F38 Who and What: Providing Context to a DNA Profile

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After attending this presentation, attendees will learn how forensic geneticists may be able to provide contextual activity-level information pertaining to what transpired prior to the deposition of a DNA profile.

This presentation will impact the forensic science community by demonstrating the need for forensic scientists to be aware of the alleged circumstances of the crime despite the possibility of contextual bias.

I keep six honest serving-men (They taught me all I knew); Their names are What and Why and When and How and Where and Who…Rudyard Kipling

The ultimate aim of forensic scientific evidence in a criminal investigation is to help establish a fact or facts that may be at issue. The questions involve what, why, when, how, where, and who as they pertain to the people, places, and things involved in the commission of the crime. The DNA technology revolution has significantly impacted the criminal justice system in that the individual who deposited crime scene biological trace or body fluid evidence can be routinely identified. This source level information has facilitated the identification and conviction of perpetrators and the exoneration of falsely accused individuals.

The forensic DNA community has concentrated its efforts in producing for stakeholders an error-free product with, arguably, less emphasis on completeness of analysis, including trying to answer questions that go beyond identifying the source (the "who" and to a lesser extent, the "where" questions). Specifically, forensic geneticists currently are rarely in a position to provide context to the DNA profile, namely what "activity" led to the deposition of the biological material. This pertains to the "what" (and perhaps "how") question relating to the case events. For example, consider a sexual assault on a female victim with an object (recovered from the suspect) and the victim's DNA is recovered from the object. He could claim that the victim handled the item during a casual encounter and this explains why her DNA was present; however, the significance of this evidence would increase if the DNA could be shown to originate from vaginal cells, a circumstance that would be consistent with a sexual encounter but not with casual handling. The ability to distinguish between these alternative propositions, sexual versus social contact, might prove to be critical to the investigation and prosecution of the case. Failure to provide this critical probative information could allow perpetrators to exploit the shortcomings in routinely used body fluid identification methods in order to provide reasonable doubt regarding the true circumstances of the crime. This presentation will briefly describe new methods that permit the definitive identification of activity-level-indicating body fluids such as vaginal secretions, menstrual blood, and skin as well as blood, semen, and saliva.

There has been some discussion in the scientific literature and in the popular press that forensic scientists should be blind to the circumstances and details of the crime due to the possibility of contextual bias influencing their interpretation of the scientific data. This study argues that forensic geneticists should, in addition to identifying the source of biological material, also concern themselves with trying to help deduce what occurred. In order to effectively assess the strength to be attached to the scientific findings, the alleged circumstances need to be taken into account and the scientist needs to be aware of them. The framework for evaluative reporting is the likelihood ratio, which measures the strength of support the findings provide to discriminate between propositions of interest.

DNA Profiling Context, Body Fluid Identification, Source/Activity Level