

THE CURRENT STATUS AND FUTURE CHALLENGES OF KOREAN CRIMINAL DNA DATABASE

Hye Yeon Kim, Kwang Man Woo, Su Jeong Park, Hye Hyun Oh, Se Yong Kim,
Jong Sik Kim, Sung Yun Park, Jeong Eun Sim, Han Chul Lee, Seung Hwan Lee
DNA Analysis Laboratory, Division of Forensic Science, Supreme Prosecution Service,
Rep. of Korea

Following the enforcement of the law allowing the establishment of criminal DNA database in South Korea, we automated the full procedure of DNA analysis for the database samples. Saliva spots are collected from FTA cards to 96-well plate using automated punching machine, and at the same time, the respective sample identification numbers are linked as barcodes. This information is continuously transferred to the following steps to prevent the confusion of sample identity. We introduced the HID EVOLution™ system provided by Tecan and Applied Biosystems. The HID EVOLution™ is a series of automated liquid handling system. Initiated by DNA extraction using PrepFiler™ kit, the procedure is followed by DNA quantification using Quantifiler Human® kit, and subsequent DNA normalization for STR amplification with Identifiler® kit. 3730 DNA analyzer and GeneMapperID analysis program are used for allele designation of amplified PCR product. DNA profiles are confirmed by cross check of each sample. We established fully optimized system which minimizes human errors and cross-contaminations of massive number of samples.

As of July 2011, about 26,000 offender profiles have been accumulated. We compare two independent criminal DNA databases with DNA profiles from crime scenes using network system between investigative institutes. So far 145 matches were found to be related to unsolved crimes. With DNA database, criminal investigation will become more efficient. And another benefit of the database is that it prevents and remedies wrongful imprisonment.

We are continuously expanding the number of STR loci and also adopting Direct PCR method for more efficient DNA database work.