

B66 One Swab, Two Uses: Rapid DNA and Conventional DNA Testing

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Learning Overview: The goal of this presentation is to show that testing a swab with a rapid DNA device does not consume all of the DNA on the swab.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by removing the fear of sample consumption that is always present when running lower level DNA samples.

One of the concerns with rapid DNA testing has always been sample consumption. Sample consumption often requires permission from attorneys in order to prevent court challenges by the defense. As a result, it is important that whatever sample is used to generate an investigative lead from a DNA sample does not consume all of the sample. Rapid DNA, which can be used to develop a DNA profile at a scene in under two hours, can be used to generate important investigative leads. However, if the DNA is consumed by the rapid DNA instrument, it prohibits additional DNA testing using conventional forensic laboratory methods. To address this problem, studies were performed to determine if the same swab run on the Applied Biosystems™ RapidHIT™ ID System can be removed and used again with conventional DNA techniques to achieve similar quality profiles.

The extraction methods typically used in forensic DNA laboratories are designed to remove as many cells from the substrate as possible. The methods frequently involve long incubation times and vigorous shaking of the samples. With rapid DNA instruments, the extraction methods are more passive in nature and do not involve shaking of the sample. Based on this, it is feasible that after a sample goes through extraction on the RapidHIT™ ID System, there may be sufficient cellular material remaining on the swab to enable successful DNA profiling using conventional methods.

The goal of this presentation is to show that testing with the RapidHIT ID™ does not consume all of the DNA on the swab. For certain sample types, a DNA profile can be generated twice from the same swab—once for an investigative lead and then again for court purposes if needed. The ability to obtain DNA profiles twice from the same swab will give law enforcement the confidence to use this technology to generate much needed investigative leads, knowing that they still have sample preserved for future testing if it became necessary.

The RapidHIT™ ID System, unlike some other rapid DNA instruments, allows for the easy removal of swabs after they are processed. Using conventional DNA techniques of extraction, quantification, amplification, and capillary electrophoresis on high- and low-level DNA samples, it was determined that there is in fact enough cellular material left over after the swab was run on the RapidHIT™ ID to produce a full DNA profile. The sample types tested included buccal swabs at varying amounts of swipes in the mouth, blood samples at varying volumetric levels, and crime scene type samples such as cigarette butts and drinking containers. In all cases, a DNA profile was achieved on the RapidHIT™ ID and after the swab was removed and processed using conventional DNA techniques.

Investigation, Rapid DNA, Consumption