

GeT with the NGS program

The GeT genomics facility near Toulouse has been developing a series of automated NGS protocols in collaboration with Tecan – including Illumina’s TruSeq® DNA and RNA kits, as well as Bioo Scientific’s NEXTflex™ PCR-Free Modules – on two Freedom EVO® workstations, helping to improve throughput and reliability for a wide range of projects.



Johanna Barbieri (left) and Marie Vidal operating one of GeT’s Freedom EVO systems

France’s National Institute of Agricultural Research (Institut National de la Recherche Agronomique, INRA) has sites around the country, with active research projects in virtually every area of agriculture. The INRA’s Génome and Transcriptome (GeT) facility in Castanet-Tolosan, on the outskirts of Toulouse, is a core facility providing a full range of genomics services for French laboratories, national and international collaborations. Next generation sequencing (NGS) forms an ever-increasing part of GeT’s workload, as Olivier Bouchez, research engineer and NGS team manager at INRA, explained: “We are a public institute, and so perform sequencing projects on behalf of a wide variety of research groups from across France. A majority of our workload is genomic DNA sequencing for plants and animals of agricultural interest by NGS, but we work on almost all types of organisms, performing over 150 projects each year with a team of 15 researchers.”

GeT’s workflow begins with the receipt of purified DNA or RNA into the laboratory, where it undergoes quantification and quality control

screening using an Agilent BioAnalyzer, with 3 µg of material required for PCR-free protocols, and 200 ng for PCR. Samples are then loaded onto the laboratory’s Freedom EVO 200 – equipped with eight-channel Liquid Handling (LiHa) and Robotic Manipulator Arms – for pre-PCR library preparation. Post-PCR processing is performed on a recently purchased Freedom EVO 150 equipped with both an eight-channel LiHa for classical library purification, and a MultiChannel Arm™ (MCA) 96 for higher throughput amplicon sequencing workflows. Olivier outlined the Group’s reason for choosing automation: “As a core facility, we need the flexibility to run numerous different chemistries and assays, depending on the needs of individual research groups. We have two HiSeq® and one MiSeq® sequencing systems, so manual preparation of libraries would be a major bottleneck in our workflow. We first invested in laboratory automation over 10 years ago, and have been using Tecan liquid handling workstations ever since, as the flexibility of these instruments is very well suited to our needs. Our two original Genesis™ platforms are still in use, and we

now have two Freedom EVO workstations at the center of our sequencing workflows, reducing hands-on time, increasing throughput and improving the reproducibility of our data.”

As a core facility, the GeT works with a wide range of chemistries, including Illumina’s TruSeq DNA, TruSeq RNA, TruSeq Nano DNA and TruSeq Stranded mRNA kits – as well as Bioo Scientific’s NEXTflex PCR-Free Modules – and has developed a range of library preparation and purification protocols for the Freedom EVO workstations in collaboration with Tecan’s application specialists. Olivier continued: “Depending on the size of the project, we process up to 50 samples a day for classical DNA or RNA libraries, or 170 samples a day for amplicon sequencing. Our protocols have to be very flexible to allow us to run just a few samples each for multiple projects in parallel, or a large number of samples for a single project. We are constantly updating and optimizing our processes, as well as developing new applications – such as bisulfite and mate pair sequencing – and the ease of script writing in Freedom EVOware® makes it very simple to create these protocols. Regardless of the chemistry being used, we prepare the reagents for each assay, then load everything onto the Freedom EVO platforms for processing, freeing up staff time to perform other tasks.”

“We have worked with Tecan for a long time, and have always been very happy with the liquid handling workstations and support. The platforms are very robust and, if I have a question, I can always contact the Tecan team for a quick answer,” Olivier concluded.

To learn more about Tecan’s genomics solutions, visit www.tecan.com/genomics

To find out more on the INRA’s GeT core, go to get.genotoul.fr



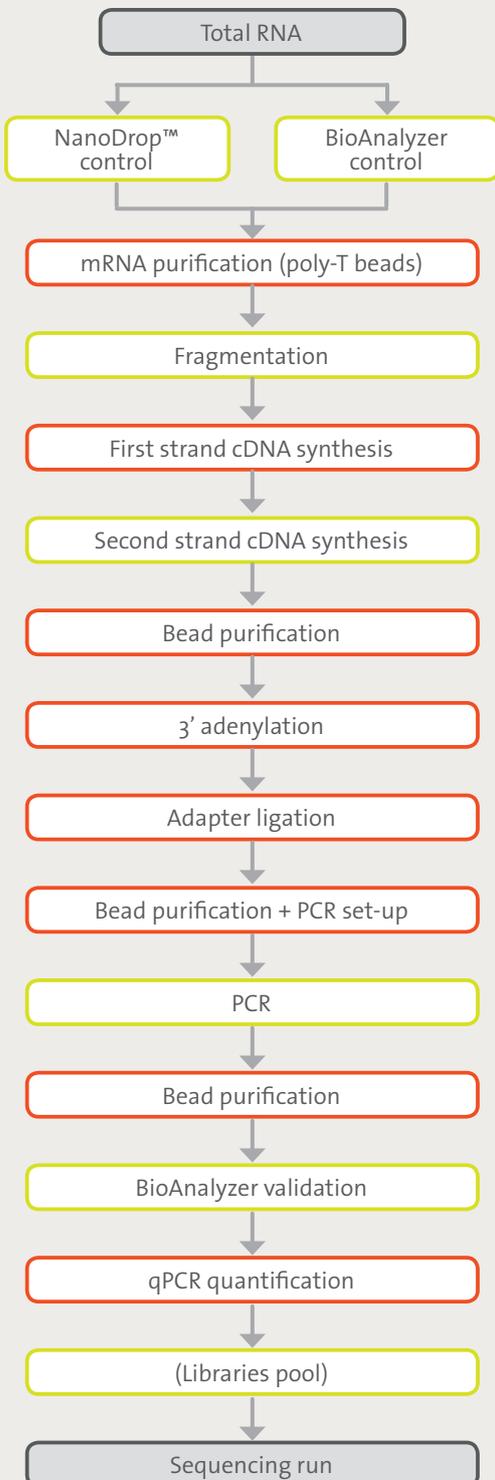
Bronwen Forster, Senior Product Manager for Liquid Handling Robotics

Leading the debate

In an ideal world, scientists want to load their samples onto an automated workstation and press a single button to start the relevant protocol. The complexity of modern assay systems makes this increasingly difficult to achieve, but instrument manufacturers can still help to overcome the difficulties in automating some applications by providing highly integrated, user-oriented solutions. Hardware and software elements should work in harmony to minimize the automation knowledge required for day-to-day operation of the system, while still providing the flexibility necessary to adapt to changing laboratory requirements. As automation becomes increasingly prevalent across virtually every area of life sciences, laboratories are turning towards more application-focused liquid handling solutions which can provide an accessible and practical route to automating complex protocols.

Cell-based assays is one area now benefitting from increased automation, in an effort to deal with increasing workloads and larger-scale screening projects. By integrating all the necessary modules and devices into a standardized solution, dedicated systems such as Tecan's new Fluent™ cell-based assay solution (pages 4 - 5) can provide high throughput, walkaway automation and allow scientists to focus on the fundamental cell biology. This can be further enhanced by user-oriented graphical interfaces to simplify the set-up and operation of the instrument, helping to ensure reliable and reproducible performance and accelerate research.

To share your thoughts on other applications that could benefit from user-friendly automation, e-mail talk@tecan.com



Key:

 Performed on Freedom EVO/Genesis Performed on thermocycler/offline

Workflow for Illumina TruSeq Stranded mRNA