Challenge

The Roy Romanow Provincial Laboratory (RRPL) works to identify, respond to, and prevent illness and disease in the Canadian province of Saskatchewan. The lab is the provincial hub for all genetic testing from blood. While most of the samples are processed for routine tests, RRPL also handles cord blood from neonates, samples for diagnostic testing, samples from patients in palliative care, and autopsy samples.

Before the FlexSTAR+ arrived at RRPL, the lab was extracting DNA manually—spending 2-3 hours each day lysing, and performing 2 manual extractions per week (spending about 3 hours per extraction). This method was already causing some efficiency issues; however, once the pandemic began and staffing was reduced from a 5-member team to a 1 or 2 member team, the delays in processing samples and sending them out became significant. The number of samples was just too large to process using manual extractions with the remaining skeleton staff. Therefore, RRPL made the decision to purchase a FlexSTAR+ workflow, which would allow large numbers of patient samples to be processed with only a few staff members working.

The FlexSTAR+ workflow is a totally automated instrument that extracts DNA from large volumes, taking the sample from primary tube to final storage tube. While the RRPL staff was excited about the arrival of the FlexSTAR+, they were also apprehensive about receiving such a large and complex instrument without on-site training. With international borders closed and travel not possible, a virtual installation and training program was the only viable option.

Solution

The FlexSTAR+ workflow was ideal for the needs of RRPL. From primary tube to storage tube, this workflow is the first and only totally automated system utilizing Qiagen's FlexiGene chemistry to isolate genomic DNA free of RNA and other contaminants. The workflow includes protocols for extractions from large volumes of blood, Oragene® saliva, buffy coats, and more. When the RRPL collects samples, it does not know how many tests will need to be performed, so the workflow needed to be able to provide high yield and high quality DNA.

After RRPL selected the FlexSTAR+ workflow, the AutoGen team then provided a seamless virtual installation and training program for the lab. Before delivering the FlexSTAR+, the AutoGen technical team used video conferencing to introduce the system and its components. They then conducted virtual training runs with RRPL. When training concluded, the AutoGen team remained accessible and set up a weekly call with RRPL in order to address any questions that arose. These calls continued until the lab members felt comfortable using the equipment and had all of their questions answered.
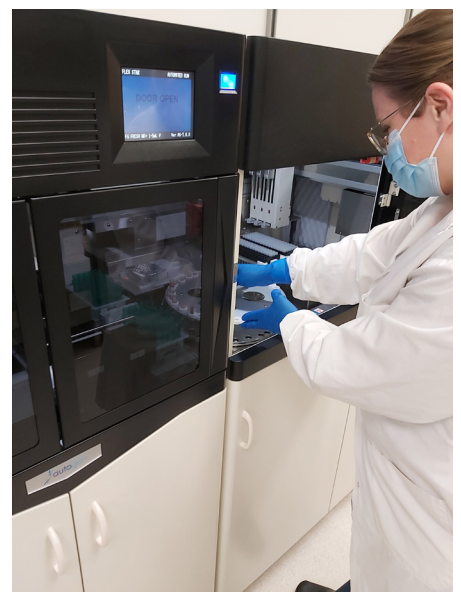
The work of the RRPL involves samples that are tested in-house and samples that are tested externally, at companies such as Blueprint Genetics, PreventionGenetics, GeneDX, and Invitae. Of the in-house samples that were used for validation, 15% were inherited cancer testing, 20% were fragment analyses and 10% were allelic discrimination assays. The inherited cancer test samples were assessed using a mix of Illumina NGS panels, Sanger sequencing, and digital standard multiplex ligation-dependent probe amplification (MLPA). The allelic discrimination assays and fragment analyses were completed using Asurgen kits or with testing methods that were developed in-house. These tests were easy to validate, as the team could run samples in parallel and compare raw data to look for any variations. Once satisfied with in-house results, the RRPL started to send samples from the FlexSTAR+ out to their external providers. Initially, they sent only non-stat samples for tests that were similar to their in-house testing. The external providers were more challenging to validate due to the number of different possible tests and the length of time it took to receive results, generally 4-8 weeks. External testing included microarrays, exomes, various NGS panels, targeted sequencing by NGS or Sanger, MLPA, and fragment analysis.
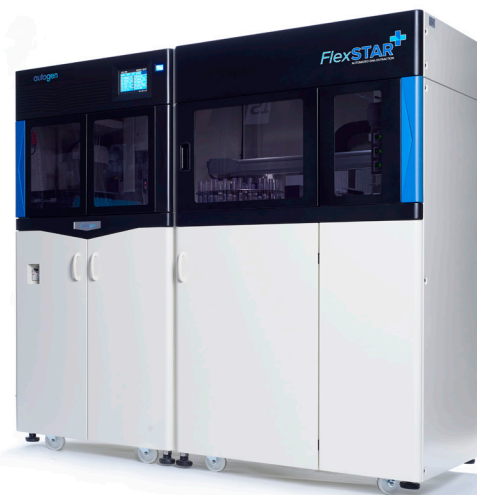
Result

Even though international borders were closed, AutoGen's first virtual installation and three-day training session were seamless. With the fully automated FlexSTAR+ workflow, the RRPL is now able to process a larger number of samples with a smaller staff. The FlexSTAR+ provides high throughput and high molecular weight DNA that is immediately ready to use and is suitable for all downstream applications. With the exception of historic samples, the RRPL is close to eliminating all manual extractions.

About AutoGen

AutoGen, a leader in the life sciences marketplace, is an organization that works to understand a lab's full workflow while identifying areas to improve efficiency and reduce costs within their nucleic acid extraction processes. Auto-Gen's workflows provide solutions that are the best fit for their customers' budgets. Our customers include biorepositories, contract research organizations, academic research laboratories, pharmaceutical companies, clinical diagnostic laboratories, and government institutions all over the world. AutoGen's mission is to provide quality instrumentation and chemistries, as well as dedicated technical support - all with a level of post-sale service that is truly unmatched.

For more information about AutoGen, visit www.autogen.com. If you would like to learn more about the FlexSTAR workflows, contact Rob Osborn at 508-395-8161 or rosborn@autogen.com