STRMIX: THE APPLICATION OF A CONTINUOUS STATISTICAL MODEL EXPERT SYSTEM TO FORENSIC CASEWORK IN NEW ZEALAND (AND AUSTRALIA)

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STRmix is software-based expert system that applies a fully continuous approach to DNA profile interpretation. STRmix was co-created by Ms Jo-Anne Bright (ESR), Dr John Buckleton (ESR) and Dr Duncan Taylor (Forensic Science South Australia), for implementation across Australia and New Zealand. STRmix has also attracted interest internationally.

ESR implemented STRmix into routine forensic casework in New Zealand in August 2012, for use with both Identifiler™ and MiniFiler™ DNA profiling data. This presentation gives a brief overview of the continuous statistical model which underpins the software and describes our laboratory's experience and the benefits realised through its introduction.

The improved interpretative capability and advanced database search functionality are both illustrated with examples of challenging profiles. With appropriate care an increased number of mixed DNA profiling results which would have previously been deemed 'unresolvable', can be effectively and objectively assessed. Where appropriate a likelihood ratio can then be applied to a reference DNA sample.

Likelihood ratios reported by ESR have now included values which are below 1, i.e. those which favour exclusion/the defence hypothesis.

This presentation will also highlight a database search function within STRmix which has allowed for meaningful database searches with mixed DNA profiles which were previously unachievable. A genotype probability distribution function can be deconvoluted from a mixed profile and this can be searched against a database.

ESR has carried out projects with New Zealand Police districts to review the suitability of volume crime cases that have previously been reported as unresolvable mixtures. This project has allowed the identification of database links to components resolved by STRmix.

Further development of the STRmix program is on-going and it is proposed that further versions may allow for an internal assessment of the number of contributors and also permit Y STR data analysis.