1. Record Nr. UNINA9910561295903321

Titolo	Handbook of DNA profiling / / edited by Hirak Ranjan Dash, Pankaj Shrivastava, and J. A. Lorente
Pubbl/distr/stampa	Gateway East, Singapore : , : Springer, , [2022] ©2022
ISBN	981-16-4318-0
Descrizione fisica	1 online resource (1189 pages)
Disciplina	614.1
Soggetti	DNA fingerprinting - Technique DNA fingerprinting Ressenya genètica Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Intro -- Preface -- Contents -- About the Editors -- Contributors -- Part I: Principles of Forensic DNA Profiling -- 1 Forensic DNA Investigation -- Definitions -- Introduction -- Value of Forensic DNA Investigations -- Evidential Value -- Forensic DNA Evidence -- Forensic DNA Analysis -- Forensic DNA Databases -- Use of Forensic Lead Investigative Information -- Familial DNA Searches -- Modus Operandi and Signature of Serial Offenders -- Offender Profiling -- Best Practices Using Forensic Investigative Leads as Effective Investigative Tool -- Step 1: Notification -- Step 2: The Investigation -- Appeal to Victims to Come Forward -- Search for Similar Cases -- Revisit the Crime Scenes -- Exhibits Material -- Reinterview Victims -- Cellular Phones -- Step 3: After the Arrest -- Preparation for the Trial -- Sentencing -- Reasons for Unsuccessful Investigations of Serial Casework -- Serial Related Cases Not Consolidated -- Serial Casework Investigated by Inexperienced Detectives -- Cases Closed as Undetected Are Not Reopened -- Informal Identity Parades -- Pretrial Preparation -- Erroneous Forensic DNA Findings -- Conclusion -- References -- 2 Introduction to Forensic DNA Typing and Current Trends -- From Sampling to Identification -- Improved Software Tools -- Massively

Parallel Sequencing/Next-Generation Sequencing: Advanced Human Identification -- The NGS Technology -- Comparing CE and NGS -- Forensic Applications of NGS Technology -- STR and SNP Sequencing -- Mitochondrial DNA Sequencing in Forensics Using NGS -- DNA Intelligence -- Forensic DNA Phenotyping (FDP): Visible Phenotype Estimation -- Ancestry Informative Markers -- Degraded Samples -- Identifying Monozygotic Twins -- Emerging Applications of NGS -- Utility of NGS/MPS over CE -- Forensic Genetic Genealogy: The New Means of Genetic Identification -- The Ekeby Man Case.
The Golden State Killer -- The Rapid DNA Instrument -- Conclusion -- References -- 3 Biological Sources of DNA: The Target Materials for Forensic DNA Typing -- Introduction -- Blood -- Semen -- Vaginal Secretion -- Oral Fluids -- Sweat -- Urine -- Fecal Matter -- References -- 4 Collection, Preservation, and Transportation of Biological Evidences -- Introduction -- Biological Evidence -- DNA Content in Biological Samples -- Collection of Biological Samples -- Methodology for the Collection and Preservation of Biological Evidence -- Scraping Method -- Double Swabbing Method -- Cutting Method -- Tape Lifting Method -- Picking Method -- Collection, Preservation, Transportation, and Storage Procedures for Commonly Encountered Biological Evidences at the Crime Sc... -- Liquid Blood -- Liquid Blood and Wet Bloodstains from Crime Scene -- Dried Blood Stains -- Semen and Seminal Stains and Evidences from Sexual Assault Cases -- Soft Tissues and Organs -- Teeth and Bone -- Hair -- Touch DNA Samples -- Chain of Custody of Forensic Samples -- References -- 5 Forensic DNA: From New Approaches for the Bio-stain Identification to the Evaluation of the Genetics Evidence in Courtroom -- Introduction About the Bio-Stain Identification -- New Approaches for the Bio-Stain Identification -- Analysis Techniques in Forensic Genetics and New Technologies -- Genetic Traces in a Fire Scene -- Genetic Traces in a Fire Scenario -- The Biological Traces Evidence -- From Scientific Proof to ``Beyond Reasonable Doubt´´ -- DNA and Fire -- Final Remarks -- The New Popperian Epistemology of the Criminal Process: Strong Scientific Evidence and Reduction of the Clues to Conjectures -- The Revolution of the Justice Method: Popper´s Way for Strong Proofs -- The Neutrality of the Researcher and the Rigorous Acquisition of the Proofs -- References.
6 Tools and Techniques Used in Forensic DNA Typing -- Introduction -- Basic Principles of DNA -- DNA Typing Methods -- Blood Group Testing -- Forensic Protein Profiling -- RFLP-Based DNA Testing -- PCR-Based Tests -- Capillary Electrophoresis -- Y Chromosome DNA Testing -- STR Typing -- Mitochondrial DNA -- X Chromosome Analysis -- Microbial and Animal Forensics -- Next-Generation Sequencing -- Conclusion -- References -- 7 Evaluation of the Autosomal STR Markers and Kits -- Introduction -- Autosomal STR Marker -- Nomenclature for DNA Markers -- Types of Autosomal STR Marker -- CODIS Markers -- Autosomal STR Multiplex Kits -- Earlier STR Multiplex Kits -- Identifiler Kit -- ``AmpFLSTR Identifiler Direct´´ -- ``AmpFLSTR Identifiler Plus´´ -- Powerplex 16HS Kit -- New Generation Kit -- Global Filer Kit -- Verifiler Kit -- Fusion 6C Kit -- Forensic Relevance of Amelogenin Marker -- Forensic Validation of Autosomal STR Kits -- Usefulness of Autosomal STR Kits in Forensic Practice -- Conclusion -- References -- 8 Forensic Human Y-Chromosome Markers: Principles and Applications -- Introduction -- Y-Chromosome Structure -- Markers on Y Chromosome and Polymorphisms -- Y-STRs -- Rapidly Mutating Y-STRs -- Mini Y-STRs -- Inheritance Pattern of Y-STR Markers -- Y-SNPs -- Y-STR Kits -- Interpretation of Y-STR Results -- No Interpretable Results --

Inconclusive Results -- Exclusion -- Inclusion/Match -- Mixture Interpretation Via Y-STR Analysis -- Forensic Use of Y-Chromosome Testing -- Sexual Assault Investigation -- Sex Determination -- Paternity Testing -- Disaster Victim Identification -- Historical Investigations -- Y-STR Haplotype Databases -- Familial Searching -- Haplogroup Prediction -- Conclusion -- References -- 9 Haplodiploid Markers and Their Forensic Relevance -- Introduction -- Theoretical and Statistical Analyses -- Single Locus -- Haplotype.
Association at Gametogenesis Level: Linkage -- Association at the Population Level -- Applications -- Individual Profiling -- Genetic Relatedness -- Conclusions -- Conflict of Interest -- References -- 10 Single-Nucleotide Polymorphism -- Introduction -- SNPs and Their Attributes -- Advantages of SNP -- Categories of SNP Markers -- Identity-Testing SNPs -- Lineage SNPs -- Ancestry Informative Markers -- Phenotype Informative SNPs -- Techniques of SNP Analysis -- Molecular Beacons (MB) -- Microarrays/DNA Chips -- SNaPshot Multiplexing Method -- Mass Spectrometry -- Forensic Application of SNP Profiling -- Human Identification (HID) from Skeletal Remains -- Paternity Testing and Kinship Analysis -- Phenotypic Information of a Missing Suspect -- Constraints of SNP -- SNP Information Databases -- Conclusion -- References -- 11 Ethical Governance of Forensic DNA Databases in Southeast Asia -- Introduction -- Research Involving Human DNA Databases -- Ethical Elements Applied to Genetic Research and DNA Databasing -- Ethical Framework for Multiple Stakeholder Responsibility -- Research on Reference Databases on Forensically Relevant DNA Markers in Southeast Asia -- Brunei Darussalam -- Cambodia -- Indonesia -- Laos -- Malaysia -- Myanmar -- Philippines -- Singapore -- Thailand -- Vietnam -- Survey of Publications on Forensic DNA databases in SE Asia -- Conclusions and Recommendations -- References -- 12 Using Laboratory Validation to Identify and Establish Limits to the Reliability of Probabilistic Genotyping Systems -- Introduction -- Standards and Guidelines Governing Internal Validation -- Published Guidance Documents -- Validation Workshops and Technical Merit Evaluation by NIST Scientists -- Key Principles -- Pushing the System Until It Fails -- Dimensions That Must Be Evaluated Individually and Collectively -- Suboptimal Amounts of Template DNA.
Variation in Contributor Ratios -- A Large and/or Unknown Number of Contributors (NOC) to a Sample -- Allele Sharing Between Contributors to a Sample, and with Noncontributors -- Degradation/Inhibition and Differential Degradation -- Additional Factors That Complicate the Interpretation of Mixed DNA Samples -- Key Principles -- Using and Sharing Validation Data and Results -- Incorporating Validation Results into Standard Operating Procedures -- Transparency of Validation Data for Independent Review -- Key Principles -- Conclusions -- References -- 13 Potential of DNA Technique-Based Body Fluid Identification -- Introduction -- Biological Background of Molecular Markers -- mRNA Profiling -- miRNAs Profiling -- Epigenetics -- DNA Methylation Profiling Method -- DNA-Compatible Cell-Specific Identification -- Conclusion -- References -- 14 Overview of Familial DNA and Forensic Phenotyping -- The Basics of DNA -- The Building Blocks for the Human Body -- The Use of DNA in Forensics -- DNA Fingerprinting -- Limitations of DNA Evidence -- The Right to Collect DNA from Suspects -- Recent DNA Controversies -- Familial DNA -- DNA Phenotyping -- Racial Profiling -- Right to Privacy -- Legislative Response -- Conclusion -- References -- 15 A Glimpse of Famous Cases in History Solved by DNA Typing -- Introduction -- Famous Cases in History Solved by Human DNA Analysis -- Colin Pitchfork Case -- Tommie Lee

Andrews Case -- Joseph Castro Case -- O. J. Simpson Murder Case -- Craig Harman Case -- Identification of 9/11 Victims -- Famous Cases in History Solved by Nonhuman DNA Analysis -- Snowball Case -- The Bogan Case -- Cold Cases Solved by DNA Analysis -- The Boston Strangler Case -- Murder and Sexual Assault of Girl in 1988 -- Arrest of Nebraska Sex Offender in 1983 Slaying of UNO Student -- DNA Examination of Unsolved Female Homicide Cases During 1990-1999. Jeffrey Gafoor Case.

Sommario/riassunto

This reference book comprehensively reviews the significance of DNA technology in forensic science. After presenting the theory, basic principles, tools and techniques that are used in forensic DNA typing, it summarizes various techniques, including autosomal STR, Y-STR, X-STR, mitochondrial DNA and NGS, used in solving both criminal as and civil cases, such as paternity disputes, identification of mutilated remains, and culprit identification in sexual assault and murder cases. It also provides an overview of DNA-based genetic diagnostics for various diseases, and discusses the role of DNA typing in drug reactions, as well as the application of non-human DNA profiling of animals and plants in forensic science investigations. Lastly, the book examines the role of internal quality control in maintaining the high quality of DNA profiling.