B35 Direct Polymerase Chain Reaction (PCR) Using MicroFLOQ® Direct Swabs With a Modified QIAGEN® Investigator 24plex GO! Protocol From Decomposing Human Remains for Disaster Victim Identification (DVI) Applications

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Learning Overview: After attending this presentation, attendees will understand the performance of a direct PCR workflow for DVI samples using the microFLOQ® direct swabs in conjunction with the QIAGEN® Investigator 24plex GO! kit. This project compared a direct and traditional workflow for processing decomposing human remains.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing an alternate workflow for processing DVI samples. DVI relies on rapid identification of decomposing human remains, often in remote areas without access to storage facilities. Collection of biological material using swabs may prove easier, more efficient, and more amenable to storage in harsh conditions. MicroFLOQ® direct swabs have been identified as a potential alternative for more rapid collection and processing of DNA in forensic and DVI situations.

4N6FLOQSwabs™ Genetics and microFLOQ® direct swabs were used to collect DNA from red muscle via an incision in the arm or leg of a decomposing human cadaver. Traditional DNA processing with the Genetics swabs was compared to a direct amplification strategy using the microFLOQ® swab coupled with the Investigator 24plex QS GO! Kit. Additionally, both swab types were evaluated for their ability to store DNA for up to three months. The direct amplification strategy was optimized by pre-treating the swab (washing, vortexing, lysis) prior to amplification and slightly modifying the cycling parameters. As an alternate method, the microFLOQ® swabs were used to sub-sample DNA stored on the Genetics swabs.

Results indicate that both swab types were able to store DNA at room temperature. Short Tandem Repeat (STR) success rates of traditional and direct PCR methods were comparable but were highly dependent on the stage of decomposition and the sample location. Up to day ten, full profiles were obtained using both processing methods with samples taken from the leg for up to three months of storage at room temperature. Full profiles were obtained from day 13 and day 20 using traditional methods, while partial profiles were obtained on day 13 using microFLOQ® swabs and subsampling. The Quality Sensor (QS) markers were used to assess sample quality. Interestingly, the QS markers indicated that even after pre-washing the microFLOQ® swabs, there was still inhibition present in the amplification for microFLOQ® swabs that were dried overnight. However, when the microFLOQ™ swabs were processed within hours of swabbing or used to sub-sample, there was less-to-no inhibition indicated by the QS markers and profile completeness improved.

Overall, microFLOQ® swabs in conjunction with the GO! Kit facilitated direct processing in the laboratory from decomposing remains.

Disaster Victim Identification, Direct Amplification, microFLOQ®

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