

BOOK REVIEW

George F. Sensbaugh,¹ D. Crim.

Review of: *Forensic DNA Typing*

REFERENCE: Butler JM. *Forensic DNA typing*. Academic Press, San Diego, CA, 2001, 322 pp.

The forensic potential of DNA profiling for human identification burst upon the scene in late 1985. Since then, forensic DNA testing has gone through several phases of technological and operational advance resulting in more rapid analysis, extension of testing to ever smaller biological samples, and a de facto international standardization based on use of commercial kits. We appear now to have arrived at an operational plateau centered on the typing of short tandem repeat (STR) polymorphisms according to standardized protocols using electrophoresis instrumentation. STR markers are used worldwide for forensic identification purposes and are the core markers in virtually all national identification databases; the U.S. national DNA database system (CODIS) is based on a consensus set of 13 STR markers.

This book provides a descriptive overview of the current state of DNA profiling with STRs. Its intended audiences are forensic scientists and the legal and law enforcement communities. The author, John Butler, has made significant contributions to the technology of STR typing.

The main body of the book consists of two multi-chapter sections, the first focusing on the biology of STR typing and the second on STR typing technology and quality management. The first section has chapters on basic DNA biology, sample collection and preparation, the polymerase chain reaction (PCR), characteristics of the STR markers in common use, key issues in STR analysis, problems particular to STR typing on forensic samples, and additional markers used in forensic testing. The second section includes chapters on electrophoretic separations, DNA detection methods, the Applied Biosystems model 310 capillary electrophoresis instrument, the Hitachi FMBIO II gel scanner, STR typing issues, validation and quality assurance, new technologies in the pipeline, and CODIS and other database issues. There is a third section, misleadingly entitled, "Biology, Technology, and Genetics," which consists of a single chapter surveying some high profile cases involving STR typing. Finally, there are four appendices providing useful resource information: DNA sequence data for the common STR markers, an illustrative CEPH family study, the DNA Advisory Board recommendations on quality assurance

standards, and a listing of vendors for equipment, products, and typing services.

As with many books written for diverse audiences, *Forensic DNA Typing* is uneven in organization and presentation. The ordering of the chapters results in the reader being given information early on that requires a conceptual foundation not provided until later in the text; PCR and electrophoretic separations, for example, are both brought into play before their respective chapters. Moreover, key detail on a particular topic sometimes appears elsewhere than under the designated text heading, putting the reader at risk of missing a point. The level of writing varies, simplistic and superficial on some points but highly specific on others, and some terminology is carelessly used. In general, the writing is strongest when dealing with the technical aspects of STR analysis and weakest when addressing topics involving basic biology and genetics. It is also notable that the book contains no discussion of population genetics issues in forensic DNA typing, given that these issues have occupied center stage for much of the last decade.

Balanced against these weaknesses are significant strengths. The book is a veritable one-stop resource for information about the consensus STRs used in the CODIS database. For example, there are detailed data on stutter patterns for each STR marker, on the sequences of the known alleles (including microvariants), and on mutation rates. Most of this information is available in the primary literature but it is useful to have it all together in one place. The STR typing kits provided by the two major vendors are compared and information is given about the basis of performance differences between them. The author has demystified the workings of DNA detection technology and has provided a comparison of the gel and capillary electrophoresis approaches to STR typing without taking sides. Many of the chapters have website references that will allow readers to access more detail on particular issues and to stay abreast of developments in the field in the future. The appendices on the DNA Advisory Board quality assurance guidelines and on vendors of supplies, equipment, and services add to the one-stop value of the book.

Forensic DNA Typing will deservedly find its way into many crime labs and law offices; both should find it useful as a single source repository of information about STR typing. It would not be my choice as a primary text for training of forensic scientists in DNA profiling—something more fundamental and biologically based would be preferred. The book would be decidedly useful, however, as a secondary reference text after a foundation has been laid.

¹ Professor of Forensic Science and Biomedical Sciences, School of Public Health, University of California, Berkeley, CA.