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Book reviews

DNA Technology and its Forensic Application. G. Berghaus, B. Brinkman, C. Rittner and M. Staak. (eds) Springer-Verlag, Berlin. 1991. Pp. 226. Paperback, price £50. ISBN 3 540 54035 0.

This book contains the scientific contributions presented at an International Symposium on the forensic application of DNA technology, held under the auspices of the German Society of Legal Medicine on 13–14 September 1991 in Cologne, Germany.

There are 33 papers covering the entire range of DNA profiling, including multi-locus probes (MLP), single-locus probes (SLP), and polymerase chain reaction (PCR). Papers are divided into separate sections: PCR, Databases, Paternity, Stain analysis and Biostatistics.

The original multi-locus probe tests (33.15 and 33.6), developed by Alec Jeffreys in 1985, were quickly adopted for use in routine casework in some European laboratories such as the Forensic Science Service (U.K.) and Cellmark Diagnostics. Alternative multi-locus probes such as MZ1.3 (cloned from human DNA using M13) and oligo-probes such as (GTG)5/(CAC)5 were subsequently introduced by other laboratories. Hypervariable single locus probes have proved to be much more efficient for databasing purposes and also tend to be more sensitive — signals can be obtained with quantities as low as 50–100 ng genomic DNA. To achieve uniformity between laboratories, there needs to be agreement on control standards, restriction enzymes, statistical interpretation methods and probes. In North America, the restriction enzyme *Hae*III is in common use, whereas Europeans have chosen *Hinf*I. The most widespread probe in use today on both sides of the Atlantic is undoubtedly the Nakamura probe pYNH24 (D2S44), hence there is probably more population data available for this locus than for any other.

The introduction of single locus probes led to questions on interpretation methods. Measurement errors due to electrophoretic distortion mean that it is not possible to identify individual alleles with certainty. It has become standard practice to use match rules or guidelines. Often, these rules are based on the standard deviation of measurement errors, although Bayesian models circumvent the need to adopt subjective criteria to define a match. Whichever method is used, the onus is on the forensic scientist to demonstrate that the statistical method used is conservative.

PCR adds a new dimension to forensic analysis; it is a powerful technique but needs to be used with great care to avoid contamination risks, especially from amplified products. Methods described include the HLA DQ alpha system, marketed in kit form by Cetus corporation. Detection of polymorphism is achieved by hybridization to allele-specific oligonucleotide (ASO) probes (a total of eight different alleles are detected). The use of low molecular weight VNTR loci (e.g. D1S80, D17S5), analysed by conventional polyacrylamide gel electrophoresis, is becoming commonplace. The advantage of PCR systems compared to conventional DNA profiling using Southern blotting is the rapidity of the technique; hybridizations are unnecessary because visualization of bands can be accomplished using silver staining. Furthermore, sample extraction/purification is easy; the whole technique is much cheaper and less labour intensive.

Paradoxically, the changes brought about by research run counter to the twin aims of interlaboratory uniformity and continuity of technique. There is a danger of locking into outdated technology: in the future, a laboratory devoted predominantly to PCR may still be required to prepare DNA profiles using SLPs in order to compare results from a potential offender who has already been put onto a database prepared some years earlier. The transition from SLP to PCR databases (which will be incomparable) is a problematical exercise, therefore.

To summarize, the volume gives an account of current techniques which are either reported in case-work or undergoing research evaluation. It is unlikely to be of great interest to those outside the forensic field, although the techniques and interpretation methods described are directly applicable to population genetics. The field moves quickly — hence there is only a brief mention of the potential of MVR by Alec Jeffreys and there are no papers on microsatellites.

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Fundamentals of Plant Breeding. H. Kuckuck, G. Kobabe and G. Wenzel. Springer-Verlag, Berlin. 1991. Pp. 265. Hardback, price £36. ISBn 3 540 52109 7.

This book was first published in German in 1939 by the senior author. The fifth German edition appeared in 1985, so this English version of the book is in effect the sixth edition. Over the years the book has accumulated two further authors and four other contributors. The book attempts to cover the whole field of plant breeding. For example, there are sections on heritability and response to selection, seed production of hybrid varieties, periclinal chimeras, gene transfer, photorespiration, trial design and genetic conservation.