

Off-the-shelf NGS library prep for Ion Torrent™ sequencing

The Leiden University Medical Center has integrated the Freedom EVO® NGS workstation into its molecular diagnostic testing and clinical research workflows. Taking advantage of this preconfigured solution, the center was quickly able to commission the platform for routine testing, while still having the flexibility to develop new protocols and conduct research studies.



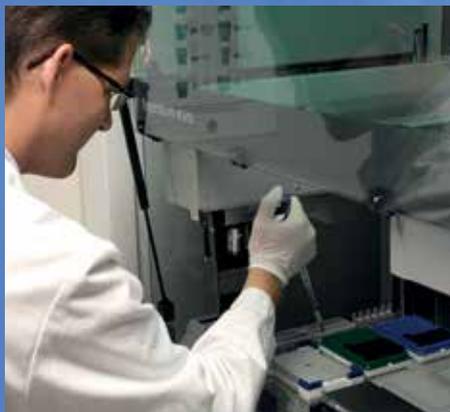
Leiden University Medical Center (LUMC) is a modern university hospital combining cutting-edge patient care with a strong clinical research program. The hospital's Department of Pathology offers a full range of diagnostic services for medical and surgical patients – both in house and for national and international referrals – as well as undertaking a variety of clinically-focused research projects. Dr Ronald van Eijk, a researcher in the department, explained the role new technologies play: “Our department is always looking at new ways of meeting the clinical needs of our patients, including developing research technologies for clinical applications. Molecular diagnostics is a good example of this, and the field has come a long way since the department first began applying molecular biology techniques in the 1990s. There is now a huge clinical demand for molecular diagnostic testing and, of course, there are a wide range of standard methods and diagnostic kits on the market, but the technology also continues to evolve on the research side, so we are always looking at new techniques.”

“We began investigating the clinical applications of next generation sequencing (NGS) about three years ago, and have been offering clinical screening of various cancer genes since the beginning of the year using the Ion AmpliSeq™ Cancer Hotspot Panel (Life Technologies). Although we do not have any NGS platforms within the department, we have access to a variety of sequencers, including Ion PGM™ and Ion Proton™ systems (Life Technologies), and MiSeq™, HiSeq™ and NextSeq™ 500 platforms (Illumina).”

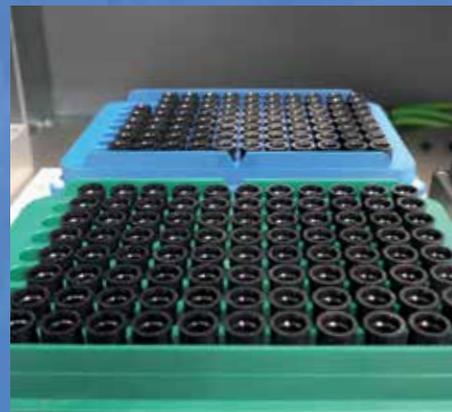
“Sample preparation is critical to the reliability of any diagnostic test, and is especially important for NGS protocols. Despite not being a particularly high throughput lab, we try to automate as much of our workflow as possible, helping to maintain the high quality standards necessary in a clinical environment. We have been using Tecan workstations for almost 10 years now, and already had a Tecan liquid handling workstation for pre-PCR sample processing, so were keen to see what the company could offer us



The platform is preconfigured to allow complete automation of library preparation for various NGS chemistries



Setting up the Freedom EVO NGS workstation is quick and easy, saving valuable operator time



Disposable tips ensure sample security and prevent cross-contamination

in terms of post-PCR library preparation. The Freedom EVO NGS workstation had just been launched and fitted our needs perfectly, as the entire Ion AmpliSeq library preparation protocol was already pre-installed on the system. This allowed us to implement the system for routine diagnostics within just two months of getting the platform up and running.”

“We currently process between 30 and 50 patient samples every week for routine molecular diagnostics, and the system is very easy to use via the TouchTools™ touchscreen interface. At the moment we have only implemented the most time-consuming and laborious elements of our workflow, but it is already saving us almost two hours of technician time per run. We plan to bring the last portion of the Ion AmpliSeq protocol into routine use very soon – saving us even more time – as well as continuing with the implementation of other technologies and assay kits.”

“It is very easy to develop new protocols on the workstation, which is important for both method development and the implementation of new standard diagnostic kits. Our previous experience with Tecan platforms meant that our staff were already very comfortable developing new methods or editing protocols using the standard Freedom EVOware® software, but it is also very intuitive for new users; over the course of a three-month placement, a trainee from the nearby University of Applied Sciences Leiden was able to develop several new protocols with limited supervision.”

“Alongside our routine testing, we have a large number of research projects which use the platform for library preparation. These studies can vary in size from under 100 to over 1,000 samples, so the instrument’s 96-well plate format and throughput are invaluable, saving a lot

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of time and providing the additional capacity we need to run research projects alongside our clinical workload.”

To learn more about the Leiden University Medical Center, go to www.lumc.nl

To find out more about Tecan’s Freedom EVO® NGS workstation, visit www.tecan.com/ngs

