Panel Discussion: What does the future hold for forensics?

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Since the late 1980s forensic DNA typing has undoubtedly been developed as a powerful tool in police investigations for identifying perpetrators of crime or missing persons, via the analysis of autosomal, Y-chromosome or mitochondrial DNA markers. But is this all that we can expect from forensic genetic testing? Certainly not! As a result of vast scientific and technological advancements over the last few years, the field of forensic genetics is developing fast. Hence, we expect that a wide range of new methods and technologies will soon be added to the next-generation forensic DNA toolkit. Which are these methods? In this session highly recognized experts will present some of the most promising forensic science topics and technologies likely to be introduced in the coming years; more specifically in the fields of microbial forensics, forensically relevant body fluid/tissue identification, forensic DNA phenotyping and genetic genealogy.

Firstly, microbial communities can reveal answers to important questions risen during forensic investigations; for example, by examining microbial succession during the decomposition of a dead body we can estimate the time since death, in others words the post-mortem interval. How accurate is this microbial clock of death? Also, forensic transcriptomics have shown great capacity to reveal tissue-specific patterns, that can be used to provide valuable 'source level' information for the police. Can the issue of inter-individual gene expression variation be solved by the inclusion of more tissue-specific mRNA markers in targeted messenger RNA-based sequencing methods? Furthermore, we will discuss the application of massively parallel sequencing for developing next-generation forensic tools, for example for the combined and high-resolution appearance and ancestry prediction. We will also explore the recent application of epigenetics for estimating one's chronological age in tissues like blood. How far are we from a complete picture of an unknown individual? Lastly, although its precursor – familial DNA searching – has been successfully used since 2003, forensic 'genealogics' has recently been in the public spotlight due to its controversial use of public genetic databases. Long-range familial searches from databases holding millions of DNA profiles can be powerful by providing the missing link in high-profile cold cases like the recent arrest of the alleged Golden State Killer. But what about the extensive potential privacy invasions - are we all under scrutiny?

How have the aforementioned tools been developed and what are the prerequisites for their accurate use and interpretation? Despite their high potential, bringing these new forensic science technologies into the justice system will entail overcoming a wide range of scientific, technological, investigative, ethical and legal challenges. During this panel discussion we will have the chance to discuss with our experts, not only these topics but also the wider picture of what the future holds for forensics. You don't want to miss it!