## B114 Investigation Into "Normal" Background DNA Present on the Adult Neck: Implications for DNA Profiling of Manual Strangulation Victims

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The goal of this presentation is to demonstrate that background levels of non-donor DNA are regularly observed on the neck surface of normal healthy adult volunteers and that this 'contamination' can be found in sufficient quantity to effect DNA profiling after physical assault.

This presentation will impact the forensic community and/or humanity by demonstrating that sufficient DNA profiling can be used as an investigative tool for offender identification in cases of assault, such as manual strangulation. This technique could therefore be of benefit to assault victims around the world. The possibility of recovering non- offender DNA should however be considered and in some cases may render this technique unusable. A multi-faceted approach that does not solely rely upon DNA profiling is therefore recommended for offender identification.

**Hypothesis:** Current theories on DNA transfer between individuals and inanimate objects state that the DNA profile recovered would be from of the last person to contact the area of interest, and that all other previous traces will be replaced by the most recent contact. This area of DNA profiling is still not fully understood. In order to test this theory further, a set of partially controlled experiments to determine whether total DNA profile replacement can be achieved on a purposely contaminated skin surface.

**Content:** It has previously been demonstrated that after simulated manual strangulation, offender DNA can be detected on the neck surface of the victim (Rutty, 2002). Although this study highlighted the possibilities of applying DNA profiling to offender identification, it did not consider the background levels of DNA that may be present on the neck surface of adults before an assault has taken place. Twenty-four healthy adult volunteers were recruited to participate in this study. All volunteers completed a questionnaire to provide information pertaining to recent activities such as washing of the neck, contact with other individuals e.g. partners. The use of make-up and perfume was also considered. Swabbing of five areas was performed on all twenty-four volunteers. Additionally, ten volunteers were asked to participate in a follow-up study to investigate the influence of background DNA contamination on the investigation of physical assault. Similarly to Rutty 2002, manual strangulation was simulated by application of moderate force to the neck surface. Swabbing was performed before contact and volunteers were asked to return 24 hours after this contact period for re-sampling.

**Methods:** Samples were collected using sterile cotton swabs moistened with sterile water using a brushing motion. DNA extraction was performed using the Qiagen DNA mini kit (Qiagen, West Sussex, UK) following the swab protocol. Quantification was performed using the Nanodrop - 1000 Spectrophotometer (DNA was amplified and analyzed using AmpF*i*STR® SGM Plus® PCR Amplification Kit, ABI PRISM® 377 DNA Sequencer, Genescan® and Genotyper® (Applied Biosystems, Foster City, CA, USA).

**Results:** Sufficient DNA can be recovered from the neck surface for DNA profiling to be carried out. The quantity of DNA varies greatly both between different individuals and areas of the neck. Non-donor contaminating alleles were found on 23% of all swabbed sites, of which 5% contained enough information for a positive identification to be confidently assigned, without further investigation. It was also noted that more areas of contamination were detected on volunteers with partners than single individuals. Results of contact experiments showed

that victim, offender and non-offender DNA could be recovered from the neck surface 24 hours after the contact was made.

**Conclusion:** DNA profiling should be considered as an investigative tool for identification of the perpetrators of assault, such as manual strangulation. The possibility of collecting non-offender DNA should however be considered, especially if the victim has recently been in physical contact with any other individual(s).

**DNA, Contamination, Manual Strangulation**

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