WILL THE DNA WIZARD REPLACE US?

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The utilization of robotics in biotechnology is nothing new. Human genome laboratories, pharmaceutical laboratories and research laboratories have long enjoyed the application of robotics for completing repetitive laboratory tasks. The utilization of robotics in forensic laboratories for the processing of casework samples is a relatively new and formidable undertaking. Robotic DNA extraction of casework samples, automated human DNA quantitation systems and capillary electrophoresis systems are currently available to facilitate productivity in forensic laboratories. What is not yet available to forensic laboratories is an automated system that will dilute the DNA samples and set up the PCR reactions. The DNA Wizard, a software method designed by Beckman for use with the BioMek® 2000 Automation Workstation, in combination with a short robotic transfer method is designed to automate those crucial steps.

The Virginia Division of Forensic Science successfully implemented the robotic extraction of forensic casework samples in July of 2002 using the BioMek® 2000 Automation Workstation in combination with the DNA IQ™ System of DNA purification. To further the goal of automating routine processes, the automated application of the AluQuant™ Human Quantitation System is also utilized. Once DNA quantitation data are generated, the DNA Wizard can be used. An alpha test version of the DNA Wizard in combination with a transfer method designed by Promega Corporation are currently being tested for the robotic DNA dilution and PCR set up of simulated casework samples. Our experimental strategy is to break the process down into steps that can be monitored for performance. The two major issues we wish to address are the accuracy of the DNA Wizard method and the risk of contamination. Our initial experiment used the DNA Wizard to make the DNA dilutions and pipette these into PCR tubes. A scientist in the laboratory then manually created DNA dilutions using the same quantitation data and pipetted those into PCR tubes. Both sets of these samples were amplified using the same PCR master mix and typed with the corresponding samples adjacent to each other for easy visual comparison. The STR results were virtually identical for the robotically diluted and the manually diluted DNA samples. We are currently testing a series of DNA samples where numerous reagent blanks were interspersed with the DNA samples to more rigorously assess the contamination risk for the robotic process. The next step in the process is to incorporate the robotic addition of the PCR cocktail and compare the robotic performance to that done manually in terms of the accuracy, quality of the STR profiles and the potential for contamination.