

Forensic DNA Typing in South Africa

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Forensic DNA typing in South Africa is the responsibility of the South African Police Services' Forensic Science Laboratory (SAPS FSL), which functions on a national level and has an average of 20,000 criminal cases to examine each year. These include amongst others the investigation of murder; rape and paternity. The investigation of politically motivated murders and robberies, and a sharp increase of serial murder cases in the past few years have added to the need for better approaches to human identification.

To meet this demand, the Forensic Science Laboratory implemented STR profiling as its primary technique of choice. For this purpose- several Applied Biosystems 377 and 310 platforms are used in conjunction with the Perkin Elmer AmpF/STR™ Profiler™ kit. To determine a kit for standard casework implementation- a trial was held in early 1997 to compare the SGM (Second Generation Multiplex, Forensic Science Services; UK) and the Perkin Elmer Profiler kits. The Forensic Science Services (UK), Perkin Elmer (Foster City; USA) and the SAPS FSL took part in the trial. Comparison of results on casework samples indicated that the Profiler kit provided a satisfactory success rate and sufficient discriminatory power for interim application to casework.

In 1996 the African Society for Genetic Profiling (ASGEP) was founded, which consists of private and government laboratories in South Africa, Namibia, Botswana, Zimbabwe, Kenya and Mauritius doing paternity and forensic DNA typing. The purpose of ASGEP is to provide a standardization body for such organizations based on existing TWGDAM and ASCLD guidelines, as well as to provide inter and intra laboratory proficiency test programs for the Southern African region.

The National DNA Statistics Database (NDS) was generated with samples supplied by ASGEP organizations, and consists of samples for the major population groups as well as sub-populations wherever possible. Tri-allelic TPOX individuals (n=30) were found while setting up the NDS. With exception of 3 individuals, the rest all showed the 8 and 10 alleles and more than 90% of the individuals were from the Xhosa population of the Eastern Cape region of South Africa. Two paternity cases by Lancet laboratories and the Kwazulu Natal Blood Transfusion Services indicated an absence of the inheritance of this trait. Two such individuals were actually suspects in criminal cases. In another case, vWA locus drop-out apparently occurred due to mutation of the primer binding region.

Casework experience has shown that the Profiler kit is very robust even with extremely poor quality forensic samples, although population diversity isn't as high as expected and different analysis and interpretive parameters apply to those suggested by Perkin Elmer's validation data.

The SAPS FSL also developed the STRlab™ program for administrative purposes; expert system analysis, sample tracking and database searching of inter-and intracase profile matches. The STRlab system consists of:

- *STRgazer* (an allele designation program of which the data is compared with exported GenoTyper® data) by
- *STRiker* (an independent analyst comparison system);
- *STRquest*, which is able to search the entire STR database for matching profiles to compile inter- and intracase hit lists as