URI CMB 190
Issues in Biotechnology

Lesson 22 Study Guide: DNA Based Forensics

1. Who recognizes, identifies, individualizes and evaluates physical evidence using the methods of natural sciences in matters of legal significance?

(A) detectives
(B) criminologists
(C) criminalists
(D) criminals
(E) local police

2. The CT CODIS Database collects two types of samples; (1) Convicted Offender Samples that include all Felony Convictions (since 03/01/04) and, (2) Forensic Unknowns that include any DNA profile from an evidentiary sample that does not match the victim or an elimination known. There are currently 10,793 offenders in CT Database and over 1,500 offender samples are added per month. Currently there are how many felons on the CT database?

(A) 1 out of 50 males in CT
(B) 1 out of 100 males in CT
(C) 1 out of 1,000 males in CT
(D) 1 out of 10,000 males in CT
(E) none of these answers is correct

3. CODIS stands for:

(A) combined DNA Index System
(B) combinatorial Operations for DNA Identification Systems
(C) criminalists for DNA Indexing Systems
(D) none of these answers are correct

4. PCR is used in plant genetics, animal cloning, drug discovery, cancer research and forensics.
(A) false
(B) true
(C) only when a plant geneticist thinks his collaborator stole his work
(D) only when forensic analysis involves plant material from a crime scene

5. DNA analysis is now a common and widely accepted forensic tool used to analyze evidentiary DNA.

(A) true
(B) false
(C) only in less than half the states
(D) only used on convicted felons

6. (STR) technology is used to evaluate specific regions (loci) within nuclear DNA. Variability in STR regions can be used to distinguish one DNA profile from another. The Federal Bureau of Investigation (FBI) uses a standard set of 13 specific STR regions for CODIS. CODIS is a software program that operates local, state, and national databases of DNA profiles from convicted offenders, unsolved crime scene evidence, and missing persons. The odds that two individuals will have the same 13-loci DNA profile is extremely unlikely. STR stands for:

(A) Standard Temperature Reactions
(B) Statewide Tracking Reliabilities
(C) Short Tandem Repeats
(D) Starwars Tracking Reactions
(E) Standard Twacking of Reactionaries

7. There was a homicide in 1994. A plastic bag was found in the shallow grave of the victim with a bloody jacket and some trace hairs were recovered. What techniques would be best used to match the hairs to the suspect's cat, snowball?

(A) PCR providing a perfect match with cat STRs
(B) all of these techniques together provide the best case
(C) PCR of the blood from the jacket to tie the DNA of the suspect to the jacket
(D) scanning electron microscopy of the trace evidence showed that they were those of a cat

8. Research on how the principles of biology and evolution are involved with criminal behavior is in its infancy. The principal mechanism of evolution, which includes two processes that operate together: chance variability and selection, is called:

(A) natural selection
(B) ingenuity
(C) conjugation
(D) predation
(E) intelligent design

9. There was a double murder in Seattle in 1996 and preliminary investigation came up with two suspects. A couple had been tortured and shot dead along with their pet dog. There was blood on one of the suspect's clothing. The blood on the clothing could be best matched with that of the dog by doing what?

(A) looking for matching dogs hairs at the crime scene
(B) finding no dog blood on the second suspect
(C) using PCR on both samples with known molecular makers for dogs
(D) obtaining the records from the local veterinarian

10. What are the odds of two people's DNA matching one another given the nationally used 13 CODIS core of STR loci used by state and federal forensics experts?

(A) over 1 in a billion
(B) 1 in 3 million
(C) 1 in 700,000
(D) 1 in 7,000
(E) less than 1 in 90

11. Which of these items could be a source for possible DNA forensic testing:

(A) all of these items can be used for DNA testing
(B) cigarette butts
(C) general clothing: including gloves, bandanas, ski masks, baseball caps
(D) condoms (inside vs. outside)
(E) a bloody knife

12. How does forensic testing help in a criminal investigation?

(A) by linking a suspect to a victim
(B) by linking a victim to crime scene
(C) by linking a suspect to crime scene
(D) by any or all of the answers

13. You are a prospective juror for a trial which you have read about in you local newspaper. You are asked, "If you had to vote right now in this case, guilty or not guilty, what would you do?" What should be your response according to the law in the United States?

(A) guilty
(B) not guilty
(C) not enough evidence
(D) none of these answers

14. Renee Pellegrino was an accomplished scholar with a law degree, had become addicted to crack cocaine and turned to prostitution. She was 40 years old and pregnant when her naked body was discovered in a cul-de-sac off Waterford Parkway South, CT. on June 25, 1997 murdered. In 2008, the state forensic laboratory had notified police that DNA taken from Pellegrino's body matched a DNA sample that had been taken from Dickie Anderson Jr. The DNA evidence:
(A) proved that Dickie Anderson was guilty
(B) showed that Dickie Anderson was not guilty
(C) provided circumstantial evidence that linked Dickie Anderson to the crime
(D) not enough evidence
(E) none of these answers