Trace Evidence: Hair

Introduction

In this lab exercise you will work with hair evidence that was collected at a crime scene. Your task is to try to match the hair evidence that was collected at the crime scene with hair collected from four suspects.

Materials

Microscope slides
Transparent tape
Scissors
Clear nail polish
Compound microscope
Prepared slides of hair samples

Safety

Always carry a microscope with two hands. Allow nail polish to dry completely to ensure you don't get it on the microscope lens.

Scenario

A murder was committed. To dispose of the body the suspect tossed the body from the car into a ditch. When crime scene investigators arrived, they photographed the crime scene and drew sketches of the body. Hair evidence was found on the victim. Hair samples were collected from the four suspects, as well as a sample of hair taken from the victims head. Complicating this, the victim worked at a pet store and is likely to have picked up hair from work. These hairs will need to be analyzed for elimination before any determination can be made on who the guilty suspect is. At the crime lab a comparison microscope was used to examine each of the hair samples. Your task is to examine all hair samples under the compound microscope and record your observations. After reviewing all samples, determine if any of the suspects' hair matches the hair found at the crime scene. You need to justify your decision.

Procedure

Part 1: Observation of your own hair

1. Obtain a clean glass slide.
2. Place the slide along the edge of the desk.
3. Wipe a thin layer of nail polish on one side of the slide the size of a cover slip.
4. Pull out a hair from your head, try to leave the root intact. Cut the hair in to approximately 1-1 ½ inch strands reserving the root for step 6.
5. While holding onto the hair between two fingers in front of the slide, slowly lower the hair onto the slide being careful not to wiggle the hair back and forth. Pull the hair down into the nail polish and let go of the hair. You may want to repeat this step with several different strands of hair to ensure best results.
6. Line the remaining hair(s) up on your desk
7. Hold the tape with the sticky side down towards the hair on the table. Lower the tape close enough to the hair for the attractive forces to cause the hair to be picked up by the tape but do not touch the table.

8. Place the tape with the attached hair(s) to the other end of the slide. Use your finger to press down on the tape to squeeze out any air pockets. Cut off the excess tape.
9. Now return to the hairs that have been drying in the nail polish. Ensure that the nail polish is completely dry then grasp the lose end of the hair and pull straight up to completely remove the hair from the nail polish.
10. You have now made a permanent slide. Label the slide with your name using a permanent marker.
11. Focus the hair using 100x magnification.
    a. Draw your hair in the space provided in the data table.
    b. Identify the type of medulla, cuticle, color, and any other distinguishing features.
12. Observe the slide under 100x. Sketch your observations in the table below. Then trade slides and observe the hair of at least two of your classmates.

Source of Hair	**Cuticle scales (nail polish)**	**Hair (Tape)**	**Characteristics**
			Color: **Medullary Index:** **Medullary Pattern:** **Cuticle:** **Pigment Distribution:**
			Color: **Medullary Index:** **Medullary Pattern:** **Cuticle:** **Pigment Distribution:**
			Color: **Medullary Index:** **Medullary Pattern:** **Cuticle:** **Pigment Distribution:**

Part 2: Analysis of Hair and Trace Evidence

1. Obtain a slide of the victim's hair from the envelope prepared by your instructor. Draw a sketch of the victims hair, and record all of the information in the data table below. Return the slide to the envelope as soon as you are finished so that someone else can use the slide.
2. Look at each of the four suspects hairs. Draw sketches and record ass required information in the table. Please take only one slide at a time
3. Compare your results with another classmate. If you find you have different answers, it might be necessary to examine more than one hair sample from any individual.
4. Obtain an envelope marked crime scene and analyze any hairs that you find. Sketch and record observations below.
5. Compare each hair to both the victim and each suspect to determine who was at the crime scene.
6. Remember that there may be hairs collected as secondary transfer that were actually from animals at the pet store. These must be eliminated and as an extension you may try to identify the species each hair came from.
7. Once examination is complete tape each hair collected from the crime scene in the correct box at the end of the lab. Then wash the slides and clean your area
8. Answer the analysis questions that follow

Source of Hair	Sketch of Cuticle scales	Sketch of Hair	Characteristics
Victim			**Color:** **Medullary Index:** **Medullary Pattern:** **Cuticle:** **Pigment Distribution:**
Suspect 1			**Color:** **Medullary Index:** **Medullary Pattern:** **Cuticle:** **Pigment Distribution:**

Source of Hair	**Cuticle scales (nail polish)**	**Hair (Tape)**	**Characteristics**
Suspect 2			**Color:** **Medullary Index:** **Medullary Pattern:** **Cuticle:** **Pigment Distribution:**
Suspect 3			**Color:** **Medullary Index:** **Medullary Pattern:** **Cuticle:** **Pigment Distribution:**
Suspect 4			**Color:** **Medullary Index:** **Medullary Pattern:** **Cuticle:** **Pigment Distribution:**
Crime Scene #1			**Color:** **Medullary Index:** **Medullary Pattern:** **Cuticle:**

			Pigment Distribution:
Source of Hair	**Cuticle scales (nail polish)**	**Hair (Tape)**	**Characteristics**
Crime Scene #2			**Color:** **Medullary Index:** **Medullary Pattern:** **Cuticle:** **Pigment Distribution:**
Crime Scene #3			**Color:** **Medullary Index:** **Medullary Pattern:** **Cuticle:** **Pigment Distribution:**
Crime Scene #4			**Color:** **Medullary Index:** **Medullary Pattern:** **Cuticle:** **Pigment Distribution:**
Crime Scene #5			**Color:** **Medullary Index:** **Medullary Pattern:**

			Cuticle: **Pigment Distribution:**
Source of Hair	**Cuticle scales (nail polish)**	**Hair (Tape)**	**Characteristics**
Crime Scene #6			**Color:** **Medullary Index:** **Medullary Pattern:** **Cuticle:** **Pigment Distribution:**
Crime Scene #7			**Color:** **Medullary Index:** **Medullary Pattern:** **Cuticle:** **Pigment Distribution:**

Hair Sample Collection

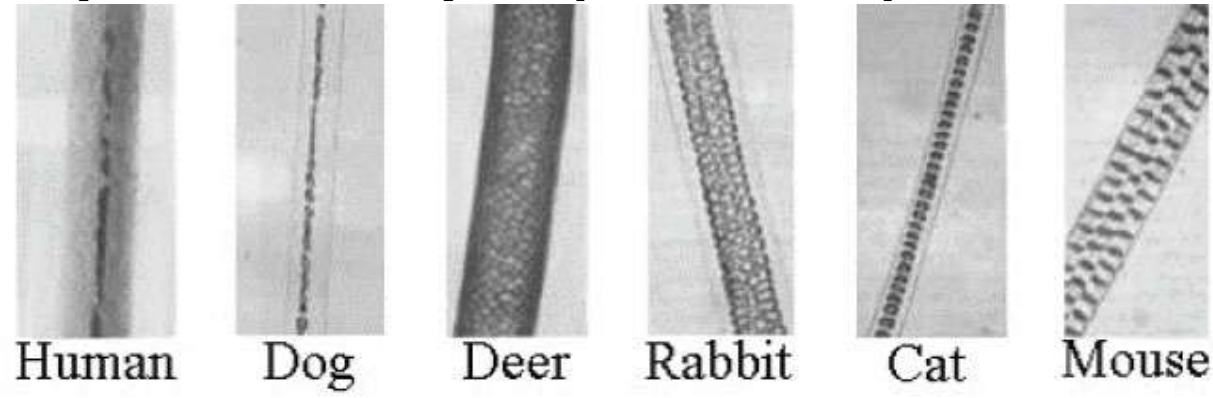
Victims Hairs	Suspects Hairs	Hairs from the Pet Shop

Analysis

1. What characteristics did you find to be most useful in eliminating the victim's own hairs? Explain

2. What characteristics did you find to be most useful in eliminating the hairs from the pet store? Explain.

3. Are you able to identify the species from the pictures below? How?



4. Which suspect was at the crime scene? How do you know?