

MSS

Skin histology - part 2:

Dermis:

- The dermis lies immediately beneath the epidermis and is much thicker.
- It is responsible for the elasticity and strength of skin.
- Contains blood vessels and nerve supply: It supplies the epidermis with nutrients, and plays an important role in thermoregulation
- Is derived from mesoderm
- **The dermis can be divided into two sub-layers:**
 - Papillary layer of dermis: Loose connective tissue
 - Reticular layer of dermis:
 - Dense irregular connective tissue
 - Is important in giving the skin its overall strength (collagen I) and elasticity (elastic fibers)
- The blood vessels form two major plexuses:
 - Subpapillary plexus
 - Subdermal plexus

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graph TD; A[Subpapillary plexus] --> B[Thermoregulation]; C[Subdermal plexus] --> B;
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- Hemorrhage from the cutaneous blood vessels is called **ecchymosis** (bruise). *go to slide 38 to see it.

◦ The **acid mantle** is a very fine, slightly acidic film on the surface of human skin:

- Is made up of natural oils, sweat, and dead skin cells, and is slightly more acidic in nature to prevent harmful (naturally alkaline) contaminants from penetrating and damaging the skin.
- The **acid mantle** adds protection from bacteria, environmental pollutants, and moisture loss.

Sensory receptors:

◦ Unencapsulated nerve receptors:

- Merkel disc :
 - for light touch and sensing an object texture
 - expanded nerve endings associated with merkel cell
- Free nerve endings:
 - In papillary dermis
 - Temperature, pain, itching, tactile sensation
- Root hair plexuses:
 - Surround the bases of hair follicles in reticular dermis
 - Detect movements of hair

◦ Encapsulated nerve receptors:

- Meissner corpuscles:
 - Encapsulated
 - In the dermal papilla

- Light touch
- Are numerous in fingertips, palms and soles
- Decline in number with aging
- Pacinian corpuscles:
 - Encapsulated
 - Found deep in reticular dermis and hypodermis
 - Coarse touch, pressure (sustained touch) and vibrations
- Ruffini corpuscles:
 - Encapsulated
 - Stretch (tension) and twisting (torque)

Skin Appendages:

1. Hair Follicles and hair
2. Sweat glands
3. Sebaceous glands
4. Nails

◦ **Hairs** are elongated keratinized structures that form within epidermal invaginations (hair follicles)

◦ Types of hair:

- 1- Lanugo: fetal hair
- 2- Down hair: light colored hair of child
- 3- Terminal (adult) hair: thicker, darker hair that begins to grow at puberty

○ Hair shaft:

- The part of a hair extending beyond the skin surface (visible part)

○ Hair root:

- The part of a hair below the skin surface (embedded part)

○ Hair follicle:

- is a tube of stratified squamous epithelium, invaginated into the dermis

○ Inner root sheath:

- Disintegrates at the level of the sebaceous gland

○ Outer root sheath:

- Is continuous with the epidermis
- It does not take part in hair formation
- Surrounded by a glassy basement membrane
- Basement membrane is surrounded by a connective tissue sheath.

○ Hair matrix:

- Contains the proliferating cells that generate the hair and the internal root sheath
 - Located just above the dermal papilla
 - Melanocytes located in the matrix produce hair color.
- The cells in the hair matrix proliferate and move upwards, gradually becoming keratinized to produce the hair.

○ Sebaceous glands

- secrete an oily or waxy matter, called sebum, to lubricate and waterproof the skin and hair
- Secrete by holocrine mode of secretion
- A **comedo** is a clogged hair follicle (pore) in the skin. Keratin combines with oil to block the follicle
- *go back to slide 49 to see the comedo.
- **Arrector pili muscles** are small muscles extend from hair follicles to the dermal papilla
 - Contraction of these muscles causes the hairs to stand on end (goose bumps)
 - Innervated by the autonomic nervous system (sympathetic)
 - Pulls hairs upright when cold or frightened
 - Depilatory

Structure of the hair shaft:

1. **Medulla:** large vacuolated and moderately keratinized cells.
 2. **Cortex:** heavily keratinized and densely packed cells.
 3. **Cuticle:** thin layer heavily keratinized squamous cells covering the cortex.
- Hairs grow discontinuously, with periods of growth followed by periods of rest and this growth does not occur synchronously in all regions of the body or even in the same area

Hair growth cycle:

1. **Anagen:** Active growth phase, (3-6 years).
2. **Catagen:** transition phase, (1-2 weeks)
3. **Telogen:** resting phase (5-6 weeks).

4. Return to Anagen.

Sweat glands:

1- Eccrine sweat gland:

- Merocrine secretion.
- Empty directly onto skin surface.
- Location: most all over body (esp. abundant on palms & soles: $\sim 500/\text{cm}^2$).
- Clear, watery secretion (99% H_2O ; rest NaCl + some waste products).
- The cells are intact.

2- Apocrine sweat gland:

- Empty into hair follicle .
- Location: armpits, groin, nipples .
- Viscous, cloudy secretion \rightarrow good nutrient source for bacteria (odor !!)
- Secretion may contain Pheromones
- Secretion begins at puberty and is stimulated during emotional distress.
- Scent glands.
- The secretory products released as pinched off apical portion of cell.

* go back to slide 57 to see them.

Nails:

- Hard plates of keratin on the dorsal surface of each distal phalanx. Lack of pigment makes them colorless.

- Nail parts:

- Free edge:

- the part you cut

- Body:

- pink part

- Lunula:

- white semicircle area

- Eponychium:

- proximal nail fold (cuticle)

- Hyponychium:

- under the free edge where dirt accumulates

- Nail bed:

- directly under the pink part

- Nail matrix:

- growth

- *go back to slide 60 & 61 to see them.

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Good luck

