DNA PHENOTYPING – WHAT CAN AND SHOULD WE PREDICT?

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Specific sequences within our DNA influence everything from aspects of our physical appearance to disease susceptibility. With the continuing release of novel human genome sequences, our knowledge regarding the role genetics plays in these traits is rapidly evolving. This consequently enables us to now contemplate inferring information about an individual from an unknown DNA sample in a manner that would previously have been restricted to the realm of science fiction.

In the field of forensic science, this has the potential to be of considerable assistance to investigators in both criminal and victim identification scenarios by creating a 'molecular eye witness', allowing us to infer phenotypic information about an individual purely from a sample of DNA left at a crime scene or extracted from an unknown skeleton.

Numerous forensic, and genetic, groups from across the globe have been devoting significant time and resources to the discovery of genetic or epigenetic markers that facilitate prediction of information such as height, eye colour, geographic ancestry and age, but despite this, accurate prediction is still much more feasible for some features than others. Therefore if we apply these assays to casework without appropriate validation, the potential exists to both misdirect the investigation and diminish confidence in this emerging area of forensic genetics. In addition, there are a significant ethical and legal considerations involved with respect to the use of DNA phenotyping, which will require considerable attention as application of these techniques to casework becomes an increasingly viable option.