

# DNA testing

Since its first use in a criminal case 21 years ago, DNA testing has emerged as a powerful tool in both civil and criminal justice. Dr Andrei Semikhodskii explains.

**B**efore the advent of DNA, human identity testing was largely carried out by blood, semen or saliva typing, but large amounts of biological material were required which limited its application. Modern day DNA technology is so powerful that it allows for the creation of a DNA profile from a minute skin flake, a single hair or from an item, handled by a person, who left no visible fingerprints on it.

## IMMIGRATION AND CHILD SUPPORT

DNA testing is now routinely used for both criminal and non-criminal applications, but there is a major difference between DNA testing for civil and for criminal cases. While the aim of criminal testing is to find a DNA match between a crime scene sample and a suspect, the main goal of non-criminal analysis is to find whether a genetic relationship exist between two (or more) people. For civil cases, DNA testing is primarily used for immigration and child support cases. In 2004, more than 7,000 DNA tests were conducted for this purpose.

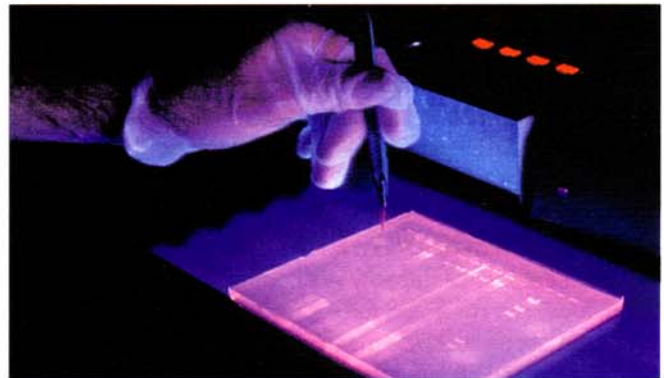
Non-criminal DNA testing has big implications for magistrates' courts especially in cases involving child support. DNA testing is the most accurate test available to determine paternity and is widely used by the Child Support Agency (CSA) for establishing who the biological parent of the child is for the purposes of providing child maintenance and support (CS).

## CHILD ADOPTION

Child adoption is another area where DNA testing is widely applied. The current practice of UK adoption agencies is to place children into families that match their ethnic background. Sometimes, it is difficult to determine the ethnic background of the child and here DNA testing can help. People of different races and ethnic groups have common facial and other features – and the same is true for their genetic characteristics. Various racial and ethnic groups have genetic markers which are specific only for these groups. For example, DNA testing can show that an individual has 20% of markers specific to northern Europe, 50% to the Middle East, 10% to the Mediterranean and 20% to sub-Saharan Africa. Using this information the family with the closest ethnicity to the child can be chosen.

The criminal justice system now heavily relies on DNA-based evidence. Annually more than 20,000 forensic DNA tests are performed in the UK. Out of all criminal cases when DNA is used as evidence two out of three involve sexual assault.

When a crime scene sample or a sample from a suspect is analysed, a DNA profile is produced. In the UK all crime scene DNA profiles, together with those of all suspects and arrestees for any recordable offence are deposited into a National DNA Database (NDNAD), which is the world's first criminal DNA database.



## POWERFUL BUT NOT FALLIBLE?

But despite the widespread belief among criminal lawyers and barristers, DNA evidence adduced at a trial is not an assailable proof of guilt; even a complete match should not automatically guarantee a conviction. DNA is a means of identification and as any other means of identification it is prone to errors, uncertainties and conflicting interpretations.

The weight of DNA evidence depends on the circumstances of the case and that it must always be assessed only in conjunction with other pieces of evidence. This 'other' evidence can decrease the weight of DNA evidence and increase the chances of successful defence.

## NATIONAL DNA DATABASE

As of 2004, the UK national DNA database held more than two and a half million DNA profiles collected from suspects and convicted criminals which is estimated to be about 40% of UK criminally active population, as well as more than 200,000 crime scene samples.

The police use the NDNAD as an investigative tool to help solve a wide range of crimes, including murder, rape, sexual assault, robbery, terrorism, burglary and arson, and have almost doubled their clearance rate for volume crimes such as house burglary and motor vehicle offences. Each new subject sample profile is added to the database and is checked against all contained crime scene sample. When a new crime scene sample profile is added, it is checked against DNA profiles of all suspected individuals, as well as against other crime scene sample records. Since its inception in 1995, the NDNAD had matched more than 200,000 crime scene samples to suspects and more than 20,000 crime scene samples to other crime scenes. Every week, more than 300 crime scene samples are matched to the suspect and convicted criminal's database.

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