



Bone Marrow Transplant Repository
Cincinnati Children's Hospital Medical Center

Case Study

Improving the Efficiency of DNA Extraction with the QuickGene Workflow

Background

The bone marrow transplant repository at the Cincinnati Children's Hospital Medical Center (CCHMC) in Cincinnati, Ohio is one of many ongoing research studies within The Cancer & Blood Disease Institute. The Division of Bone Marrow Transplantation and Immune Deficiency is an international leader in delivering cutting-edge therapies for many diseases such as refractory cancers, rare genetic conditions affecting the immune system, hemoglobinopathies, and bone marrow failure syndromes. The bone marrow transplant repository employs 4 full time technicians. The repository study collects, processes and stores thousands of specimens annually which are ultimately used for research both within CCHMC and with other collaborators.

The lab originally performed DNA extraction from blood and saliva manually, with a maximum output of 30 samples in 2 days per technician. As demand grew the team needed to find a more efficient method. Their search led them to AutoGen's QuickGene workflow specifically with the QuickGene-610L.

“ We are very happy with the QuickGene-610L. It's a very simple system and protocol, and is easy to train staff. I don't know if I would trust a brand-new technical staff member to operate some of the larger models, but with the 610, I definitely do. ”

Kelly Lake, Lab Manager

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I. Challenges

Manual extraction methods could not keep up with increasing demand and staff became frustrated

Researchers at the bone marrow transplant repository were manually extracting DNA, using old-school extraction and precipitation method. As research projects expanded in number and scope, the number of samples needing to be processed increased to the point that the team recognized they needed a new, more efficient approach.

The manual extraction method was not only too slow to keep up with demand, but the protocol was very repetitive and tedious. The researchers found the process to be slow and frustrating. They felt as if they were running in place and wasting their precious time doing work that a machine could do.

Qiagen kits require many manual steps, leaving room for error

In their pursuit for a better DNA extraction method, the lab briefly considered using Qiagen kits. While the kits could reduce the time burden, they still require many manual steps. Considering the volume of samples the lab needed to process, they felt that the Qiagen kits would also be cumbersome. The manual steps left too much possibility for error; samples could end up in the wrong tubes, for example. The lab felt that this was not an ideal solution for their situation.

II. Approach

Consulting peers for validation on automated nucleic extraction instrument choice

The team realized that an automated extraction technology would provide the best solution for their growing demand. An internet search led them to AutoGen and the QuickGene workflows and family of instruments. They spoke with AutoGen and learned that there was one QuickGene system already being used at CCHMC. A visit to one of the clinical labs to see the machine in action and to speak with the lab members followed. The clinical lab shared their first-hand experience; they were very pleased with their QuickGene-610L, especially because it could handle blood and saliva samples up to 2mL.

Speed of extraction and purity of product were key factors in the decision to purchase the QuickGene-610L

It was important to the staff in the repository that the automated extraction instrument would be able to process samples quickly, that it could accommodate samples of 2 mL or more, and that it would yield high purity DNA. The QuickGene-610L isolates DNA using an ultra-thin polymer membrane technology under gentle positive air pressure extraction conditions, without using conventional centrifugal processes. This extraction process results in higher yields of DNA with higher molecular weight and high quality. The QuickGene-610L is able to extract genomic DNA from a 2 mL whole blood or saliva sample, and process 6 samples within 12 minutes (60 samples per hour). The automated protocol can allow the technical staff to attend to other activities while the samples are being processed.

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III. Results

Easy to use

The technical staff found the QuickGene-610L extremely easy to use. Only three steps are required after preparing lysate samples: apply sample to cartridge, place cartridge holder on instrument, and press the start button. Training the staff was straightforward; there was no hesitation to have less-experienced technical staff operate the system.

Greatly increased efficiency

The QuickGene-610L increased the efficiency of the lab's workflow. By automating most of the manual tasks of the extraction process, it allowed for a much greater number of specimens to be processed per day. Within a year the lab had purchased another QuickGene-610L in order to double throughput. The lab now has four QuickGene-610L models; efficiency has quadrupled and quality of life in the lab has improved substantially. Multiple machines can run at the same time to process up to 400 samples per day. Before the acquisition of the first QuickGene, it would take someone a day and a half to complete just 30 samples.

“ My advice to other labs looking to automate their nucleic acid extraction process would be to let the QuickGene do the extraction for you so your tech can be doing other things. The QuickGene-610L is a really valuable system for our needs. One of the best features is the fast turnaround in 30 minutes. I'm really glad we found AutoGen and the QuickGene system. ”

Kelly Lake, Lab Manager

Flexible Utility

The staff at the bone marrow transplant repository found that the QuickGene-610L fulfilled their needs in a customizable manner. Some days only a few samples need to be processed, while other days there are hundreds. The system allows parameters to be modified and stored as new protocols. In addition, the compact size of the machine does not hinder lab space, and because a separate centrifuge is not required for the protocol, it is available for other staff members to use. Most importantly, the QuickGene-610L works quickly and allows staff members to be free to work on other projects.

About AutoGen

AutoGen is a leading provider of automated nucleic acid extraction workflows that allows lab professionals to produce premier quality and value-added extraction results. Our workflows provide solutions that are the best fit for our customers' laboratory needs and budget, and our customers include biorepositories, contract research organizations, academic research laboratories, pharmaceutical companies, clinical diagnostic laboratories, and government institutions all over the world. We strive to provide quality instrumentation and chemistries, as well as dedicated technical support – all with a level of post-sale service that is truly unmatched. Visit www.AutoGen.com to learn more.



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