Effects of Microbial DNA on Human Forensic DNA Profiles

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Most biological evidence obtained from crimes scenes is found in non-sterile environments, and therefore there is an opportunity for the forensic samples to become contaminated with environmental DNA. In particular, the effects of microbial species that may contaminate forensic samples have not been extensively studied. This type of information could be especially important in cases where decomposition has occurred and microbes are in abundance. We investigated the environmental effects on DNA samples via contamination from microbial sources by intentionally spiking human DNA samples with known concentrations of DNA from 17 common microbe species associated with human decomposition. Quantitation and amplification was performed using the Quantifiler® Human DNA quantitation kit (Thermo Fisher Scientific, Inc.) and PowerPlex® 16 HS system (Promega Corp.), respectively. Single species of microbial DNA were added in varying quantities (1, 50, 100 ng) to a standard 1 ng human DNA sample. Results indicate that there was little to no effect on quantitation of the human DNA samples. However during genotyping, two species, *Bacillus subtilis* and *Mycobacterium smegmatis*, produced an artifact peak at the TPOX locus. The same artifact was still amplified when the DNA of the two species was tested in the absence of human DNA. This type of data will impact the forensic community as it demonstrates that microbial contamination may affect the development and interpretation of a human DNA profile. As most forensic genotyping kits are developed to be human specific, these results indicate that caution should still be used in interpreting the human DNA profile, especially in cases of decomposition in which there would be higher levels of microbial contamination.