Genomics solutions for marine biology

A Freedom EVO® platform is helping scientists at Italy's Stazione Zoologica Anton Dohrn, one of the world's top marine biology and ecology research institutions, to provide a range of automated genomics services for marine biologists.

"With so much flexibility available to us, there are a lot of potential applications."

The Molecular Biology and Bioinformatics Unit at the Stazione Zoologica Anton Dohrn of Naples provides a range of research services – including DNA sequencing, qPCR, NGS, technical consultations and training in molecular biology – as well as on-demand protocol development. As part of the European Marine Biological Resource Centre (EMBRC), it is a core laboratory focused on developing and optimizing a variety of protocols to enable the study of new marine organisms. Automation has an important role to play, offering maximum flexibility and enabling the department to provide rapid, high quality sequencing, as Dr Elio Biffali explained: "Our department supports researchers at Stazione Zoologica and external organizations, providing routine services such as Sanger and next generation sequencing, real-time PCR and mini-preparations of plasmidic DNA. Working in the marine environment brings its own challenges, but this is also what makes it so interesting, as the extent of biodiversity means that there is a wide assortment of organisms for us to work on. Marine biologists do not use typical model organisms – such as mice or rats – but algae or other marine organisms, which are more difficult to work with. For example, the marine environment makes it difficult to access and retrieve samples or organisms, reducing the amount of material we have to work with. In addition, the composition of the animal tissues has evolved to accommodate the salty environment – some algae, for example, produce foam – and any residual salt from the ocean must be removed before the DNA or RNA can be extracted and purified. There is also a lack of available reference material. Nothing is standardized in such a biodiverse environment."

The unit has invested in a Freedom EVO 200 liquid handling platform to help with this work, allowing it to automate protocols for more complex and high throughput projects. The system is equipped with dual liquid handling arms – a MultiChannel Arm™ 384 for pipetting in 96- or 384-well formats, and an eight-channel Liquid Handling Arm with four large and four low volume syringes – as well as a gripper tool for manipulating microplates on the workdeck. In addition, the system has two MIO™ incubators, a Te-Shake™ shaker, a Te-VacS™ vacuum manifold, hotels and all the tools necessary for automated *in situ* hybridization, as well as a circulating water bath with a refrigeration system. The platform also has the capability to perform automated electrophoresis protocols using the E-Gel® system (Life Technologies).

"Our group's philosophy is to ensure that we have – and maintain – the highest flexibility possible," Elio continued. "When we came to replace our existing system, which is no longer supported, we looked for a platform that combined the maximum possible flexibility with speed and, obviously, high quality. We spoke to various manufacturers, eventually choosing the Freedom EVO because it offered the best solution in terms of costs, throughput and flexibility. Moreover, this system provides the best technology for our automated *in situ* hybridization protocols and can be freely configured to meet our needs. This allows us to develop high quality, flexible protocols."

Dr Marco Borra, EMBRC-IT liaison officer, added: "The Freedom EVO is very intuitive, and it is really easy to reconfigure the system and adjust the workdeck layout as our needs change. The Freedom EVOware® software is quite open and user friendly, and is everything that we asked for. We received excellent on-site training from Tecan and, as we familiarized ourselves with the system, learnt to create and optimize new protocols. This has enabled us to develop automated protocols for the kits we most commonly use, even though most are intended to be performed manually."

"With the Freedom EVO, we can alternate between different high throughput screening protocols, automatically switching between 96- and 384-well formats very rapidly

during a run, which significantly increases our throughput compared to our previous workstation. We've had the system for about a year now, and we are transferring all our day-to-day protocols – real-time PCR, Sanger sequencing, mini-preparation and gDNA extraction – onto the Freedom EVO. In the near future, we also plan to implement protocols for our next generation sequencing, including library preparation and the different steps of library enrichment. Eventually, we intend to run all our PCR sequencing reactions on the Freedom EVO, and hope to introduce cherry-picking for library screening. With so much flexibility available to us, there are a lot of potential applications," Marco concluded.

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

To find out more about the Molecular Biology and Bioinformatics Unit at Stazione Zoologica Anton Dohrn, visit **www.szn.it** and **www.sbmweb.it**

Elio Biffali and Marco Borra from the Molecular Biology and Bioinformatics Unit