A23 Quality Control: How Sterile Are Your Laboratory Examination Gloves?

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The goal of this presentation is to inform participants of the potential for cross-contamination of DNA from nitrile examination gloves used in the DNA laboratory setting by investigating potential manufacturer contamination and potential contamination by analysts, and the possible implications for such cross-contamination in interpreting forensic DNA casework.

This presentation will impact the forensic science community by demonstrating the difficulty of depositing contaminating DNA on nitrile examination gloves by the brief and casual contact required to remove gloves from their boxes. However, it also demonstrates the possibility of obtaining DNA of a high enough quantity to potentially complicate forensic DNA analyses.

Quality control is an essential component of the forensic laboratory as it is crucial in obtaining accurate analytical results and maintaining the integrity of the testing. The use of latex or nitrile examination gloves is an essential quality control measure against cross-contamination from a DNA analyst's hands to the sample they are processing in a forensic DNA laboratory. The gloves create a barrier between the epithelial cells that can potentially be shed from the analyst's hands and the sterile laboratory environment. However, opened boxes of gloves are often left in arbitrary spaces until the supply is depleted and analysts often retrieve gloves from the boxes with their bare hands. The objective of this research is to systematically test whether such laboratory procedures could potentially introduce contaminating DNA into the laboratory setting.

Sterile swabs were used to collect samples from nitrile examination gloves and the boxes in which they were housed. Both previously opened and previously unopened boxes of gloves were tested. The previously opened boxes of gloves were randomly chosen from a university laboratory in which a genetics course was being conducted. The internal box surface, rim of the box, and the exposed surface of the top glove were swabbed for possible epithelial cells deposited by an individual reaching into the box to retrieve a pair of gloves. In addition, one glove was removed from the box by a gloved researcher and the exposed surface of the next glove was swabbed. This procedure was repeated with the removal of a second glove. Previously unopened boxes of nitrile examination gloves were opened by an ungloved analyst. The internal box surface, rim of the box, and the exposed surface of the top glove were swabbed for possible DNA deposited by the analyst. The analyst removed three gloves with bare hands and the exposed surface of the next glove was swabbed. This procedure was repeated with the removal of another three gloves. In addition, previously unopened boxes of nitrile examination gloves were opened by a gloved analyst. The internal box surface, rim of the box, and the exposed surface of the top glove were swabbed for any DNA that may have been deposited in the box during packaging by the manufacturer. The gloved analyst removed ten gloves and the exposed surface of the next glove was swabbed. This procedure was repeated an additional two times with the removal of twenty additional gloves.

The DNA was extracted from the swabs using a common commercial kit and quantified via quantitative PCR. One sample taken from a previously opened box of gloves contained DNA that was of high enough quantity for further analysis. All other samples produced a no DNA after quantitative PCR. The sample containing DNA was amplified and did not generate a successful DNA profile.

DNA Cross-Contamination, Nitrile Examination Gloves, Forensic DNA

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