Silent witness

The ARC Linkage Project, *Silent Witness*, aims to strengthen traditional forensic techniques, specifically in the area of hair identification. Hair is one of the most common forms of evidence found at crime scenes and the use of hair to identify victims and perpetrators pre-dates modern DNA profiling techniques by over a century.

The Minister for Innovation, Industry, Science and Research, Senator Kim Carr, announced funding for *Silent Witness* in May this year. Funding for the project totals $207,762 over three years, and was awarded as part of the second funding round of the Australian Research Council's 2007–08 *Linkage Projects* scheme.

Silent Witness is a collaboration between the University of Canberra, the University of Adelaide, the Australian Federal Police, the University of Technology Sydney, and Leica Microsystems Pty Ltd. Success in this project will allow for more accurate identification of hair samples found at a crime scene and will enhance their value as forensic evidence.

Thanks, in part, to television programs such as CSI and Bones, DNA profiling has become popularised, leaving the modern public with the impression that a single hair deposited at a crime scene is all the evidence police require to identify a subject. In reality, this is far from the case. Without the hair root (which is rarely recovered), hair is not a reliable source of nuclear DNA—the biological material used for matches that is found in high concentrations in blood or other body fluids such as saliva.

Silent Witness aims to improve the identification of hair through two separate areas of research. One area of research will look at ways to improve hair analysis techniques using colour imaging and pigmentation pattern recognition. This will expand and strengthen the use of traditional light microscopy. In addition, ancient DNA methodologies will be investigated. Such techniques are more usual in the fields of palaeontology and archaeology, disciplines that routinely work with DNA in fossils, bones and hair.

Ancient DNA research typically uses mitochondrial DNA, which is passed down through the female line and is easier to recover from heavily degraded samples contained in mummified tissues, permafrost cores and other sources of archaeological and/or palaeontological material.

Professor Alan Cooper is an Australian expert in the field of Ancient DNA genotyping. In 2004, Professor Cooper was awarded an Australian Research Council Federation Fellowship allowing him to move from Oxford University to Adelaide to establish the Australian Centre for Ancient DNA (ACAD).

Professor Cooper specialises in using ancient DNA to record and study the evolutionary process. His research is characteristically multidisciplinary involving information from disciplines such as geology, archaeology, anthropology, and forensics, to provide novel insights into evolution, population genetics and palaeoecology. Through *Silent Witness*, Professor Cooper hopes to share his knowledge with the forensic science community.

"The courts are still cautious when it comes to accepting mitochondrial DNA results as evidence," Professor Cooper said. Unlike nuclear DNA, mitochondrial DNA is not unique to the individual but identical along the maternal line. A person shares mitochondrial DNA with all immediate blood relatives and anyone able to trace a connection through an uninterrupted female line of descent. This lowers the value of the technique for identifying specific individuals, but does not preclude it as an exclusion tool.