DNA - A Victim of its Own Levels of Sensitivity

Diane Robinson, 10 January 2018

It all seems so easy in the TV crime dramas: a few swabs, a quick bit of lab work, check the DNA database and you have the perpetrator bang-to-rights.

Perhaps we should not be surprised that real life is not quite like that. To be sure, if you have a good sized biological sample, which can be unambiguously associated with the criminal, routine processes can help lead to secure convictions. Criminals, however, watch CSI too, and try not to leave traces, so in difficult cases the forensic analysis will be working with very small samples of possibly degraded DNA, so reading the genuine genetic “signal” from the “noise” of potential background contamination may be challenging because the polymerase chain reaction (PCR) amplifies everything - not just the bits of DNA you wish to identify. Whereas in the early days of genetic finger printing it was necessary to have blood stains measured in square centimetres, now it may be possible to detect the DNA in sweat deposited on a credit card held in the fingers - but it is also more than likely that many people will have held that card and have therefore left confusing “multi-source” deposits, which must be picked apart by expert interpretation. We heard examples of how difficult it could be to avoid accidental cross contamination in the laboratory, when a single flake of skin may easily be blown from an unrelated sample onto equipment being prepared to deal with another case, potentially leading to incorrect identifications.

Diane Robinson gave us insights into the difficult nature of forensic biology, and raised matters of concern connected with the increasing sensitivity and complexity of interpretation associated with the latest, admittedly impressive, technology. It must be remembered, she pointed out, that some of this highly skilled work may need to be carried out urgently, working through the night, and without food, after a full normal day of work. Furthermore, the standardisation of what used to be cutting edge high sensitivity methods means that such work is increasingly performed by less senior, and probably less experienced staff. She therefore pointed out the possible need for new protocols to ensure that appropriate levels of weight can be given to this type of evidence.