

On-demand protein expression

The High Throughput Expression Laboratory at the University of York is a service facility offering bespoke protein expression, and uses a Freedom EVO® 200 workstation to meet its demand for high throughput cloning, expression and screening.

The High Throughput Expression Laboratory (HiTEL) is part of a joint project between the Biology and Chemistry departments at the University of York, UK, providing high throughput cloning and gene expression services for various bacterial, parasitic, plant and animal genomes. The laboratory offers a fully customized expression service, including cloning, optimization, purification and screening of both prokaryotic and eukaryotic cell lines.

The HiTEL serves several departments within the university, as well as many external clients, and is also closely involved in a number of international collaborations, including the SPINE2-COMPLEXES work program and the *Bacillus* Systems Biology project. Experimental officer Dr Rachel Adamson explained the laboratory's primary role: "We work with various organisms, cloning genes of interest into plasmid vectors, then transfecting them into suitable cell lines for expression of the gene product. Small scale trials are used to establish the optimum incubation temperature and induction method for expression of the target protein, then the process is scaled up to produce large amounts of protein for the client."

To meet the throughput demands of a busy service laboratory, HiTEL relies on automation of its gene cloning and protein expression workflow using a Freedom EVO 200 platform. This customized workstation provides reliable cloning and protein expression for HiTEL's customers. "As a service laboratory, we rely on our automated systems to ensure reproducible cloning and protein expression for our clients. When the HiTEL facility was first established in early 2006, we looked at automated liquid handling systems from



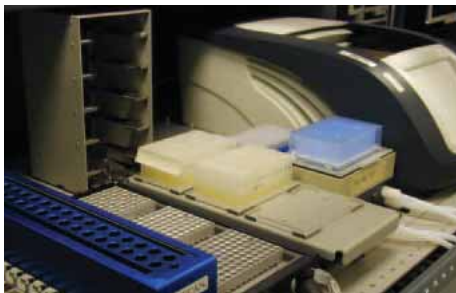
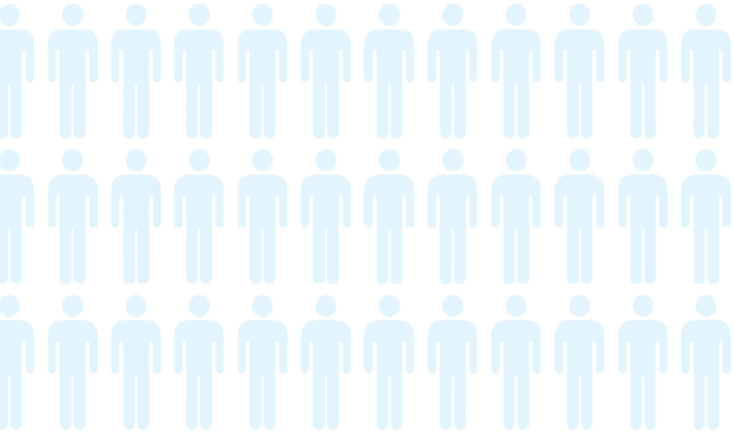
Experimental officer Dr Rachel Adamson loading samples onto the deck of the Freedom EVO

various manufacturers, and several other laboratories were performing similar processes using Tecan instruments. These laboratories received a very high level of customer service and technical support from Tecan, and this was a major factor in our choice of a Freedom EVO platform."

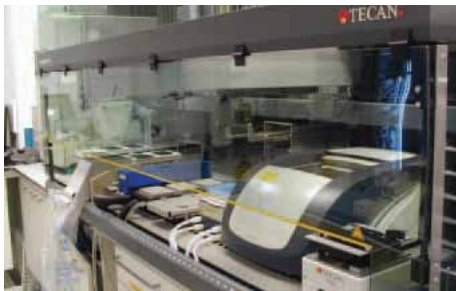
"Tecan's support allowed us to get our system set up and running very quickly, something facilities using other automated platforms have struggled with. We have a lot of different equipment integrated into our workstation – including a thermal cycler to allow on desk PCR amplification – and Tecan has helped us to customize the platform to our workflow. When the instrument was first installed, I attended a Tecan course on how to operate the system and develop scripts using the intuitive Freedom EVOware®

software, and this ability to continually adapt the platform has been important for streamlining and development of our processes. It is very easy to write new scripts in Freedom EVOware, and the on-screen plan of the deck means you can simply drag-and-drop commands where you want the system to perform them."

Cloning of genes of interest is automated by the Freedom EVO workstation in a 96-well plate format, using either ligation-independent or Clontech In-Fusion™ cloning systems. Using bespoke primers designed in house, target genes are amplified in the system's integrated thermal cycler, then purified on the deck. Sample concentrations are automatically normalized prior to ligation into plasmid vectors, and subsequent transformation into suitable cell lines.



An 8-channel liquid handling arm ensures rapid and precise pipetting



The Freedom EVO workstation is fully integrated into the laboratory's workflow

“Automation of this process minimizes variation between samples and eliminates operator errors,” Rachel continued. “This helps to make protein expression very predictable and reproducible, giving us a high level of confidence in the amount of protein we can produce from any given gene or protocol. Equally importantly, it offers walkaway automation of time-consuming laboratory processes, allowing staff to perform other tasks and helping to accelerate our production.”

“Technical support and service provision is also very important to our laboratory, as we cannot afford for the system to be offline for lengthy periods awaiting servicing or repairs. Tecan is very good at rapidly responding to our needs, usually within 24 hours, ensuring that the down-time of the system is minimal. We are very happy with the level of service we receive from Tecan, and with the performance of our Freedom EVO platform.”

To find out more on Tecan's Freedom EVO workstations, visit www.tecan.com/freedomevo

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Tony Mamone, Genomics and Forensics Market and Application Manager at Tecan

Leading the debate

The same is true for forensic science as it is with any other scientific discipline; there is a natural progression as developments gather apace, patterns start to form and the same questions come up time and again, and this is when the idea of regulation and standardization comes along.

Forensics is now far along this road and it's no longer a question of 'if' regulation happens, more a matter of 'how' and 'when'. At present, it is a semi-regulated industry; most laboratories are self-regulated and participate in voluntary programs to demonstrate that their management, personnel, operational and technical procedures all meet established guidelines. However, forensics is a different animal in different parts of the World, and international standardization and regulation will not be easy. At present, it's not even common to share data with different countries, although laws passed recently are encouraging this between some EU countries. UK and US forensic laboratories are already what one might call standards based, but the UK is perhaps the more progressive. In German-speaking Europe, it's another story completely; forensics is still held as an academic science, laboratories are based in universities, publications are encouraged and, as a result, methods and SOPs are frequently improved. For some, working in these more progressive cultures, standardization will not be so popular. Once SOPs are in place, it's more difficult to make a change, even an improvement, and this can be interpreted as slowing progress.

So is regulation really necessary?

Undoubtedly, mistakes are being made, but not very often and, by their esoteric nature, they're hard to spot. The ramifications, however, are very powerful, and it is likely that it will only take one high profile 'mistake' to propel this argument into the public arena. Once it is clear that it would be in the public's best interest to have stricter controls, the industry will have no choice but to join forces and respond.

Email talk@tecan.com to tell us what you think about this or another life science topic of your choice.