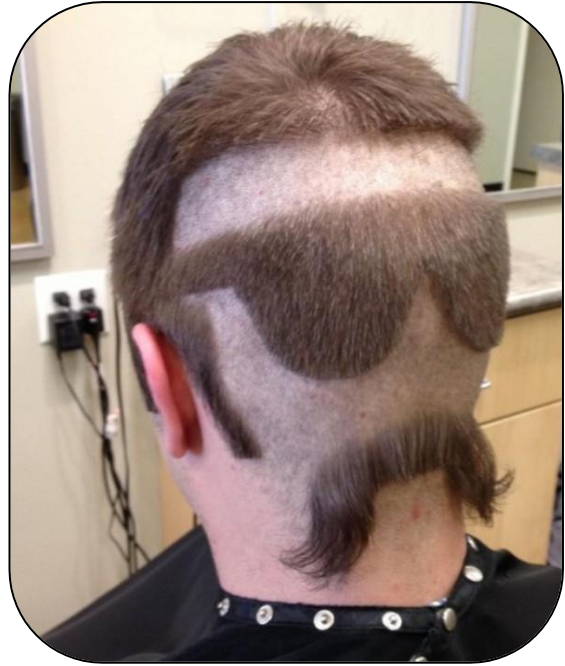


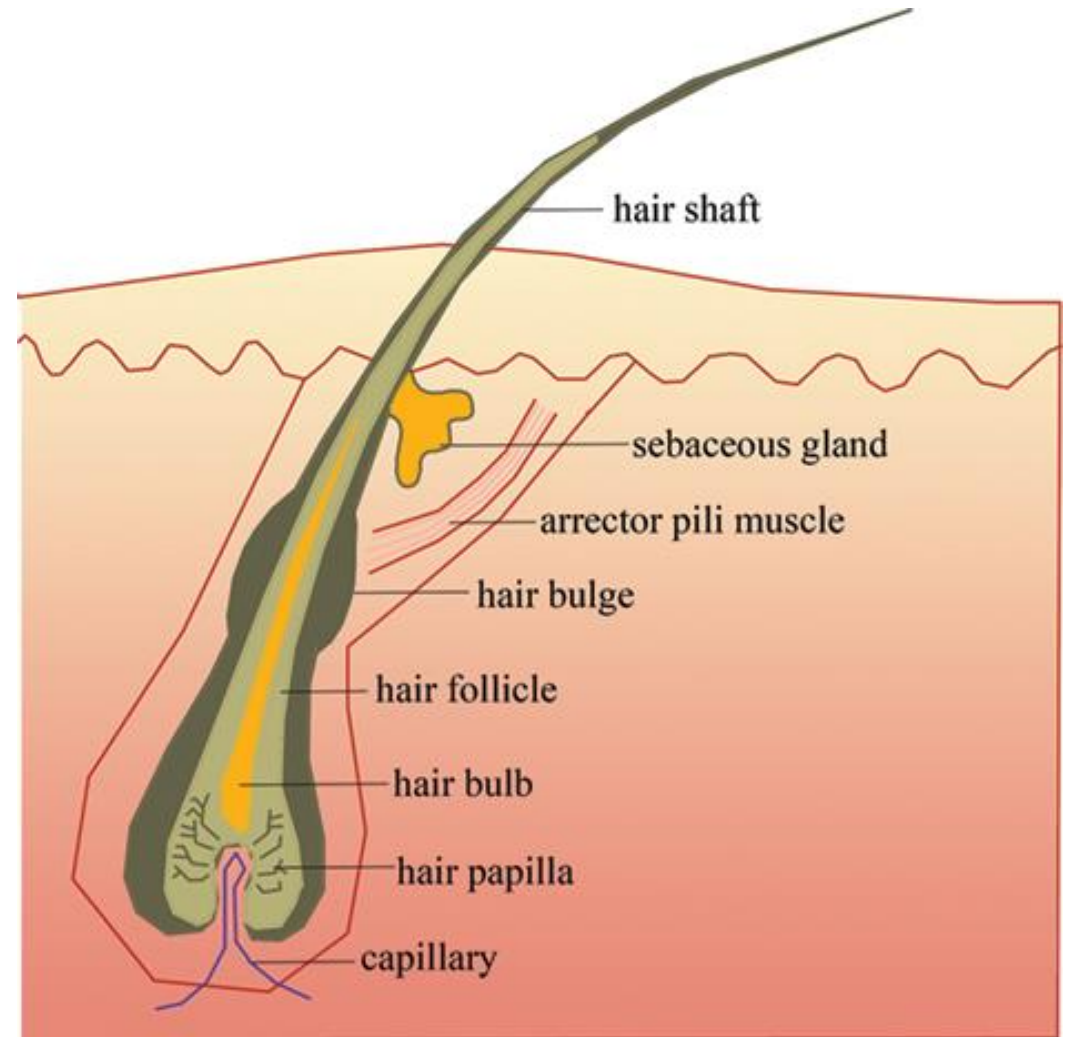
HAIR

ANALYSIS



Hair functions to regulate temperature, reduce friction, protect from light, and produce sensory data.

Hair consists of a hair shaft produced by a follicle embedded in the skin.



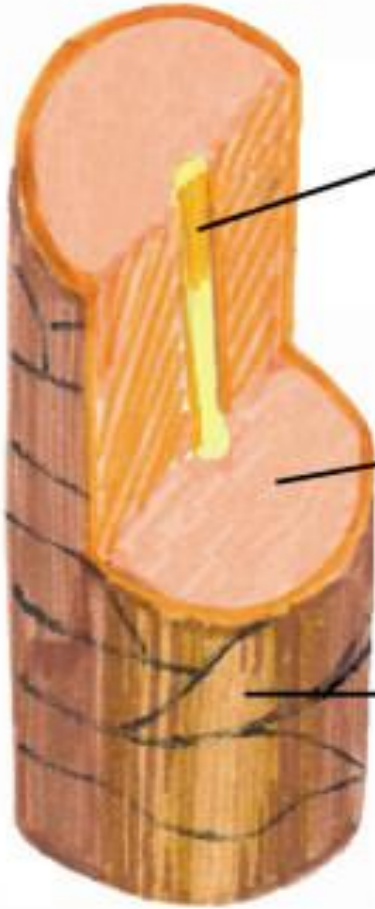
Hair is composed of the protein keratin, which is also the primary component of finger and toe nails.

Hair is produced from a structure called the hair follicle. Humans develop hair follicles during fetal development, and no new follicles are produced after birth.





Hair color is mostly the result of pigments, which are chemical compounds that reflect certain wavelengths of visible light.



Medulla

the inner most layer
may even be absent (especially in fine
or light blonde hair)

Cortex

provides strength, moisture, colour and
texture

Cuticle

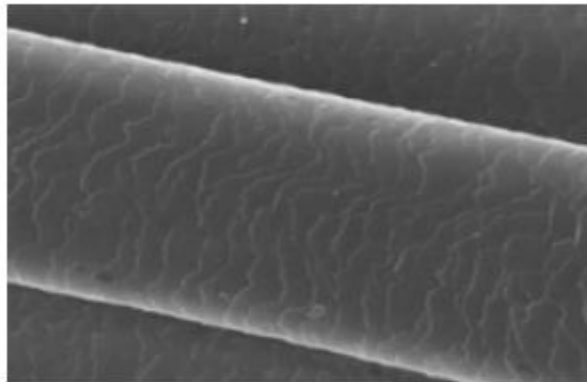
outermost layer protects the cortex
a hard shingle-like layer of overlapping
cells, like scales

THE STRUCTURE OF HAIR HAS BEEN COMPARED TO THAT OF A PENCIL WITH THE MEDULLA BEING THE LEAD, THE CORTEX BEING THE WOOD AND THE CUTICLE BEING THE PAINT ON THE OUTSIDE.

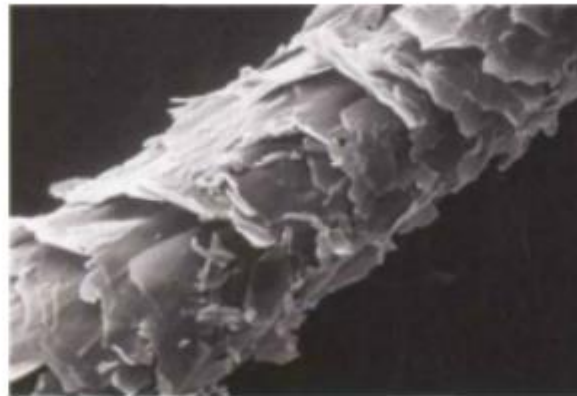
CUTICLE : OUTERMOST LAYER

The cuticle varies in:

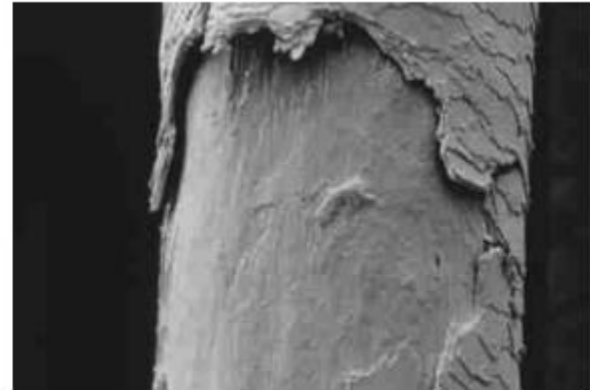
- **Its scales**
- **Its thickness, and**
- **Whether or not it contains pigment.**



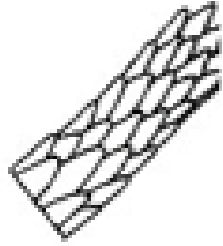
Healthy Cuticle Layer



Raised Cuticle Layer



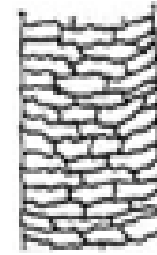
Damaged Cuticle Layer Missing Scales



Spinous



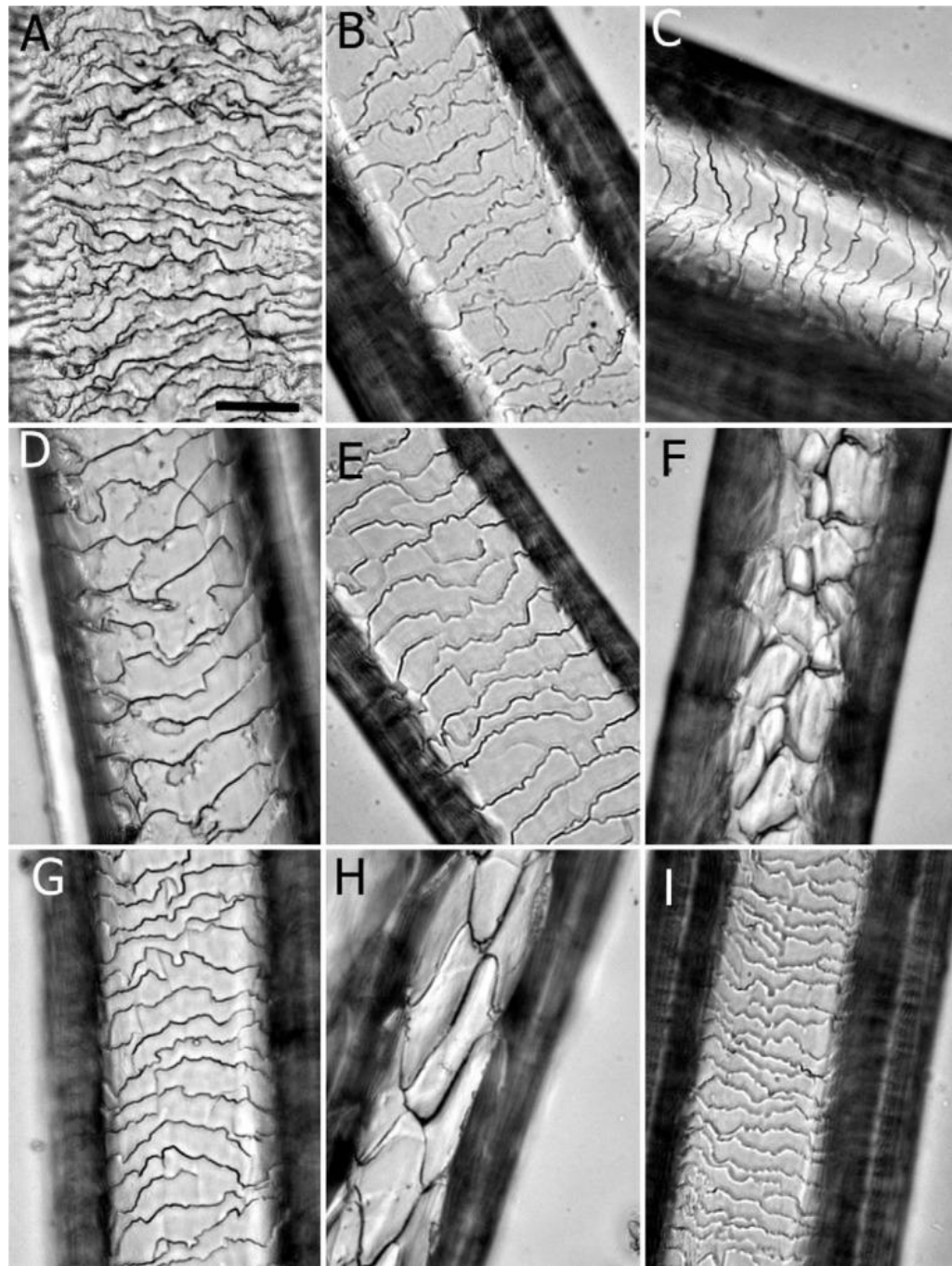
Coronal



Imbricate

Animals: cuticle scales resemble petals (spinous) or a stack of crowns (coronal)

Humans: commonly flattened and narrow (imbricate)



C O R T E X



The cortex varies in:

- Thickness
- Color (pigment)

Distribution of the cortex is perhaps the most important component in determining from which individual a human hair may have come.



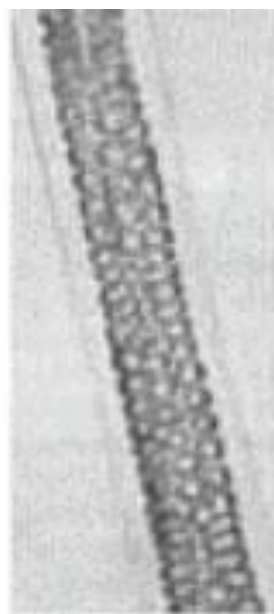
Human



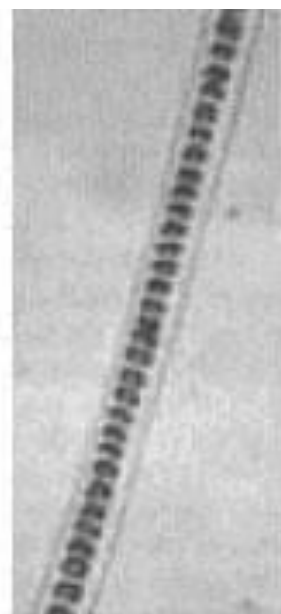
Dog



Deer



Rabbit



Cat








Mouse

MEDULLA

The medulla may vary in:

- **Thickness**
- **Continuity** - one continuous structure or broken into pieces
- **Opacity** - how much light is able to pass through it
- **It may also be absent in some species.**



Medulla Pattern	Description	Diagram
<i>Continuous</i>	One unbroken line of color	
<i>Interrupted (Intermittent)</i>	Pigmented line broken at regular intervals	
<i>Fragmented or Segmented</i>	Pigmented line unevenly spaced	
<i>Solid</i>	Pigmented area filling both the medulla and the cortex	
<i>None</i>	No separate pigmentation in the medulla	



Bleaching disturbs the scales on the cuticle and removes pigment leaves hair brittle and yellowish

Dyeing colors the cuticle and the cortex

Macroscopic investigations indicate
Length, color, curliness

Phase contrast microscopy shows
presence of dye or other treatments

Electron microscopes yield yet more detail

Chemical tests
presence of various substances

Examining a hair shaft
timeline for exposure to toxins

Neutron Activation Analysis (NAA)
concentrations of substances



The hair growth cycle consists of three distinct stages:
anagen, catagen and telogen.





Time to TEST YOUR HAIR!