

Microbial 'signature' for sexual crimes

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Bacterial communities living on an individual's pubic hairs could be used as a microbial 'signature' to trace their involvement in sexual assault cases, according to a study published in the open access journal *Investigative Genetics*.

Hairs are one of the most common types of trace evidence collected during forensic investigations, but the majority of those recovered from crime scenes lack their roots and contain insufficient amounts of human genetic material to carry out DNA profiling of suspects.

To trace suspects from the hairs they leave at a crime scene, an alternative approach could be through the detection of a microbial 'signature'. Different areas of our bodies harbor distinct communities of microbe, or microbiota, but it is the significant differences between individual people's microbiota which may offer unique bacterial profiles for forensics.

In the first study of hair microbiota for forensics, researchers found in their preliminary results that pubic hairs in particular show the most potential for [forensic investigations](#), with an ability to distinguish between males, females and individual people, based on the bacteria present. They also found that an individual's pubic hair microbiota appeared to be transferred during intercourse, suggesting its potential for forensic analysis on sexual assault cases.

Lead author Silvana Tridico from Murdoch University, Australia, said: "The advent of DNA profiling has resulted in an increase of sexual

offenders using condoms, which they take away, post-assault. The implication of this present study is that the transfer of bacteria between victim and offender, in rape cases, may provide a new way of linking the offender to the victim, in instances in which no human DNA is transferred."

In the small study, seven individuals (three male and four female, two of whom were a co-habiting couple) each collected scalp and pubic hair samples at the start of the study. The researchers carried out an analysis of the hair samples to identify microbial DNA, in order to build a picture of the microbial communities which were present. This was repeated two and five months thereafter.

Scalp hair showed fewer distinct varieties of microbe (approximately 50 varieties in male hairs, and 55 in female) and appeared to be more influenced by common environmental microbes. In contrast, each individual's pubic hairs harboured distinct communities of microbe, with around 73 different varieties in male pubic hairs and 76 in females. The researchers say that these preliminary results suggest that microbial communities on pubic hairs could be used as microbial 'signatures' to identify individuals.

While the [microbial communities](#) on pubic hair generally remained individually distinct and consistent over the course of the study, in one instance at the five month time point, the co-habiting couple's microbiota were more similar to each other than previously. Interviewing revealed that the couple had sexual intercourse 18 hours prior to the collection of their pubic hairs. This suggests that an exchange of microbes had occurred which the researchers say bodes well for future forensic applications involving sexual crimes.

More information: Silvana R Tridico, Daithi C Murray, Jayne Addison, K Paul Kirkbride and Michael Bunce, Metagenomic Analyses

of Bacteria on Human Hairs: A qualitative assessment for applications in forensic science. *Investigative Genetics* 2014, 5:16.

www.investigativegenetics.com/content/5/1/16

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