

HAIRS & FIBERS

Biology of Hair

Hair is composed of the protein **keratin**, which is also the primary component of finger and toe nails.

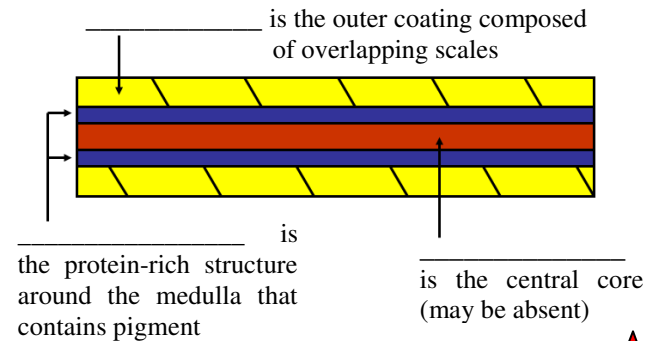
Hair is produced from the **hair follicle**, which develops during **fetal** development, and no new follicles are produced after birth.

Hair color is mostly the result of **pigments**. Hair **shape** (round or oval) and **texture** (curly or straight) is influenced heavily by **genes**. The physical appearance of hair can be affected by **nutritional** status and intentional **alteration**.

The **body area** from which a hair originated can be determined by its length, shape, size, color, and other physical characteristics.

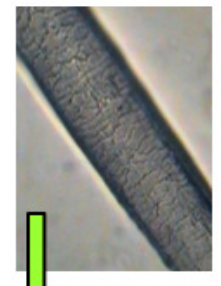
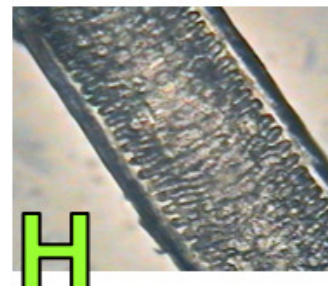
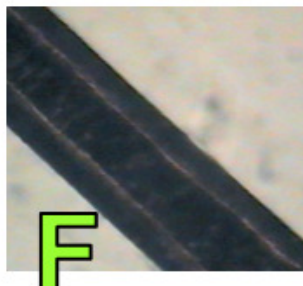
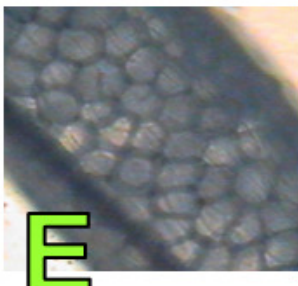
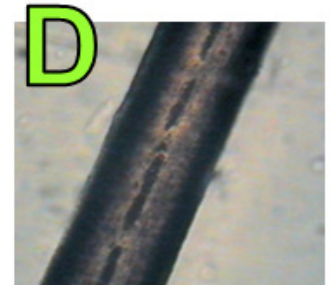
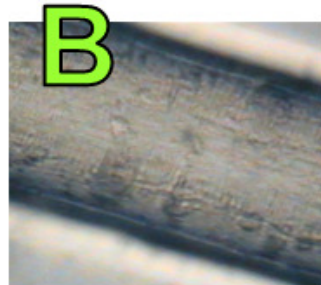
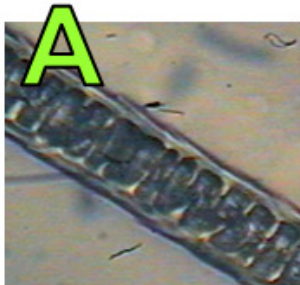
In order to test hair evidence for DNA, the **root** must be present.

★ *Label the diagram.*



★ *Complete this statement:* The structure of hair has been compared to that of a **pencil** with the medulla being the _____, the cortex being the _____ and the cuticle being the _____ on the outside.

Can you identify the animal hairs shown?



★ *Think About It ... Answer these questions.*

- (1) In which samples are we viewing the cuticle? How do they compare?
- (2) In which samples are we viewing the medulla? How do they compare?
- (3) What characteristics can be used to identify hair samples?

Fiber Evidence

A **fiber** is the smallest unit of a textile material that has a **length** many times greater than its **diameter**. It can be spun with other fibers to form a **yarn** that can be woven or knitted to form a fabric.

The **type** and **length** of fiber used, the type of **spinning** method, and the type of **fabric** construction all affect the significance of fiber evidence.

Matching **unique** fibers on the clothing of a victim to fibers on a suspect's clothing can be very helpful to an investigation, whereas the matching of **common** fibers such as white cotton or blue denim fibers would be less helpful.

Cross transfers and multiple fiber transfers between the suspect's clothing and the victim's clothing dramatically **increases** the likelihood that these two individuals had physical contact.

Natural Fibers

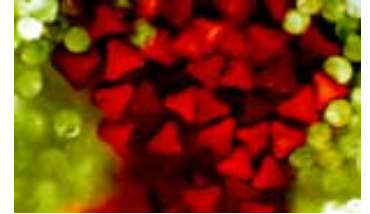
Many different **natural** fibers that come from plants and animals are used in the production of fabric.

Cotton fibers are the plant fibers most commonly used in textile materials, while the most common animal fiber is **wool**. Most wool fibers come from sheep.

Synthetic Fibers

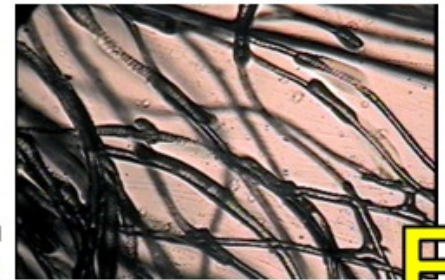
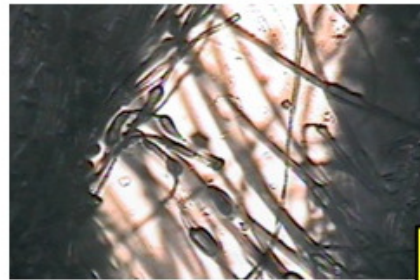
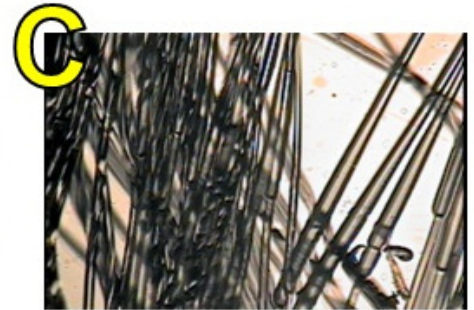
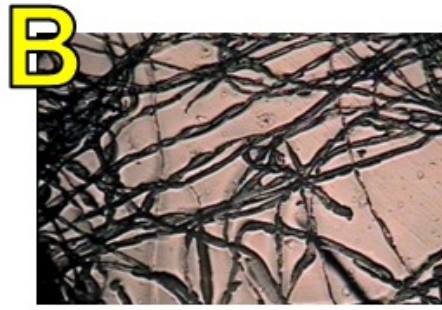
More than half of all fibers used in the production of textile materials are synthetic or **man-made**.

Nylon, **rayon**, and **polyester** are examples of synthetic fibers.



Cross-section of a man-made fiber →

Can you identify the types of fibers shown?



★ Think About It ... Answer these questions.

- (1) Which samples are natural fibers?
- (2) Which samples are synthetic fibers?
- (3) What characteristics can be used to identify fiber samples?