

THE BIOLOGICAL ASPECTS OF FORENSIC DNA PHENOTYPING

Manfred Kayser, Erasmus University Medical Center Rotterdam

Forensic DNA Phenotyping (FDP) is a young field of forensic genetics and includes, in its widest sense, the extraction of information on human phenotypes via molecular analysis from biological crime scene samples. Currently, FDP mostly involves the prediction of human externally visible characteristics (EVCs), and sometimes the inference of bio-geographic ancestry, from DNA. FDP is growing out of the realization that the current approach of human identification via comparative DNA profiling is usually only successful for persons already known to the investigating authorities, whereas unknown persons cannot be identified. If appearance information of an unknown sample donor can successfully be extracted from a crime scene sample, this information is expected to be useful during police investigation in search for unknown suspects as it will allow reducing the number of potential suspects with information directly obtained from the crime scene. Recent advances in human genetics have started to deliver knowledge about the genes involved in EVCs such as pigmentation, hair morphology, or body height. For a few EVCs such as eye or hair colour, a reasonably small set of DNA markers has been identified that explain a large proportion of the trait variation and hence provide strong prediction accuracies. At least for one EVC, eye colour, the accumulated knowledge has already been used to produce a forensically validated DNA test suitable for forensic case work applications. This talk will summarize the current knowledge on the genetics and molecular predictability of human appearance, and how it may be applied to forensic questions. Additional biological aspects of FDP, such as on inferring bio-geographic ancestry from DNA, as well as ethical and legal aspects of FDP, and more practical forensic issues will be addressed during the dedicated Forensic DNA Phenotyping workshop and panel discussion involving distinguished experts.