The Austrian DNA Intelligence Database - High Degree of Automation for the Analysis of STR Profiles

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The project of the Austrian DNA Intelligence Database was established on October 1st, 1997. Buccal swabs are collected as reference samples from suspects and are processed at the Institute of Legal Medicine, University of Innsbruck. DNA of the buccal epithelial cells is isolated performing a Chelex extraction method. The DNA profile is obtained by multiplex PCR, applying the Second Generation Multiplex (Forensic Science Service, Birmingham), consisting of the six STR loci HUMVWFA31/A, HUMTH01, D8S1179, HUMFIBRA, D21S11, D18S51 as well as the sex determination locus Amelogenin.

Extraction and amplification set-up is performed by a robotic microplate processor (Plato 3* Series, ROSYS/ANTHOS, Switzerland). The PCR racks are subsequently incubated in PE 9600 gene machines, located in a different laboratory unit. Thus, DNA preparation is spatially separated from amplification products, minimizing contamination. Amplicons are prepared for electrophoresis using a robotic pipetting device (ASYS HITECH, Austria) and subsequently separated and fluorescently detected on ABI Prism 310 Genetic Analyzers. This instrument setup enables a high degree of automation on the basis of the 96-well microtiter plate format, avoiding the risk of mixing up samples.

During the first six months a total of approximately 3000 buccal swabs have been analyzed within the framework of the DNA database project with a success-rate of more than 90% full profiles at first attempt. Biostatistic parameters were calculated using the DNAVIEW software (C. Brenner). No evidence for departure from Hardy-Weinberg equilibrium was observed in any of the STR loci. However, the impact of the large sample size as well as the fact that the DNA samples may originate from a heterogeneous gene pool is discussed in comparison to previously published data.

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