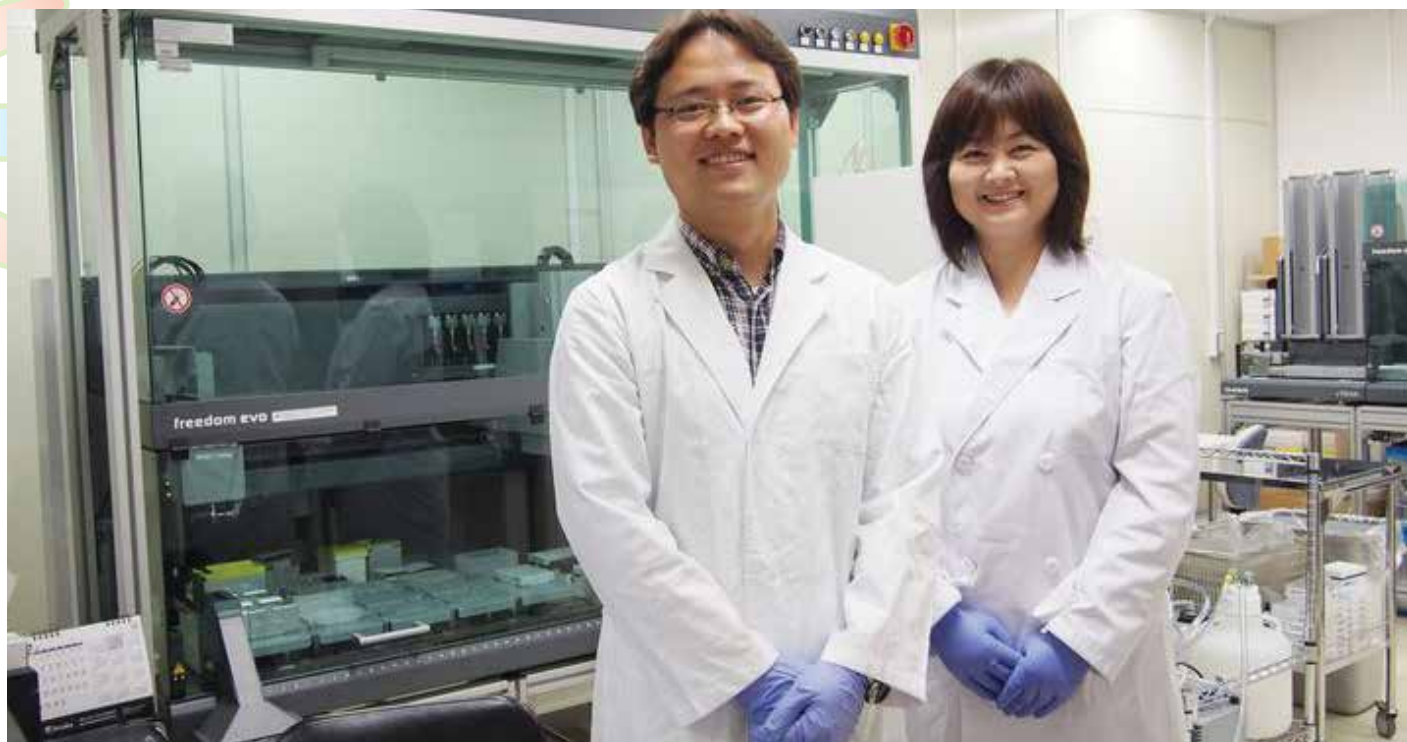
like. This gave us the confidence to build a relationship with Tecan, and to adopt the Cavro Omni Robot for our automated systems,” concluded Mr Çavdar.

To find out more about Tecan's Cavro Omni Robot, visit www.tecan.com/omnirobot

To learn more about Zivak Technologies, visit www.zivak.com

Boosting drug discovery with efficient transfection technology

The Life Sciences Laboratory of the Central Research Institute at Ishihara Sangyo Kaisha Ltd has used Tecan's Freedom EVO® 200 workstation to develop a successful automated protocol for efficient siRNA transfection, paving the way for efficient high throughput screening of small RNA libraries.



Dr Lin Bangzhong and Ms Tomona Yamaguchi with the Freedom EVO 200

“Automation has allowed us to significantly widen our products' applications, and we have now started larger scale investigations.”

Under the theme 'science to protect life', Ishihara Sangyo Kaisha Ltd in Osaka, Japan, conducts research and development of bio-reagents that contribute to progress in medical and life sciences. Working jointly with Professor Yasufumi Kaneda of Osaka University and the university's venture enterprise, the Company has developed GenomONE™, a series of unique kits for transfection, cell fusion and IgG antibody

introduction. The core technology of this product range is a new type of non-viral vector that uses the cell membrane fusion activity of envelope membrane components from the hemagglutinating virus of Japan (HVJ). The genome of the virus has been completely inactivated while still maintaining the viral envelope's ability to introduce its contents directly into target cells. Various physiologically active substances can be put into this envelope for transfection into cells.

“My work involves optimizing a transfection system for siRNA using the HVJ Envelope (HVJ-E) vector,” explained Ms Tomona Yamaguchi, research scientist at the Central Research Institute. “We have developed reagents and protocols specialized for siRNA, and have had considerable success with various cells that have, until now, been difficult to transfect; non-adherent

immune cell strains, particularly primary culture T-cells and B-cells, can now be transfected, and many GenomONE users have reported success with cell types that they could not transfect using other methods, such as lipofection and electroporation. By successfully transfecting the desired substances in appropriate amounts and still keeping the cells in good condition, the HVJ-E method gives investigators a smooth progression towards *in vivo* experimental stages.”

The team, again in association with Osaka University, has now successfully developed an automated HVJ-E transfection and functional assessment system using a Freedom EVO 200 liquid handling platform and Infinite® M1000 microplate reader, as Ms Yamaguchi described: “We started in January 2013, performing a series of experiments to confirm that we could

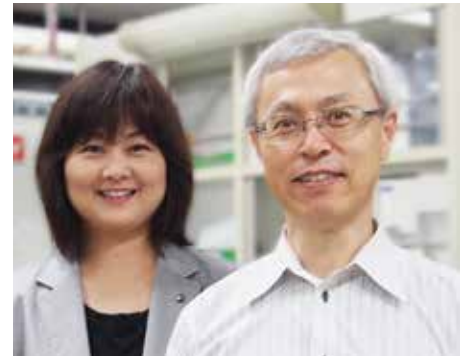
reproduce the results from manual processing and, by March, we had established an optimized automated test system.”

Dr Bangzhong Lin of Osaka University Office for University-Industry Collaboration programmed and operated the Freedom EVO 200. He commented: “For a high throughput screening (HTS) protocol such as this, it was essential to perform automated dispensing operations under sterile conditions, and this was made possible with the installation of a HEPA filter with an integrated incubator and Carousel HS™. It was also critical that minute volumes of two types of solutions were mixed within each well of a 96-well plate. This was achieved by a combination of the precise positioning of the pipetting tips during dispensing using both a Liquid Handling Arm and a MultiChannel Arm™ 96, and by expelling the droplets at high speed. Following incubation, the Infinite M1000 was used for quantitative colorimetric assessment of cell growth.”

Ms Yamaguchi highlighted the benefits of switching from manual operation: “Automation has eliminated both the variability in the results caused by differences

in the skill of the experimenter, and the potential for human error. I was particularly impressed by the way the Freedom EVO transfers plates; the movement is really smooth and there is very little vibration. Using the Freedom EVO has halved the processing time, plus we have increased the number of assay plates we are able to process, which was limited by manual handling. The quantity of consumables we use has also been reduced by our automated protocol. Automation has allowed us to significantly widen our products’ applications, and we have now started larger scale investigations, including screening large siRNA libraries for candidate molecules that may become drug discovery targets. I certainly aim to use the Freedom EVO again in future projects, whenever automation could potentially play a part.”

Dr Fuminori Kato, general manager at the Central Research Institute, added: “With the advent of techniques like next generation sequencing, it has become possible to detect and identify small RNAs that were not previously known, suggesting that many more original small RNAs are still to be discovered in the near future. By



Ms Tomona Yamaguchi and Dr Fuminori Kato

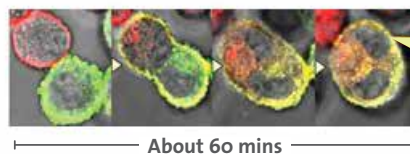
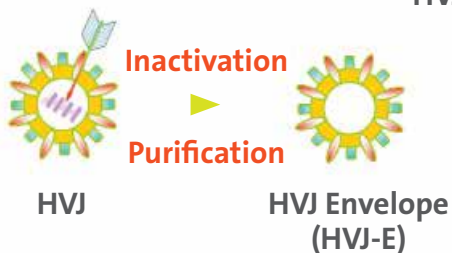
combining GenomONE with the automation of the Freedom EVO, we have been able to demonstrate HTS of immune cells for the first time. We anticipate that the GenomONE series and Freedom EVO 200 will make a great contribution towards the research of this quickly expanding group of biological molecules, as well as propelling applied research in the field of medical diagnosis.”

To find out more on Tecan’s genomic solutions, visit www.tecan.com/genomics

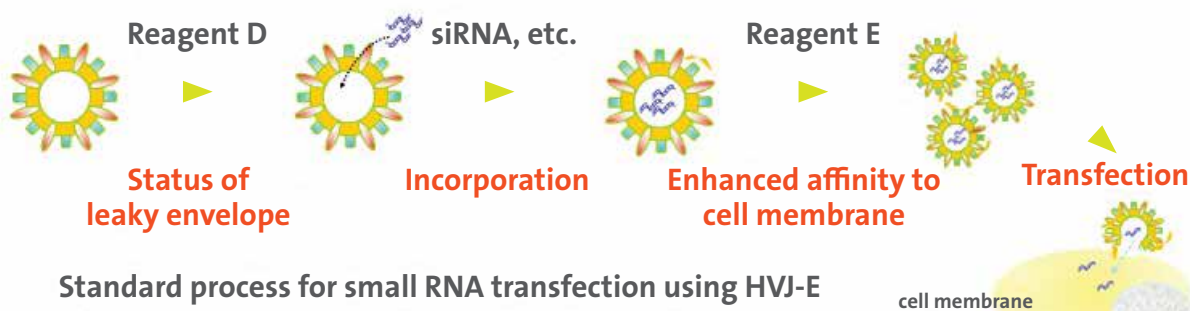
To find out more about Ishihara Sangyo Kaisha Ltd, visit www.iskweb.co.jp/eng/index.html

What is HVJ-E?

*HVJ; Hemagglutinating Virus of Japan (Sendai virus)



Cell fusion using HVJ-E!



Standard process for small RNA transfection using HVJ-E

The Freedom EVO has enabled the Company to optimize a transfection system for siRNA using the HVJ Envelope vector (schematic provided by Ishihara Sangyo Kaisha Ltd)

Meeting the high throughput demands of mass spectrometry sample preparation

Independent contract research organization ADPEN Laboratories specializes in residue analysis, and has invested in a Freedom EVO® 100 liquid handling platform for mass spectrometry sample preparation.



ADPEN Laboratories, based in Jacksonville, Florida, USA, provides advanced analytical services to the pharmaceutical, agrochemical and food safety industries, working with multinational companies, government and international organizations worldwide. In 2003, the Company undertook a large-scale water monitoring study requiring automated sample preparation, as Steven Perez, Laboratory Manager, explained: “ADPEN was contracted to analyze between 10,000 and 15,000 samples from agriculturally sensitive areas across the US where there is concern about run-off from the fields contaminating

the water supply. This involved analyzing several hundred surface and drinking water samples each week, which required turnaround times of less than 10 days. The biggest bottleneck in the entire workflow was sample preparation; pipetting samples into a 96-well plate for analysis by mass spectrometry is very time consuming. To resolve this issue we needed to automate the sample preparation process, and required a liquid handling platform that could pipette consistently, accurately and reproducibly, saving time and freeing staff to perform other tasks.”

“When we saw the Freedom EVO, all the pieces of the puzzle came together; we knew that it was a viable option for us,” Steven continued. “Tecan’s long history of automation, combined with the Freedom EVO’s accuracy and flexibility, was ideal. Initially the client was hesitant, believing that an analyst would be more careful and do a better job. However, we ran many method trials to test the system’s robustness and validate the platform, successfully demonstrating that automation on the Freedom EVO was as good as, or better than, manual procedures. Reproducibility was excellent – relative standard deviations of less



The ADPEN team with the Freedom EVO. Left to right; Joshua Kaster, Olga Almaraz, Adelaida LaRosa, Steven Perez, Santana Bryant, Giuseppe Franzeze, Melisa Marshall



than 5 % were achieved – and the need for samples to be re-extracted due to spurious results was all but eliminated. The client was very happy with the results, approving the use of the platform for the study, and so we purchased a Freedom EVO 100 with a four-channel Liquid Handling Arm, which we use with Teflon-coated stainless steel tips. The system is controlled by Freedom EVOware®, with the optional TouchTools™ interface.”

“To prevent microbial activity which may cause any residue to diminish, samples are collected in vials containing sodium omadine solution, which we prepare on the Freedom EVO. We know that if the client requests 3,000 vials by a particular date, it can be done very easily; the analyst just starts the method and leaves the Freedom EVO to prepare 500 vials of preservative. The sample preparation process itself is also quite simple. Samples, blanks and calibration curve standards are pipetted into 96-well plates and 100 µl of internal standard is added. Although we currently pipette microliter volumes, the Freedom EVO gives us the flexibility to dispense precisely up to one milliliter as our requirements change.”

“The elimination of sample carry-over is

absolutely essential when performing residue analysis at levels as low as parts per trillion by liquid chromatography-mass spectrometry, as even trace amounts of a compound will be detected. Despite this, we were able to use stainless steel, rather than disposable, tips for this project due to the efficiency of the tip washing. Including four-second wash steps into our protocols proved very effective; carry-over is not an issue, allowing us to use septa – rather than solid – vial caps, which is a major benefit. The tips pierce the septa, allowing an aliquot of the sample to be withdrawn and transferred to the correct location in a 96-well plate, and the septa reseal as the tip is removed. We no longer need to spend time uncapping and recapping vials and, as the sample is always sealed, the potential for cross-contamination with another substance is effectively eliminated, which is paramount.”

“The Freedom EVOware software is quite intuitive, enabling methods to be easily modified, and gives us confidence that the Freedom EVO will accurately and reproducibly do exactly what it is programmed to do every single time. TouchTools is great too; the analyst simply selects the method, starts the run and walks

“When we saw the Freedom EVO, all the pieces of the puzzle came together.”

away. It is just so easy. We always knew that automation was going to be very good for us, and would improve productivity, we just needed to demonstrate it to the client. The Freedom EVO did a great job; it just sailed through all the trials, and has alleviated the sample preparation bottleneck, reducing turnaround times from 20 days to less than 10 days. We can now do twice as many sample sets in a day, significantly increasing throughput and helping to reduce turnaround times and increase productivity. The Freedom EVO just works flawlessly,” concluded Steven.

To find out more about Tecan’s LC-MS sample preparation solutions, visit www.tecan.com/lcms

To find out more about ADPEN Laboratories, visit www.adpen.com

Removing the constraints of manual dose-response assays

The Stanford Genome Technology Center has invested in an HP D300 Digital Dispenser to study the effects of small molecule chemical inhibitors in yeast, enabling more experiments to be carried out more easily, and in less time.

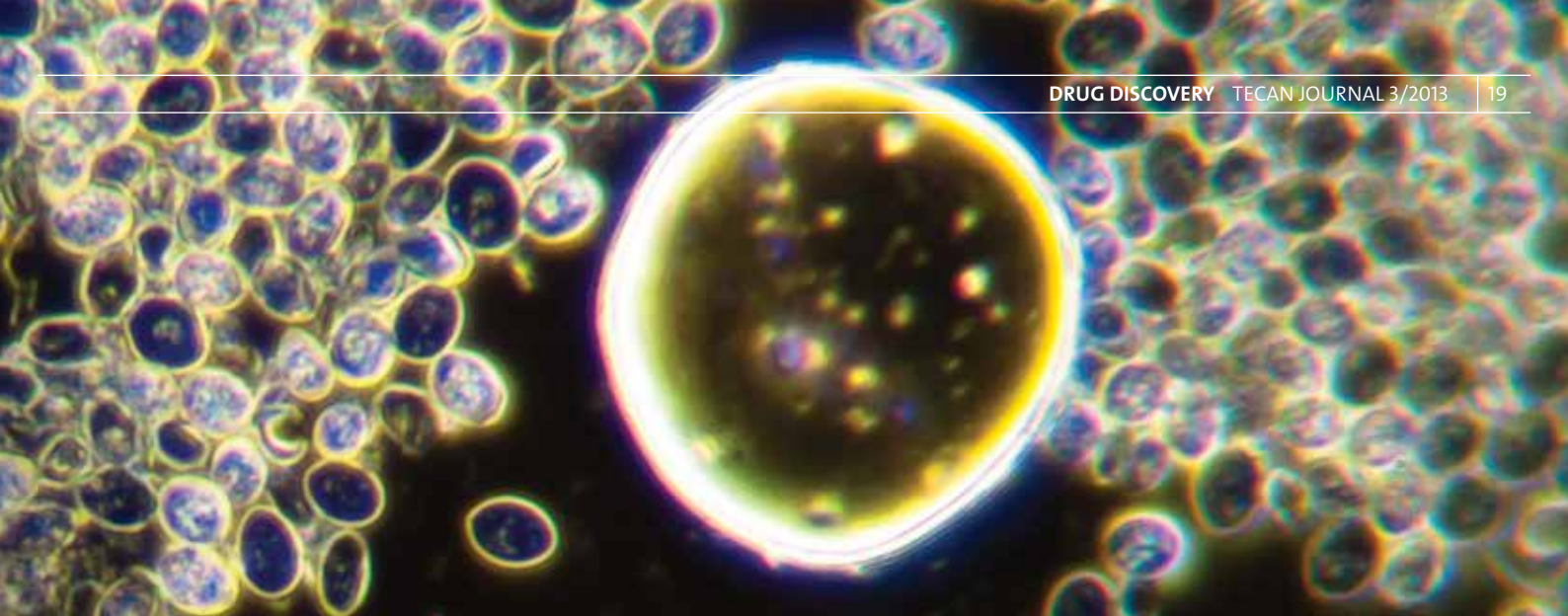
The Stanford Genome Technology Center (SGTC) in Palo Alto, California, USA, focuses on developing genomic technologies and innovative techniques to address important biological questions. Performing yeast functional genomics studies allows the Center to investigate the effects of small molecule chemical inhibitors, as Bob St. Onge, a Senior Research Scientist at SGTC, explained: “Our goals include the identification of new chemical inhibitors

that may be useful tools for studying cell biology or have the potential to be developed into a drug, as well as new druggable targets – proteins within the cell that are amenable to inhibition by small molecules. Yeast is very easy to culture and grows quite rapidly, making it ideal for our investigations; a lot of experiments can be performed that would take considerably more time to carry out in a human cell system, and many pathways – especially those related

to cellular metabolism – are conserved. For example, some cancer drugs, which target specific proteins in tumor cells, target the same proteins in yeast cells. There are also experimental tools that are available in yeast, but not in other systems. We have a knock-out strain for each and every gene in yeast, and the effects of small molecules on all of these strains can be examined. The strains can be assayed individually, or collectively as a pool of knock-out strains in a single culture.



Research Assistant Sundari Suresh using the SGTC's HP D300



Instead of looking at individual targets or processes, we can essentially look at all potential targets simultaneously, getting a better idea of what is really going on. This is particularly important when small molecules are studied, as even the most specific compounds often have multiple effects on the cell.”

“Yeast has a short doubling time, and we can do many experiments very quickly, testing large numbers of chemical inhibitors against many strains by performing growth assays in suspension cultures in 48-, 96- and 384-well plates. To help with this work, we recently purchased an HP D300 Digital Dispenser, which enables us to take full advantage of the yeast system. It is perfect for our experiments, allowing us to dispense compounds directly into yeast culture plates, which are then assayed in microplate readers. We have several Tecan Sunrise™ and GENios™ readers, and these play an important role in our studies, acting as yeast incubators and enabling us to monitor growth in real time over the course of one or two days, measuring and quantifying the effects of candidate compounds very precisely.”

Bob continued: “The HP D300 removes the technical burdens and constraints involved in manually setting up dose-response assays, making it very simple to plan and dispense the exact drug concentrations required, which really opens up new experimental options. It is easy enough to manually test a particular drug at a certain concentration range, but looking at ten different drugs and a variety of different strains is a pretty big investment in experimental planning and pipetting, especially when studying drug

combinations. Every laboratory is limited to some degree by staffing levels, time and cost, and an instrument like the HP D300 lets you perform experiments so much more rapidly; we can set up ten 384-well assay plates and obtain the results the next day, freeing up time to do other things. As the experiments are now much easier to do, we do a lot more of them, looking at the effects of specific drugs and strains either individually or in combination. I can say with certainty that we have performed experiments that we wouldn’t otherwise have done, and that those experiments have actually led to some very interesting results.”

“The HP D300 is also very intuitive; we were shown how to use it one day, and were setting up our own experiments the next; very little training was needed as the software is so user friendly. The instrument is in use almost every day now and, in fact, the main challenge for us is to build the informatics tools needed to keep track of, and analyze, all the new data we have generated,” concluded Bob.

To find out more about Tecan’s HP D300 Digital Dispenser, visit www.tecan.com/digitaltitration

To find out more about the Stanford Genome Technology Center, visit www.med.stanford.edu/sgtc



“We have performed experiments that we wouldn’t otherwise have done, and those experiments have actually led to some very interesting results.”



Novartis embraces full automation

Basel-based Novartis Pharma AG has completed a year-long collaboration with the Tecan Integration Group, developing a fully automated Freedom EVO®-based system for antibody formulation screening.



“Working with TIG was fantastic... an interesting, really nice collaboration.”

In 2007, as part of the FDA Quality by Design initiative, the Biologics Section of Novartis Pharma AG in Switzerland created an automation laboratory to prepare and screen antibody formulations, meeting the high throughput demands of its analytical workload. Principal Scientist Olivier Graf explained: “To cope with the ever-increasing sample numbers, we had two options; introduce automation, or outsource the analysis to an external service provider. We chose automation, giving us full control of our data, and speeding up sample preparation, integration and delivery of results to our clients. Automation is more cost-effective and avoids the need to transfer methods to an external company, which can be complicated and time consuming, particularly if different chromatographic data systems are in use.”

“We began collaborating with the Tecan Integration Group (TIG) around mid-2010, and the project took about a year to complete. We already knew which analytical instruments and modules we needed to incorporate, and that our techniques were working well, but integrating everything into the system was still a considerable technical challenge. We needed a system that was as compact as possible, with error handling systems, macros that start the chromatographic data systems automatically, and data management capabilities; the robotics and third-party devices required made the system really complex. The TIG proposal was straightforward, incorporating all the third-party instruments and integrating them with the Tecan software.”

Novartis chose a customized solution consisting of two Freedom EVO 200 systems coupled back-to-back, one dedicated to liquid handling for sample preparation, the other to logistics. The

sample preparation platform is equipped with an eight-channel Liquid Handling Arm and a MultiChannel Arm™ (MCA) 96, as well as a Robotic Manipulator (RoMa) Arm for maneuvering plates. A RoMa Arm on the logistics platform enables transfer of 96-well sample plates via a Te-Link™ module to the sample preparation workstation for dilution, or to the analytical instruments for analysis. Integrated third-party modules – including barcode readers, a high speed thermoshaker, a shaker-incubator, a capper/decapper, a plate sealer, a centrifuge, and a plate hotel – enable complex preparation methods involving digestion, reduction and alkylation to be performed. For sample analysis, the system incorporates a UV/Vis spectrophotometer for quantification of proteins, a dynamic light scattering system for protein characterization, a capillary electrophoresis instrument, and five HPLCs. The entire set-up is controlled by Tecan’s Pegasus software package.

Associate Scientist Sébastien Heitz continued: “We already had a Freedom EVO 200 liquid handling platform, which was chosen for its capability to handle RoboColumns® (Atoll) and increase the speed of the sample purification process. We receive antibody suspensions in BD Falcon™ tubes, purify them on this workstation using RoboColumns with Protein A, and then transfer them to our customized system for all the subsequent steps. The antibody solutions may or may not be formulated, or may contain excipients such as sucrose or trehalose, and the sample concentrations will also vary. This affects the viscosity of the solution. To address this issue, the new system has specialized liquid classes for our protocols. Working at maximum capacity, we carry out either one run of 192 samples or two runs of 96 samples in one week, depending on the run time of the analytical method.”



Olivier added: “Pre-automation, we were limited by the number of samples we could handle. Fully automating our processes has allowed us to carry out all the projects in house in preference to outsourcing the work, with significant cost savings. We have employed additional staff, who focus on data interpretation rather than time-consuming manual pipetting and loading samples onto instruments, and can deal with even the smallest requests from our customers. Automation has also streamlined and simplified mobile phase preparation; instead of several analysts preparing the same mobile phase for different instruments, scientists simply request sample analysis and the results are available the next day.”

“Working with TIG was fantastic. The team was really receptive to any last-minute changes, implementing these very quickly, and the software programmer was always highly proactive. It was all very straightforward, a really interesting and nice collaboration. With Tecan, we accomplished our big challenge; developing a customized, fully automated platform that does everything we need,” concluded Olivier.

To find out more about Tecan’s customized solutions, visit www.tecan.com/tig

To find out more about Novartis, visit www.novartis.com/innovation/research-development/index.shtml



The Novartis team with its customized solution for antibody formulation screening. Left to right; Olivier Graf, Sébastien Heitz, Vanessa Seyfried, Sabine Dehm, Kim-Sarah Schneider, Gilles Thoma

New possibilities for biological surfaces research

Two Freedom EVO® 200 workstations are helping researchers at McMaster University's Biointerfaces Institute to investigate novel biomaterials and biointerfaces. The Institute's high throughput, multi-faceted approach is borrowed from the pharmaceutical industry, and relies on the flexibility and modularity of its Tecan workstations.



The Biointerfaces Institute at McMaster University in Hamilton, Canada, is a state-of-the-art facility offering large-scale screening and characterization of biologically active surfaces and biomaterials. Officially opened in April 2013, the Institute uses high throughput screening techniques and advanced characterization methods more commonly found in the pharmaceutical industry, and was created to exploit this multi-faceted approach for the development of new biomaterials and biologically derivatized surfaces. Dr John Brennan,



The Biointerfaces Institute's approach relies on the flexibility of its Freedom EVO platforms

Director of the Institute and Canada Research Chair in Bioanalytical Chemistry and Biointerfaces, described their approach: "We first looked at using high throughput 'pharmaceutical research' techniques in 2007, and couldn't believe that nobody was applying this approach to the development of biomaterials and biointerfaces. You begin by screening many materials, followed by detailed analyses on positive results or 'hits', to give a better understanding of why a particular interaction occurred. This downstream analysis – using techniques such as advanced fluorescence imaging, mass spectrometry and solid-state nuclear magnetic resonance spectroscopy – is vital. Putting this approach into practice meant creating a multidisciplinary team with expertise in all these interconnected fields, and this was the founding principle of the Biointerfaces Institute. We then looked at the best way to create an efficient, high throughput workflow and decided on two main technologies; microarrays and nanoparticles. As both of these technologies are fairly labor intensive, we needed specialized automated platforms that would enable us to achieve the necessary throughput to really move forward with our surface chemistry investigations."

The Institute chose a pair of Freedom EVO 200 platforms as the foundations of its research, taking advantage of the instruments' modular design and open architecture to develop flexible, high throughput solutions. John explained: "Our Freedom EVO workstations lie at the heart of everything we do; each platform provides walkaway automation of liquid handling and primary analysis. The microarray-based platform is set up for front-end assays and high throughput screening in microplate or microarray formats. Preliminary fluorescence-

based analysis is performed using either an Infinite® M1000 microplate reader or LS Reloaded™ microarray scanner, both of which are integrated into the workstation. Hits from the high throughput screening are then investigated downstream with more data-rich, medium throughput imaging methods, including X-ray photoelectron spectroscopy, MALDI mass spectroscopy, surface plasmon resonance and infra-red spectroscopy. The other platform is geared towards nanoparticle-based formulation and synthesis, and uses specially configured liquid handling tools that can work with viscous solutions, nanoparticle suspensions, and other non-conventional liquids. The Freedom EVO 200 is used in tandem with a fluorescence activated cell sorter (FACS) for selecting nanoparticles with interesting properties. This set-up gives us detailed information on surface chemistry, particle size and distribution, and elemental composition of surfaces."

"Tecan is the only company able to offer this level of configurability."

Dr Fred Capretta, Associate Professor of Chemistry and Chemical Biology, explained why the Institute chose the Freedom EVO workstations to automate its workflow: "Within the team we had previous experience with virtually every supplier of laboratory automation equipment, and there were two main factors that made Tecan our first choice of supplier. Firstly, the Tecan team was very willing to customize the instruments to exactly meet our requirements, creating systems that perfectly matched our workflow. The Company is well known for being able to



Automation provides the high throughput necessary for effective characterization of biomaterials

successfully integrate all kinds of third-party devices onto its systems, and we were keen to take advantage of this flexibility. The deck of our synthesis workstation has also been modified to accommodate METTLER TOLEDO MiniBlocks®, allowing us to use tubes as well as microplates and microarray supports.”

“Secondly, the user-friendly Freedom EVOware® software allows complicated experiments to be set up relatively quickly and left to run unattended on the Freedom EVO. This is very important for our work, giving us the ability to perform complicated manipulations and precisely control the pipetting and immobilization of many different types of molecules – including proteins, DNA, small molecules, polymers and viscous precursor solutions – directly onto substrates that are also manipulated on the deck of

the instrument. We are now beginning to explore the advanced settings within Freedom EVOware, setting up the different liquid classes and customizing the pipetting functions, and this is already proving helpful for our development of new sol-gel derived materials, which are very sensitive to a range of conditions; ionic strength, pH, water-to-silica ratio and humidity.”

“The precision and control offered by automation will be critical for synthesis condition screening, helping us to systematically work across a wide variety of reaction parameters to discover effects of combinations of conditions,” John concluded. “The Freedom EVOs’ modularity also makes them easily reconfigurable to perform a number of different procedures, allowing us to quickly set up the workstations for

novel applications. This flexibility is just as important as throughput as the workstations are a communal resource that will potentially be used by 20 or 30 different research groups, and Tecan is the only company able to offer this level of configurability.”

To find out more on Tecan’s liquid handling solutions, visit www.tecan.com/liquidhandling

To find out more about the Biointerfaces Institute, visit biointerfaces.mcmaster.ca

A turnkey solution for forensic identification

Genia Geo has chosen Tecan's HID EVOLution™ system as part of its comprehensive forensic identification services for governments around the world. This one-stop solution encompasses everything from designing and building laboratories to training crime scene investigators and judges, and revolves around Tecan and Life Technologies' fully validated, walkaway set-up for robust genetic identification.



Dr Carlos Azambuja, President of GENIA

GENIA, based in Montevideo, Uruguay, has been at the forefront of genetic testing in Latin America for over 20 years. Originally specializing in the health and agricultural markets, the GENIA group created Genia Geo in 2012 to establish forensic identification services for governments around the world. Dr Carlos Azambuja, President of GENIA, explained: "Genia Geo was set up to provide government entities, such as Ministries of the Interior or of Justice, with everything necessary to implement a national system for DNA-based forensic identification. This includes not only the design, construction and furnishing of genetic sequencing laboratories, but also all of the ancillary services – such as local forensic investigation units, national sample logistics systems

"Tecan's regional representatives were extremely supportive... so we felt very comfortable with our choice."



Alejandra Torres is one of the scientists benefitting from Tecan's automated solutions

and DNA databases – as well as training of staff at every level, from the police officers collecting the evidence, right through to the magistrates who will be presented with the results in a court."

"The first project of this type is currently being implemented in Venezuela, working with the Ministry of Science and Technology and the CICPC (Cuerpo de Investigaciones Científicas Penales y Criminalísticas) to create a national system for DNA-based human identification as part of the Bolívar-Artigas agreement signed between the Uruguayan and Venezuelan governments. Working with internationally renowned Uruguayan architects Carlos Ott and Carlos Ponce de León, we are building three DNA processing facilities; a high throughput center at the IDEA Institute in Caracas – which will be processing reference samples

from police personnel and prisoners, as well as researching new forensics technologies – and two regional laboratories for crime scene analysis in Guarenas and Barinas. We looked at the available options for sample processing and sequencing, and decided that a completely integrated solution was the best match for our customers' needs."

Genia Geo chose Tecan's HID EVOLution system for all three laboratories. This set-up combines a Freedom EVO® workstation with an Applied Biosystems® 7500 Real-Time PCR System and 3130x1 Genetic Analyzer (Life Technologies), offering a validated automation solution that has been optimized for human identification applications. Carlos continued: "Although we did not have previous experience with Tecan equipment, the HID EVOLution represented a fully integrated, walkaway processing system that

could help to simplify the laboratory workflow and improve process security. We were able to visit several other laboratories using the HID EVOLution set-up, and they were very positive about both the equipment and the Tecan service. The local distributor – Tagaca – and Tecan’s regional representatives were also extremely supportive from the outset, so we felt very comfortable with our choice.”

“Tecan was also instrumental in designing our pilot laboratory here in Uruguay,” Carlos added. “User training is an important part of the service we provide, and so we needed a facility that would allow us to teach the Venezuelan technicians to use the equipment. It is very important that they are trained on the same equipment they will be faced with in their own laboratories, so creating the pilot center here in Montevideo was the perfect solution. It is currently acting primarily as a training laboratory for our customers’ staff, and will give us the ability to support the work being performed at their sites once they go live, troubleshooting any issues

they might have. The other benefit of having the pilot facility is that it allows us to develop research collaborations into innovative forensics technologies which may be implemented in the future, such as Ion Torrent™ sequencing.”

“We are still in the early phases of the project, so are not really using these systems to their full potential yet, but so far the instruments have been very easy to use. The software is user friendly, and we have received very good support from the Tecan team to help integrate the systems into our complete laboratory workflow. We are now looking to provide the same comprehensive service in several other countries, and Tecan will certainly be at the forefront of our minds for these projects,” Carlos concluded.

To find out more on Tecan’s forensics solutions, visit www.tecan.com/forensics

To learn more about Genia Geo, go to www.geniageo.com



Left to right: Juan Martín Marqués, Alejandra Torres and Leticia Repetto with the HID EVOLution

Boosting capacity for veterinary testing

The Veterinary Laboratory for the Pennsylvania Department of Agriculture, USA, uses a Freedom EVO® 150 workstation to test for Johne's disease, a contagious, chronic and potentially fatal paratuberculosis infection of the small intestine in ruminants.



Deepanker Tewari, Director of the Pennsylvania Veterinary Laboratory in Harrisburg

“The Tecan platform and scheduling software give us all the flexibility we need...”

The Veterinary Laboratory for the Pennsylvania Department of Agriculture is part of the tripartite Pennsylvania Animal Diagnostic Laboratory System (PADLS), which provides a comprehensive range of immunohistochemical, serological, molecular diagnostic, bacteriological and virological tests, as well as pathological and aquatic services for the State of Pennsylvania. PADLS routinely offers disease testing for animals of agricultural importance and, in the case of animal disease emergencies such as outbreaks of avian influenza, foot and mouth disease or classical swine fever, is well equipped to offer testing as part of the National Animal Health Laboratory Network. Just within the cattle species, PADLS provides services to over 10,000 herds – comprising more than half a million livestock – in Pennsylvania alone, as well as any others moving between states or for export to the Americas, Europe and Asia. This high throughput testing requires rapid response, as Deepanker Tewari, Director of

the Pennsylvania Veterinary Laboratory in Harrisburg, explained: “We currently process about 100,000 samples annually and have to be prepared for any outbreaks or animal health issues, such as avian influenza, equine herpes, etc., so flexibility is very important in our laboratory. We originally purchased a Freedom EVO 150 workstation with Gemini™ software from Tecan in 2004 to coincide with an expected increase in testing for BSE (bovine spongiform encephalopathy). As BSE testing numbers dropped, we decided to repurpose this instrument for automating an IDEXX assay for Johne's disease (paratuberculosis) in cattle, in order to cope with the 60,000 tests we were receiving annually. Although the workstation itself was perfect for the task, the platform's existing software meant that we would need to set up specific scripts to run different plate combinations, which was far from ideal. We contacted Tecan, and the Company worked closely with us to design a Freedom EVOware® Plus-based solution that



The Freedom EVO enabled the laboratory to perform 60,000 tests a year for Johne's disease



simplified our workflow and enabled us to schedule the number of plates we wanted for a specific assay run with just a single process. We greatly appreciated the support we received from Tecan.”

The scheduling feature, exclusive to Freedom EVOware Plus, removes the need to write different scripts for all the different batch sizes required, making it easy to adjust to varying throughputs. Deepanker continued: “The Freedom EVOware Plus scheduler is very easy to use; while it standardizes the platform for an assay run, the staff are free to do other important tasks, like quality control testing and the large amount of paperwork that we need to complete to meet animal health regulations. We chose to do initial sample dilutions and plate loadings by hand, but the rest of the ELISA is automated. The washing steps use Tecan’s fixed tips that work very well for serological assays; we had no problems with cross-contamination in our initial validation, and this is constantly confirmed by assays we perform for national proficiency testing schemes.”

The system coped easily with the laboratory’s initial Johne’s disease workload but recent changes in the Federal testing program have reduced this load to 20,000 samples annually, leaving plenty of capacity on the instrument for other ELISAs. Deepanker concluded: “Our needs are constantly changing, with new diseases and new testing protocols coming up all the time. The Tecan platform and scheduling software give us all the flexibility we need to deal easily with this, and we are looking at other assays that we can automate on the system now that we have additional capacity. We are really happy with the system, with the workflow we can achieve and especially with how easily we can adapt to our changing needs.”

To find out more on Tecan’s veterinary solutions, visit www.tecan.com/veterinary

To learn more about the Pennsylvania Animal Diagnostic Laboratory System, go to www.padls.org



Daniel Moser, Marketing Manager, TIG, Tecan Schweiz AG

Leading the debate

Laboratory automation is a continually shifting landscape, requiring constant innovation to match the latest cutting-edge techniques to the routine workflows of life science laboratories. Implementation of these novel technologies can often be complex, involving numerous sample handling processes and integration of a number of separate instruments or devices into a single, cohesive workflow. This issue is further complicated by the increasing use of high throughput technologies, requiring laboratories to reliably and reproducibly process hundreds, or sometimes thousands, of samples a day.

Laboratory automation is an obvious solution to help laboratories address both the increasing complexity and higher throughput requirements of these innovative technologies, but there is not always a standard automation system available to meet their individual needs. Although many companies and academic centers have the expertise to develop a bespoke automation solution in house, there are a wide range of associated issues – such as quality assurance and regulatory concerns – which can make this approach unfeasible.

The Tecan Integration Group (TIG) was created in 1996 to address this challenge, bringing together a multidisciplinary team of life scientists, engineers and software programmers to provide smooth implementation of bespoke solutions and new technologies. Drawing on over 30 years of experience in liquid handling, project management, quality assurance and regulatory compliance, TIG aims to support customers throughout the development of their system – from initial planning through to final acceptance of the workstation following installation – offering a guarantee of quality and complete peace of mind.

To share your experiences of working with Tecan to produce bespoke solutions, send your comments to talk@tecan.com

Meet Tecan at these events

Americas		
13 th International Congress of Therapeutic Drug Monitoring & Clinical Toxicology	Salt Lake City, UT, USA	22 – 26 Sept 2013
24 th International Symposium on Human Identification (ISHI 24)	Atlanta, GA, USA	07 – 10 Oct 2013
63 rd Annual ASHG Meeting	Boston, MA, USA	23 – 25 Oct 2013
FAST: Functional Analysis & Screening Technologies	Boston, MA, USA	28 – 30 Oct 2013
SOFT 2013	Orlando, FL, USA	28 Oct – 01 Nov 2013
Asia and Pacific		
The 3 rd Annual Biobank Conference & Exhibition	Shanghai, China	26 – 28 Sept 2013
28 th JSSX Annual Meeting in Tokyo	Tokyo, Japan	09 – 11 Oct 2013
JACLaS EXPO 2013	Yokohama, Japan	10 – 12 Oct 2013
The 15 th Beijing Conference and Exhibition on Instrumental Analysis	Beijing, China	23 – 26 Oct 2013
China International Medical Equipment Fair (CMEF Autumn 2013)	Xiamen, China	03 – 06 Nov 2013
36 th Annual Meeting of the Molecular Biology Society of Japan	Kobe, Japan	03 – 06 Dec 2013
Europe, Middle East and Africa		
MipTec 2013	Basel, Switzerland	24 – 26 Sept 2013
ESBB Conference 2013	Verona, Italy	08 – 11 Oct 2013
Luminex xSAMPLES 2013	Lisbon, Portugal	30 – 31 Oct 2013
JIB International Days of Biology 2013	Paris, France	13 – 15 Nov 2013
Medica 2013	Düsseldorf, Germany	20 – 23 Nov 2013
HandsOn: Biobanks 2013	The Hague, Netherlands	21 – 22 Nov 2013
Webinars		
Reader and washer webinar series; your body is 3D, why is your cell culture not?		27 Sept 2013

Tecan are pioneers in automated liquid handling and innovative life science solutions. For over 30 years we continue to enable and support our customers to make the world a healthier and safer place.

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