

**MULTIPLE-LABORATORY VALIDATION OF FLUORESCENT STRS USING  
PROFICIENCY TEST RESULTS**

**Charlotte J. Word, Ph.D., Linda A. Danielsen, M.S., Jennifer E. Reynolds, Ph.D., Lewis O. Maddox,  
Ph.D., and Robin W. Cotton, Ph.D.**

*Cellmark Diagnostics, Germantown, MD*



Since the introduction of DNA identification testing in the United States in the middle 1980's, there have been extensive challenges in court to the admission of DNA testing results obtained using each new testing system that has become commercially available. The challenges have largely centered on the general acceptability of the particular DNA test procedure in the general scientific community as well as the acceptability and application of the DNA test in the forensic arena. A frequent complaint from the opponents of DNA testing for previous test systems was the lack of publications in the scientific literature demonstrating the wide-spread use general acceptability and reliability based on extensive validation studies of the test system.

This argument has been particularly prevalent recently in some courts where the admissibility of fluorescent STR (short tandem repeats) data is being strongly opposed. Although there are a substantial number of relevant publications in the general human genetic, molecular biology and forensic scientific literature supporting the use of STRs, the issues are being clouded by one unique feature of human DNA identification testing using fluorescent STRs. The opponents are claiming a lack of general acceptability in the forensic community because there are two commercial providers of PCR-based human STR DNA identification tests that yield typing results for the same STR loci using different detection platforms (for example the Hitachi FMBIO®, the ABI Prism® 373 or 377 DNA Sequencers and 310 Genetic Analyzer).

Contrary to the challenges, the availability of multiple test systems and detection platforms offers an extraordinary mechanism for demonstrating the validity and reliability of fluorescent STR testing across many laboratories. There is an ever-mounting volume of data demonstrating this reliability and that is from the summary data compiled by ASCLD/LAB-certified proficiency test providers. The demonstration that multiple forensic laboratories using different DNA extraction techniques, different test systems, and different detection platforms obtain the same allele typing results for each STR locus when testing the same biological sample is unrefutable evidence that the available systems are reliable and that the testing laboratories are proficient in the use of the test systems. Since each forensic DNA analyst is required by DAB guidelines to perform a minimum of two proficiency tests per year, yet another validation of fluorescent STR DNA identification testing is provided each time a proficiency test is completed and reported. This presentation will address how the summary data from several proficiency test providers can be a critical tool for demonstrating general acceptance and reliability of STR testing in the forensic DNA laboratories.