

Pankaj Shrivastava  
Hirak Ranjan Dash  
Jose A. Lorente  
Jahangir Imam *Editors*

# Forensic DNA Typing: Principles, Applications and Advancements

 Springer

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Jose A. Lorente • Jahangir Imam  
Editors

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# RNA- and DNA-Based Identification of Body Fluids

# 5

Arjun Rao, Manisha Rana, Ashish Pradhan, and Moumita Sinha

## Abstract

The most common form of evidence to forensic investigators is the body fluids collected at crime scenes. They ascertain the suspect or victim, they provide valuable DNA evidences and can play a vital role in acquit an innocent individual. The determination of a specific bodily fluid is predominantly the initial step as the body fluid composition is very relevant to the further investigation process. The ability to identify and report an unexplained stain at the scene of crime without waiting for the laboratory results is another very important phase in the forensic body fluids analysis. Many forms of detection methods for body fluids have been known for over a century, such as alternative light source, immunological tests, spectroscopic techniques, chemical methods, catalytic tests, and microscopic methods. Although these modern forms of detection of body fluids are often definitive, these are done at a time with only one body fluid. Currently the usage of molecular genetic based approaches using DNA methylation detection or RNA-based profiling methods has recently conquered to replace the traditional body fluids identification methods.

## Keywords

Blood · Saliva · Semen · Forensic · RNA · DNA

## 5.1 Introduction

Individual's involvement in a crime can be detected and identified by the body fluids traced at the crime scene event. These types of evidences found at the scene of crime are among the most ubiquitous in nature especially to forensic investigation

A. Rao (✉) · M. Rana · A. Pradhan · M. Sinha  
Department of Forensic Science, Guru Ghasidas Vishwavidyalaya, Bilaspur, CG, India



# SNP Testing in Forensic Science

# 18

Moumita Sinha and I. Arjun Rao

## Abstract

SNP is the abbreviation for single nucleotide polymorphism (SNP) which occurs at particular site in the genome as variant of single nucleotide. These variations are represented in different population and individuals to some considerable degree. The presence of SNPs is ubiquitous not only in human genome but also among some plants and microorganisms like bacteria. The popularity of SNPs among forensic researchers has been fascinated due to their capable advantages in parentage testing. SNPs have low mutation rates and are very capable in the identification and examination of degraded samples with small amplicons. SNPs provide valuable information on geographical origin and individual identification of unknown humans, plants and microorganisms samples.

## Keywords

SNP · Forensic · Testing · DNA · Detection

## 18.1 Introduction

A single change of sequence in base between individuals and population of different geographical origin as well as ancestry at a specific location in the genome is termed as single nucleotide polymorphisms or SNPs. SNPs as genetic markers are abundant in human genome and readily available for individual identification and geographical identity. SNPs are assessed by forensic scientists for a variety of reasons: (a) SNPs can be amplified in small amplicons of 100 bp by using PCR, (b) degraded DNA samples are easily analysed for SNPs, (c) as size-based separation for SNP is not required in a fully automated processing of sample and analysis of data can be

M. Sinha (✉) · I. A. Rao

Department of Forensic Science, Guru Ghasidas University, Bilaspur, Chhattisgarh, India

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