Forensic a much wider application range. at

Business, Career

Forensic science is more than just what you see on televisionand read in criminal novels.

There are dozens of people who are involved in acriminal investigation and there’s a significant need for individuals withspecialized skills and training. With so many sub-disciplines to choose from, the field of forensic science offers a virtually limitless number of career pathsto students who are interested in the mechanics of crime-solving. Onesuch developing field is Forensic Molecular Genetics.

The first use of DNA in forensic science was toidentify the perpetrator of a murder in 1985, since then, forensic science haswitnessed dramatic changes in the field of human identification. Over the past25 years advances in DNA (deoxyribonucleic acid) technology have led tospectacularly precise forensic identification techniques. Current work inforensic genetics is pushing these technologies even further by analyzingextremely damaged DNA and by introducing RNA (ribonucleic acid) techniques toforensics. Currently, millions of samples from blood, semen, hair and tissues etc are analyzed to determine their origin. While traditional forensic molecular genetics has beenoriented towards using human DNA in criminal investigation and civil courtcases, it currently presents a much wider application range. At presentforensic molecular genetics is progressively incorporating the analysis ofnonhuman genetic materials such as other animal species, plants ormicroorganism to a greater extent, providing ancillary evidence incriminalistics in cases such as animal attacks, trafficking of species, bioterrorism and biocrimes, and identification of fraudulent food composition, among many others. With the exception of monozygotic twins, every

individualhas a different genome. Forensic molecular genetics primarily uses DNA Fingerprintingfor the production of a unique DNA profile for every person.

PCR enhances theprocess by helping in the amplification of minutest of DNA samples. Furtheradvancements include new DNA isolation methods, Y-chromosome haplogrouping (indicating” male” DNA in a mixed sample seen usually in sexual assault cases), mitochondrial DNA analysis (which is inherited along the same maternal line), analysis of SNPs in place of STRs for degraded samples obtained from disastersites, use of automated sequencers and DNA databases etc. New genetic markersbeing tested include mRNA and miRNAs, as they are much smaller in size, thusless prone to degradation. Thus, relying on these methods pedigree analysis, determination of paternity/maternity, victim and suspect identification, andmost importantly exoneration of the innocent becomes highly accurate andensures justice for all.