Automated forensic testing tackles casework backlog

The Nebraska State Patrol Crime Laboratory has chosen the HID EVOlution™ System to automate its forensic DNA testing and, after a smooth installation and validation, is eagerly anticipating it will help to reduce the existing nine month casework backlog.

The Nebraska State Patrol Crime Laboratory is responsible for forensic DNA testing for the entire state of Nebraska, USA. About 350 cases a year require DNA analysis, but the number of samples for each case is variable and can run into the hundreds. Jason Linder, forensic scientist in the Biology Unit of the Nebraska State Patrol Crime Laboratory, explained: "Previously, the highest percentage of the cases we handled was sexual assaults. We still see a lot of those but, in the last couple of years, there has been a huge increase in the number of trace DNA samples from cases like burglaries and robberies, where we need to look for very small amounts of DNA, for example where a felon has handled a firearm."

The HID EVOlution System at NSPCL

"In our efforts to reduce the nine month backlog of casework that we currently have, we decided to automate parts of the DNA analysis workflow," said Jason. "With funding from federal DNA grants, we chose the HID EVOlution System for DNA quantitation and downstream PCR set-up." The HID EVOlution System has been specifically designed to streamline routine sample workflows for human identification applications, and is based on Tecan's Freedom EVO® 150 liquid handling workstation with an integrated Applied Biosystems 7500 Real-Time PCR System and 3130xl Genetic Analyzer. "We have already been using Applied Biosystems products for our DNA analysis, and Tecan's collaboration with Applied Biosystems in the development of the HID EVOlution System has made implementation of the system very straightforward, without having to worry about writing and validating software scripts. Our system is pretty much off-the-shelf with no modifications, which means that all the validation work for the instrument was already done for us. The validation of the installation has gone smoothly, because we have not had many issues; Tecan's service engineer was able to help me identify an airflow problem with the balance and, once that was corrected, the instrument has been running flawlessly."

"For our internal validation, required by federal guidelines, I checked the gravimetric precision and accuracy of the pipetting, and ran some cross-contamination studies. I also confirmed the precision, accuracy and reproducibility of DNA quantitation with the

Members of the Forensic Biology Unit (l to r: Cammi Strong, Melissa Kreikemeier, Katherine Rector and Jason Linder)

Applied Biosystems' Quantifiler® kit, running PCRs using a range of DNA concentrations. The federal guidelines are issued by the Federal Bureau of Investigation (FBI) for DNA analysis and quality assurance, which we need to comply with for participation in the Combined DNA Index System(CODIS). All the analysts in the Biology Unit have also done a qualifying test to meet the federal guidelines, by running some samples to demonstrate that they are able to get the correct results using the new instrument."

"All of the training was done in-house, including Applied Biosystems showing us how to use the HID EVOlution software for the kits and interpret the results. Our laboratory analyzes 15 STR loci including the 13 core CODIS loci, plus amelogenin for sex typing, using the Quantifiler Human DNA Quantification kit for DNA quantification, and AmpFℓSTR® Identifiler® PCR Amplification kit for PCR and analysis of short tandem repeats (STRs) – the same products that we used previously for manual DNA analysis. The workflow works really well with the automated set-up."

"Before July 1st, when the system officially went live for casework samples, I was really itching to use the system because, during the validation, I could see just how much it was capable of, and what it should be able to do for us. At the moment, it's hard to say how long it might take until we clear the backlog but, from what I have seen so far, the HID EVOlution System will really help by achieving a higher throughput and freeing up the analysts' time, so that they can prepare more samples ready to load onto the workstation. It will also ensure the reliability of our results, because there is very little chance of a sample switch or mis-pipetting from human error," Jason concluded.

To find out more about the HID EVOlution System, visit **www.tecan.com/hid**