The Central Park Jogger Case Revisited

On April 19, 1989, a young woman left her apartment around nine p.m. to jog in New York's Central Park. Nearly five hours later, she was found comatose lying in a puddle of mud in the park. She had been raped, her skull was fractured, and she had lost 75 percent of her blood. When the woman recovered, she had no memory of what happened to her. The brutality of the crime sent shock waves through the city and seemed to fuel a national perception that crime was running rampant and unchecked through the streets of New York.

Already in custody at the station house of the Central Park Precinct was a group of 14- and 15-year-old boys who had been rounded up leaving the park earlier in the night by police who suspected that they had been involved in a series of random attacks. Over the next two days, four of the teenagers gave videotaped statements, which they later recanted, admitting to participating in the attack. Ultimately, five of the teenagers were charged with the crime.

Interestingly, none of the semen collected from the victim could be linked to any of the defendants. However, according to the testimony of a forensic analyst, two head hairs collected from the clothing of one of the defendants microscopically compared to those of the victim, and a third hair collected from the same defendant's T-shirt microscopically compared to the victim's pubic hair. Besides these three hairs, a fourth hair was found microscopically similar to the victim's. This hair was recovered from the clothing of Steven Lopez, who was originally charged with rape but not prosecuted for the crime.

Hairs were the only pieces of physical evidence offered by the district attorney to directly link any of the teenagers to the crime. The five defendants were convicted and ultimately served from 9 to 13 years.

In August 1989, more than three months after the jogger attack, New York Police arrested a man named Matias Reyes, who pleaded guilty to murdering a pregnant woman, raping three others, and committing a robbery. In January 2002, Reyes also confessed to the Central Park attack. Follow-up tests revealed that Reyes's DNA compared to semen recovered from the jogger's body and her sock. Other DNA tests showed that the hairs offered into evidence at the original trial did not come from the victim, and so could not be used to link the teenagers to the crime as the district attorney had argued. After an 11-month reinvestigation of the original charges, a New York State Supreme Court judge dismissed all the convictions against the five teenage suspects in the Central Park jogger case.
Hair Evidence

The murder of Ennis Cosby, son of entertainer Bill Cosby, at first appeared unsolvable. It was a random act. When his car tire went flat, Ennis pulled off the road and called a friend on his cell phone to ask for assistance. Shortly thereafter, an assailant demanded money and, when Cosby didn’t respond quickly enough, shot him once in the temple. Acting on a tip from a friend of the assailant, police investigators later found a .38-caliber revolver wrapped in a blue cap miles from the crime scene. Mikail Markhasev was arrested and charged with murder. At trial, the district attorney introduced firearms evidence to show that the recovered gun had fired the bullet aimed at Cosby. However, a single hair also recovered from the cap dramatically linked Markhasev to the crime. Los Angeles Police Department forensic analyst Harry Klaas identified six DNA markers from the follicular tissue adhering to the hair root that matched Markhasev’s DNA. This particular DNA profile is found in one out of 15,000 members of the general population. Upon hearing all of the evidence, the jury deliberated and convicted Markhasev of murder.

Bill Cosby and his son Ennis Cosby, Courtesy Andrea Mohin/Redux Pictures

typing mitochondrial DNA is much greater from samples, such as hair, that have limited quantities of nuclear DNA. Hairs 1–2 centimeters long can be subjected to mitochondrial analysis with extremely high odds of success. This subject is discussed in greater detail in Chapter 10.

Can DNA Individualize a Human Hair? In some cases, the answer is yes. As we learned in Chapter 10, nuclear DNA produces frequencies of occurrence as low as one in billions or trillions. On the other hand, mitochondrial DNA cannot individualize human hair, but its diversity within the human population often permits exclusion of a significant portion of a population as potential contributors of a hair sample. Ideally, the combination of a positive microscopic comparison and an association through nuclear or mitochondrial DNA analysis strongly links a questioned hair and standard/reference hairs. However, a word of caution: mitochondrial DNA cannot distinguish microscopically similar hairs from different individuals who are maternally related.

Collection and Preservation of Hair Evidence

When questioned hairs are submitted to a forensic laboratory for examination, they must always be accompanied by an adequate number of standard/reference samples from the victim of the crime and from individuals suspected of having deposited hair at the crime scene. We have learned that hair from different parts of the body varies significantly in its physical characteristics. Likewise, hair from
Chapter Review

- The hair shaft is composed of three layers called the cuticle, cortex, and medulla and is most intensely examined by the forensic scientist.
- When comparing strands of hair, the criminalist is particularly interested in matching the color, length, and diameter. Other important features in comparing hair are the presence or absence of a medulla and the distribution, shape, and color intensity of pigment granules in the cortex.
- The probability of detecting DNA in hair roots is more likely for hair being examined in its anagen or early growth phase as opposed to its catagen or telogen phases.
- The follicular tag, a translucent piece of tissue surrounding the hair's shaft near the root, is a rich source of DNA associated with hair. Mitochondrial DNA can also be extracted from the hair shaft.
- All positive microscopic hair comparisons must be confirmed by DNA analysis.
- Fibers may be classified into two broad groups: natural and manufactured.
- Most fibers currently manufactured are produced solely from synthetic chemicals and are therefore classified as synthetic fibers. They include nylons, polyesters, and acrylics.
- Microscopic comparisons between questioned and standard/reference fibers are initially undertaken for color and diameter characteristics. Other features that could be important in comparing fibers are striations on the surface of the fiber, the presence of delustering particles, and the cross-sectional shape of the fiber.
- The visible-light microspectrophotometer is a convenient way for analysts to compare the colors of fibers through spectral patterns.
- Infrared spectrophotometry and the polarizing microscope are reliable methods for identifying the chemical composition of fibers.
- Fiber evidence collected at each location should be placed in separate containers to avoid cross-contamination. Care must be taken to prevent articles of clothing from different people or from different locations from coming into contact.

Review Questions

1. The ______ is important for the individualization of hair.
   a. cuticle
   b. cortex
   c. follicular tag
   d. medulla

2. The final growth phase in which hair naturally falls out of the skin is called the
   a. anagen phase
   b. telogen phase
   c. catagen phase
   d. follicular phase

3. The most prevalent plant fiber is
   a. hemp
   b. cotton
   c. wool
   d. mohair

4. Which of the following is not a manufactured fiber grouping?
   a. polyester
   b. rayon
   c. mohair
   d. spandex

5. In the examination of fibers, the first and most important step in the examination will be
   a. a microscopic comparison for color and diameter using a comparison microscope.
   b. a determination of whether the fiber is natural or manufactured.
   c. synthesizing long-chained molecules into a polymer.
   d. analyzing the individual characteristics of the material.

6. True or False: Because of advances in forensic technology and the equipment available, it is now possible to individualize human hair through its morphology.

7. True or False: Two of the features that make hair a good subject for establishing individual identity are its resistance to chemical decomposition and its ability to retain structural features over a long period of time.

8. True or False: Most often, when hair evidence is present in a criminal case, the primary purpose is to establish the identity of the individual when no other means is available.

9. True or False: The ultimate value of fibers as forensic evidence will depend on the criminalist's ability to narrow their origin to a limited number of sources or even to a single source.

10. True or False: Properties frequently used to identify fibers are refractive index and an IR spectrum.

11. What is hair and what organ produces it?
Application and Critical Thinking

1. Indicate the phase of growth of each of the following hairs:
   a. the root is club-shaped
   b. the hair has a follicular tag
   c. the root bulb is flame-shaped
   d. the root is elongated

2. A criminalist studying a dyed sample hair notices that the dyed color ends about 1.5 centimeters from the tip of the hair. Approximately how many weeks before the examination was the hair dyed? Explain your answer.

3. Following are descriptions of several hairs; based on these descriptions, indicate the likely race of the person from whom the hair originated.
   a. evenly distributed, fine pigmentation
   b. continuous medullation
   c. dense, uneven pigmentation
   d. wavy with a round cross-section

4. Criminalist Pete Evett is collecting fiber evidence from a murder scene. He notices fibers on the victim's shirt and trousers, so he places both of these items of clothing in a plastic bag. He also sees fibers on a sheet near the victim, so he balls up the sheet and places it in separate plastic bag. Noticing fibers adhering to the window sill from which the attacker gained entrance, Pete carefully removes them with his fingers and places them in a regular envelope. What mistakes, if any, did Pete make while collecting this evidence?

5. For each of the following human hair samples, indicate the medulla pattern present.

   A. 
   B. 
   C. 
   D. 
   E. 
   F. 
   G. 
   H. 
   I.
A young child is kidnapped from her school playground. Shown on the left is a reference sample of the kidnapper's child's hair. The only cars that left the parking lot before the child was discovered to be missing were those of four cafeteria workers. The car of each worker was searched and hairs collected. These recovered hairs are shown on the right. Which recovered hair, if any, is consistent with that of the victim and warrants further investigation?

A.

B.

C.

D.

E.

F.

G.

H.

Reference Hair from Victim

Hair from car of Worker A

Hair from car of Worker B

Hair from car of Worker C

Hair from car of Worker D

Courtesy Richard Safarstein, Ph.D.