CLASSIFICATION OF INDIVIDUALS AND THE POTENTIAL TO DETECT SEXUAL CONTACT USING THE MICROBIOME OF THE PUBIC REGION

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In the absence of traditional DNA evidence, detection of sexual contact during intercourse is an important need for forensic analysis that might be addressed by studies of the pubic microbiome. Since 16S sequencing of various other body parts has shown that the microbiome may be individualizing, we reasoned that transfer of the assailant's microbiome to a victim might be detectable. Microbiome profiles were generated from pubic hairs and swabs taken from the pubic mound region of 12 couples and 19 singles, and evaluated for similarity over an average of four collection times with varying degrees of self-reported sexual activity. A model constructed using a Random Forest classifier was able to predict samples belonging to the same individual collected up to six months apart, demonstrating the stability of the pubic mound microbiome over this timeframe. Couples were found to be significantly more similar to one another than to unrelated members of the opposite sex, in proportion to shared sexual activity. Further analyses using the Deblur algorithm to assign operational taxonomic units (OTUs) establish that at least 10 percent of the victim's pubic microbiome must be derived from the attacker in order to detect transfer, but that single transfer events will not generally be discovered. Nevertheless, Bayesian SourceTracker software is shown to have potential to establish that sexual contact occurred when the assailant is known, or to exonerate suspects as contributors to a mixed microbiome. Our results establish limited potential of the pubic hair/pubic mound microbiome as a tool for forensic associations.