Workshops by EDVOTEK®

NABT
San Diego, CA
Sat., Nov. 10, 2018

Left at the Scene of the Crime

Saturday, Nov. 10 • 9:00 - 10:15 AM • Sheraton San Diego Hotel and Marina • Room: Spinnaker 2

Explore genetic diversity with a cutting edge forensic science experiment! Your students will become crime scene investigators as they analyze biological evidence using DNA fingerprinting, a technique that identifies people via genetic differences.

In humans, DNA is packaged into 23 pairs of chromosomes. Although most of this DNA is identical between individuals, small sequence differences, or "polymorphisms", occur at specific locations throughout the genome. These polymorphisms include single base pair changes and repetitive DNA elements. Polymerase chain reaction (PCR) can analyze polymorphisms at several loci within the human genome. Since each individual's genome contains a different combination of polymorphisms, each person has a unique "DNA fingerprint". DNA fingerprinting is used to analyze biological evidence from crime scenes. Thirteen loci are examined, making the odds of an exact match less than one in a trillion. After the crime scene sample is analyzed, it is compared to DNA fingerprints from the suspects.

In this workshop, you will learn how to analyze crime scene and suspect samples using agarose gel electrophoresis. After performing this investigation in the classroom, students will have experience with data collection, critical analysis of results, and scientific inquiry. This will help them to transform advanced topics in genetics into a concrete scientific understanding.

Teaching the Polymerase Chain Reaction (PCR)

Saturday, Nov. 10 • 11:15 - 12:30 PM • Sheraton San Diego Hotel and Marina • Room: Spinnaker 2

How are scientists able to identify genetic mutations and infectious agents? What technique is indispensable to both medical and life science labs? The answer is the Polymerase Chain Reaction (PCR)!

In 1984, Dr. Kary Mullis revolutionized the field of molecular biology when he devised a simple and elegant method to copy specific pieces of DNA. Mullis discovered that he could replicate DNA in vitro using short, synthetic DNA primers and DNA Polymerase I. Furthermore, this method allowed for the rapid amplification of a selected DNA sequence in vitro because the primers are engineered to target a specific gene. For the development of this technique, known today as the Polymerase Chain Reaction (PCR), Mullis was awarded the Nobel Prize in Chemistry in 1993. Its ease of use and ability to rapidly amplify DNA enables scientists to use PCR to quickly create copies of a specific region of DNA. In addition, because amplification by PCR requires very little starting material, it is ideal for forensic analysis of biological samples or determination of paternity.

Today, we can easily perform PCR in the classroom laboratory. In this hands-on workshop, we will amplify a small region of the Bacteriophage Lambda genome using PCR and analyze it using gel electrophoresis. This quick and easy experiment has been optimized so that the entire experiment can be completed in one 75-minute lab period.

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