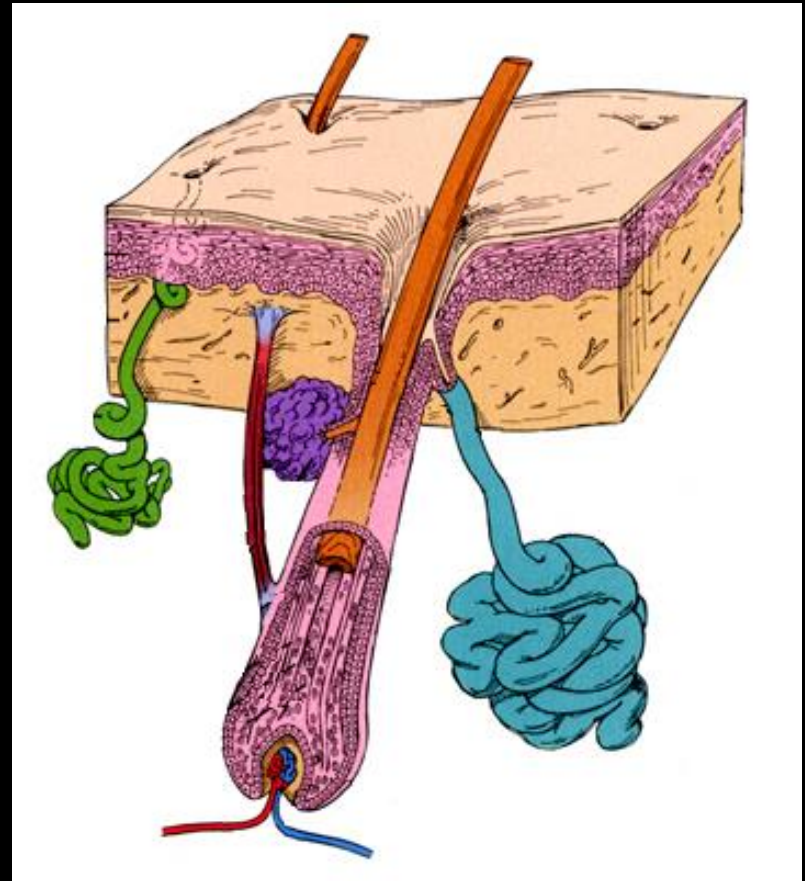


# The Hypodermis

- Aka. Subcutaneous or superficial fascia
- Composed of Adipose
- Not really a part of the integument, but it is important in stabilizing the position of the skin in relation to underlying tissue
- Reduces heat loss, acts as an energy reserve, shock absorber
- Men accumulate – neck, arms, lower back, stomach, and butt
- Women accumulate – breasts, butt, hips, and thighs.

# Integument

- Sweat glands
  - Sudoriferous glands
- Oil glands
  - Sebaceous glands
- Hair
- Nails



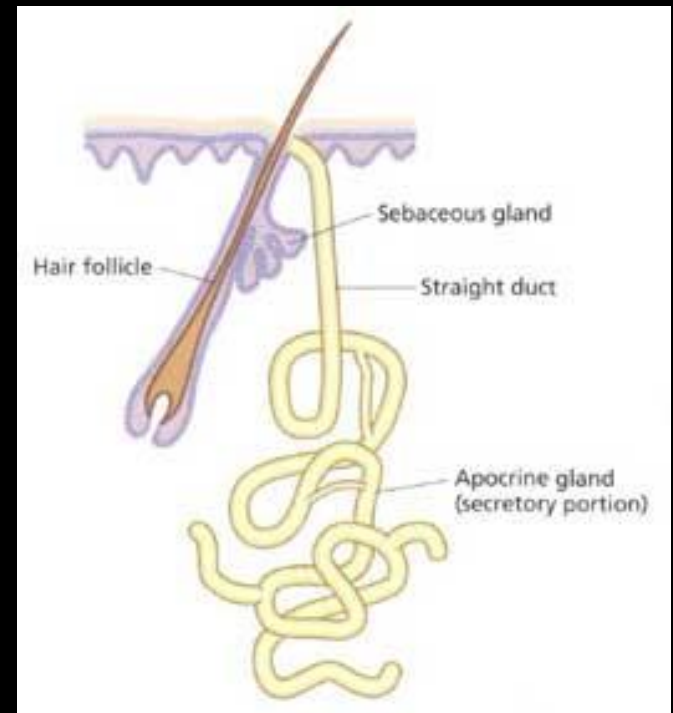
# Sweat Glands - Eccrine

- Meocrine
- Most numerous
  - Palms, soles of feet, forehead...
- Simple coiled tubular gland
  - Secretory part lies in dermis – duct extends to surface – pore (opening) for sweat to go out
- Composition
  - 99% water
  - 1% salt, vitamin C, antibodies, urea, etc.
- Assists in temperature regulation of the body



# Sweat Glands - Apocrine

- Located → axillary and groin regions
- Ducts are larger than eccrine
- Ducts empty into hair follicles
- Is thicker than regular sweat – also contains fat
- Secretion odorless → bacteria decomposes the fat → odor
- Start to function at puberty
- No role in temperature regulation



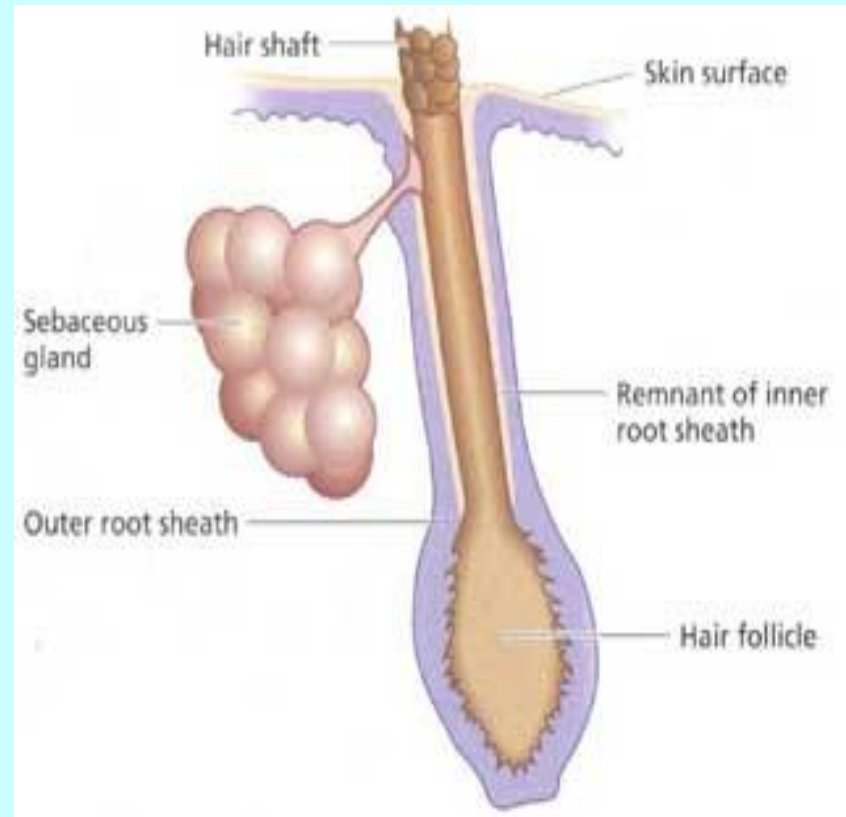
# Sweat Glands - Ceruminous

- Modified sweat gland
- Makes ear wax
- Function
  - Provides a sticky barrier to that impedes the entrance of foreign bodies



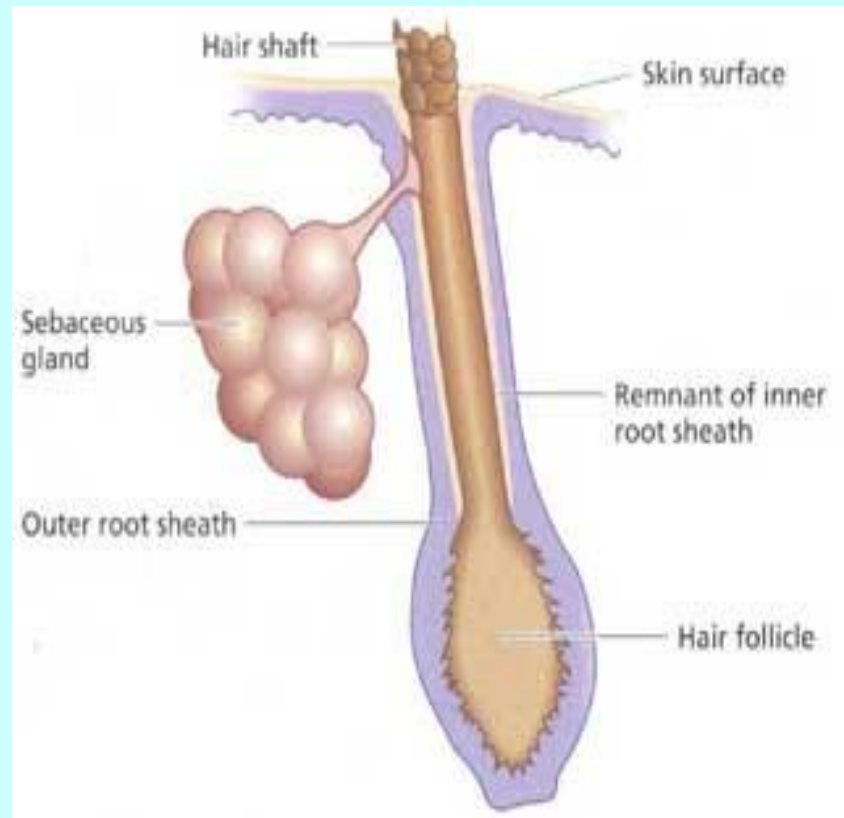
# Sebaceous Glands

- Found everywhere except on palms of hands and soles of feet.
- Holocrine glands that produce globules of a fatty material that accumulate, swelling and bursting the cells → resulting mixture of fatty material and cell parts is called **sebum**



# Sebaceous Glands

- Sebum is secreted into hair follicles and helps to keep the hair and skin soft, pliable, and waterproof.
- Sebum also inhibits the bacterial growth
- Large on face, neck, and upper chest
- Small everywhere else



# Hair

- Seen almost everywhere on the body
  - Not on the soles of the feet, palms of the hands, and sides of fingers and toes
- About 5 million!



# Hair

- Hair helps to keep mammals warm
- Humans sparse hair
  - Ability to sense insects on the skin before they bite or sting
  - Scalp → guards head against physical trauma, heat loss, sunlight
  - Eyebrows & Eyelashes → shield eyes
  - Nose hairs → filter large particles

# Hair

- Flexible strands produced by hair follicles and consist largely of dead, keratinized cells
- Made up of hard keratin
  - Tougher and more durable
  - Individual cells don't flake

# Hair - Types

- **Vellus**

- “peach fuzz”
- “immature hair”
- Located over much of the body



- **Terminal**

- Heavy, more deeply pigmented, sometimes curly
- Located on head, eyebrows, and eyelashes

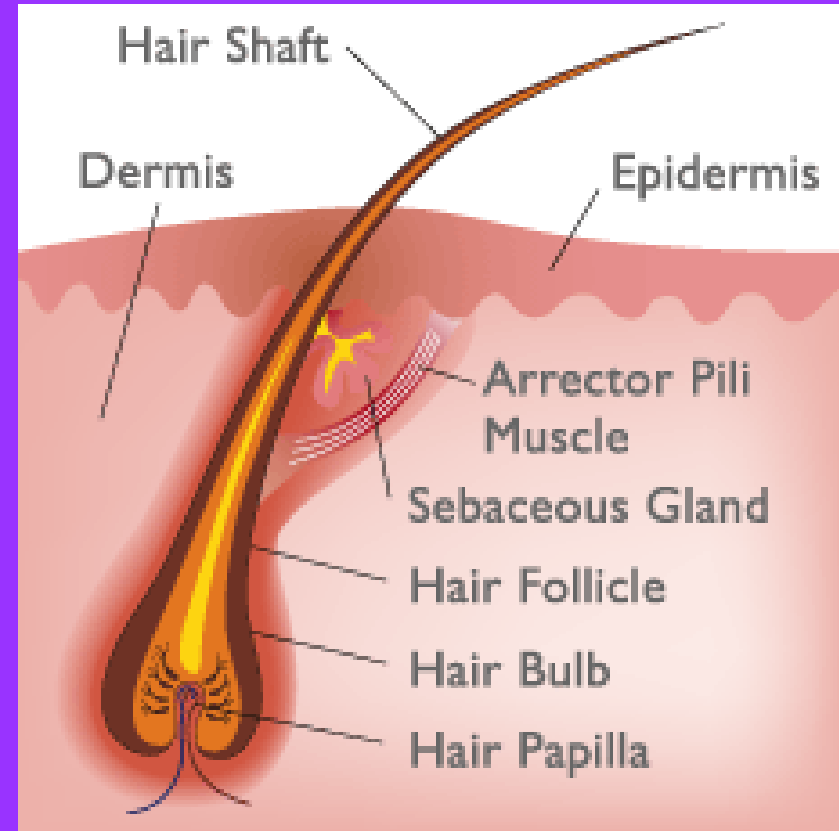


# Major Hair Regions

- Shaft
  - Projects from the skin
- Root
  - Embedded in the skin
  - Penetrates into the dermis and sometimes hypodermis

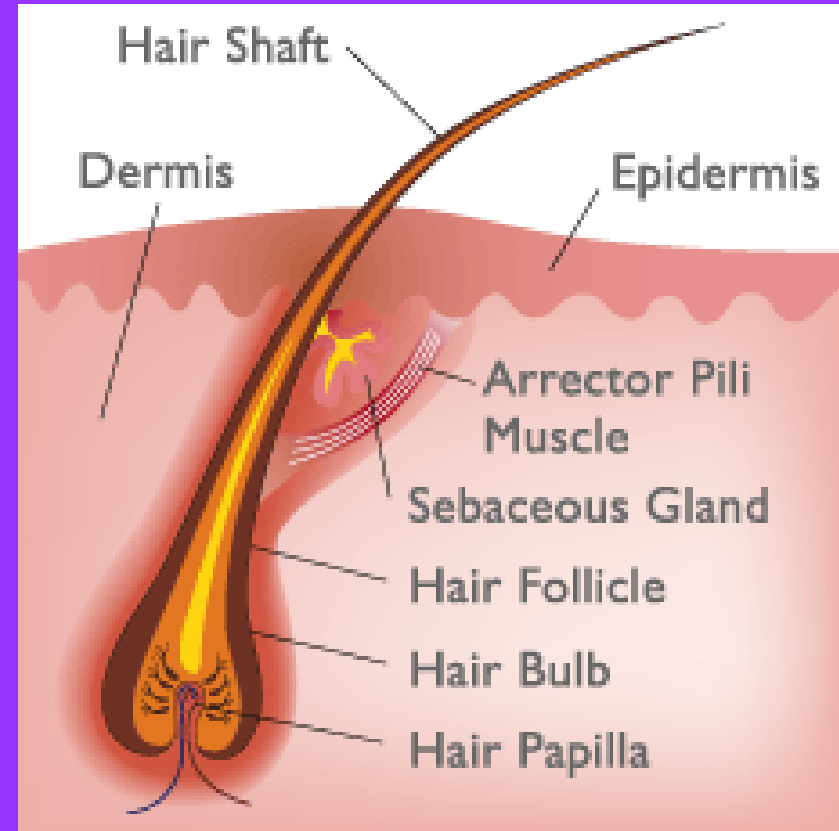
# Hair Root

- Hair follicle
  - Surrounds the root
  - Made up:
    - External root sheath  
→ downward projection of the epidermis
    - Internal root sheath  
→ produced by the matrix



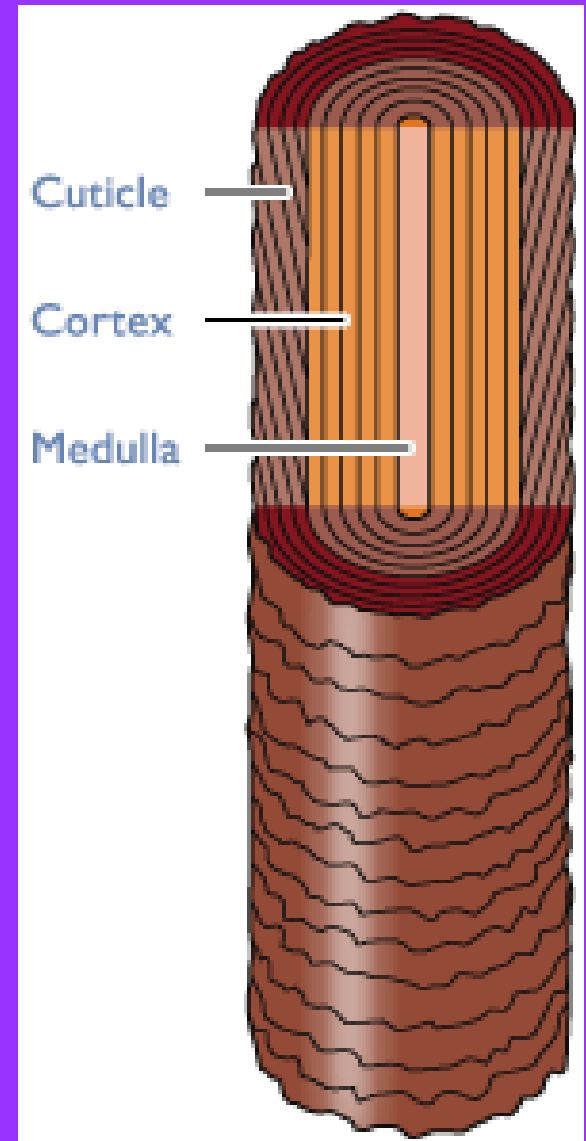
# Hair Follicle

- **Hair bulb**
  - Base of each hair follicle
  - Has a indentation – hair papilla
- **Hair papilla**
  - Peg of connective tissue containing nerves and capillaries that nourish the growing hair follicle
- **Hair matrix**
  - Another part of the hair bulb
  - The site of cell division → hair growth



# Hair Parts

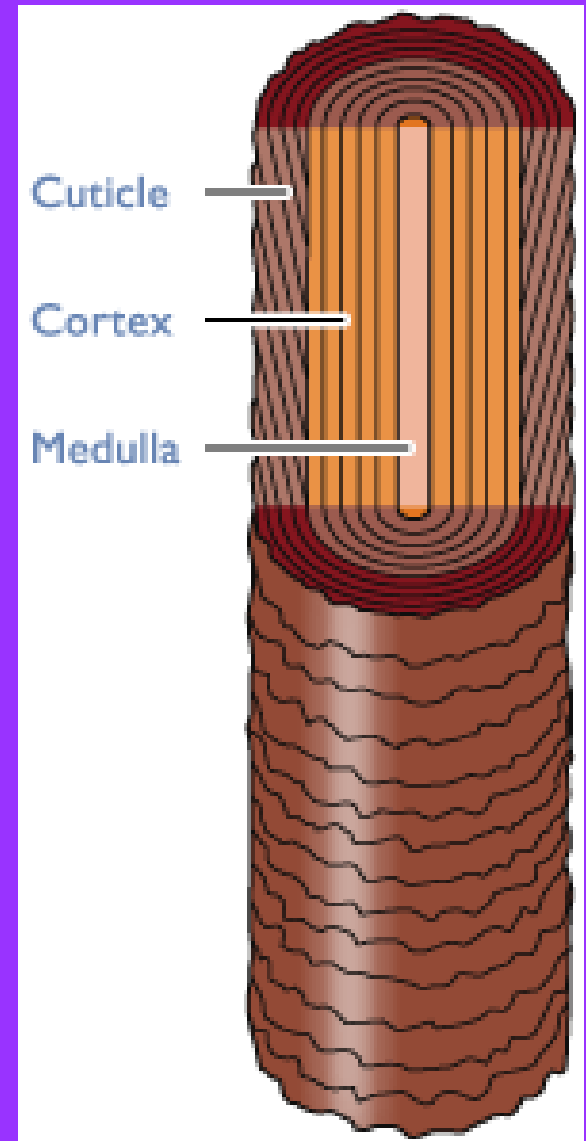
- Medulla
  - Center core
  - Consists of 2 or 3 rows of large irregularly shaped cells containing pigment granules and air spaces
  - Contains flexible soft keratin → gives hair its' elasticity
  - Fine hair has no medulla



# Hair Parts

- **Cortex**

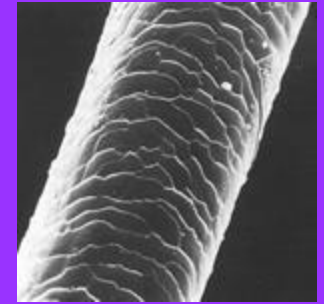
- Bulky layer surrounding the medulla.
- Consists of several layers of flattened cells
- Makes up 75-80% of the protein structure
- Contains hard keratin → contributes to stiffness
- Contains pigment granules in dark hair but mostly air in gray or white hair



# Hair Parts

- **Cuticle**

- Single layer of overlapping, protective, scale-like cells (shingles on a roof) pointing away from the scalp.
- Helps to keep neighboring hairs apart so hair does not mat
- Hair conditioners smooth out the rough surface to make our hair look shiny.
- Most keratinized
  - Provides strength
  - Keeps inner layers tightly compacted
- Split ends
  - Cuticle worn away, inner



# Hair Color



- Hair pigment is made by melanocytes at the base of the hair follicle → color then transferred into the cells of the cortex

# Hair Color

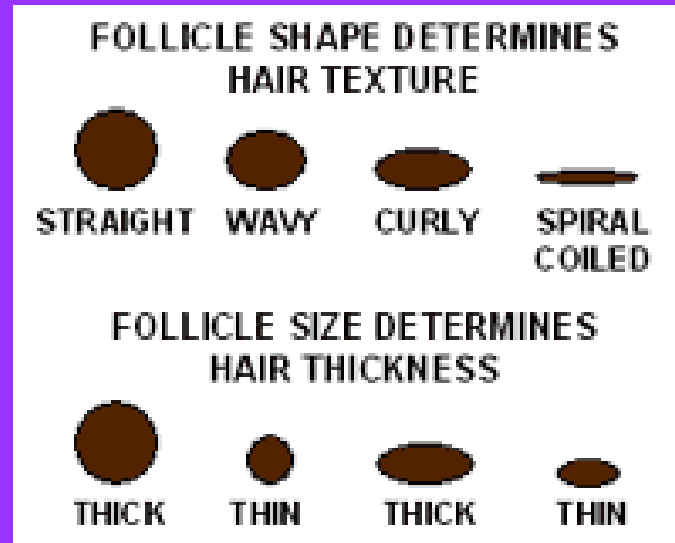


- Various proportions of melanins of different colors (yellow, rust, brown, black) combine to produce hair color from blonde to pitch black
- Melanin levels may vary causing hair color to change
- Gray hair
  - Pigment production decreases
  - Melanin replaced by air bubbles in hair shaft



# Hair Shape

- Curly hair strands look like a ribbon (flat)
- Straight hair strands look round
- Wavy hair strands are a combination of flat and round



# Hair - Muscle

- Arrector pili
  - “raiser of hair”
  - Smooth muscle
    - Pulls hair follicle upright
    - Goosebumps

