Skin histology

- The skin is considered the largest organ of the body; It has more than one tissue forming it, that's why it's an organ

- Epidermis + dermis= cutaneous membrane
- Hypodermis = subcutaneous tissue, Same as superficial fascia,made up mainly of adipose tissue

Major Skin Functions

- Protection,Mechanical barrier against the entry of organisms,UV
- Sensory Perception
- Temperature Regulation
  - Through sweat glands
  - Through cutaneous blood vessels
- Excretion
- Formation of Vitamin D
  Our skin acts as a gland producing steroid hormone (calciferol, increase absorption of ca++ from small intestine) through skin cells
- forming waterproof layer, preventing water loss and water gain

The skin is composed of

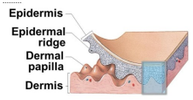
- the outer epidermis
- deeper dermis
  - Rests on the hypodermis (Superficial fascia Subcutanous tissue Subdermal fat)

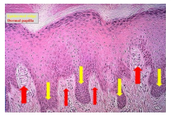
Epidermal-dermal junction

The **dermal papillae** are nipple-like extensions of the dermis into the epidermis

The epidermis conforms to the contours of the underlying dermal papillae forming **epidermal ridges**

- Prevents the two layers of skin from separating
- More prominent in palms and soles
- the basement membrane follows the contour of the interdigitations between epidermis and dermis
friction ridges:-
interdigitations form distinctive patterns unique for each individual (fingerprints and footprints)
For grasping with our hands, And for walking barefoot
- Repeated rubbing of your skin, the two layers will start to pull apart from each other
Which develops blister in which epidermis is pulled from the dermis, which creates bockets filled with fluids

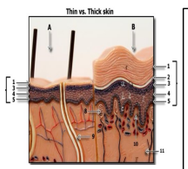




Types of the skin

Thin skin

- **4 layers**
- **less Prominent stratum corneum**
- **Less developed stratum granulosum**
- **Dominant and lines most of the body surface**
- **Thicker dermis**
- **hair and sebaceous glands**



Thick skin

- **5 layers**
- **Prominent stratum corneum**
- **Well developed stratum granulosum**
- **Palms of the hands and soles of the feet**
- **Thinner dermis**
- **No hair and sebaceous glands**

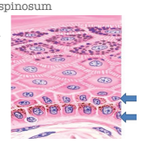
the outer epidermis

- It is rich in a tough protein called keratin
- Is derived from **ectoderm**
- The epidermis forms a waterproof barrier between the body and the external environment, which resists friction and microbial invasion and prevents water loss

Stratum basale

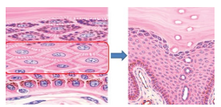
- Consists of a single layer of basophilic **columnar** to **cuboidal cells** that rest on a basement membrane
- cells are attached to one another by desmosomes, and to the underlying basement membrane by hemidesmosomes.
- Cells are characterized by intense mitotic activity

Stratum basale along with the deepest part of stratum spinosum is called **Stratum germinativum**



Stratum spinosum

- Consists of 8-10 rows of polyhedral cells
- Cells synthesize **keratin filaments** that become assembled into tonofilaments
- During histologic preparation, cells shrink and intercellular spaces appear as spines
- Spines represent sites of desmosome attachments to keratin tonofibrils(Intermediate filaments of desmosomes are called **keratin**)

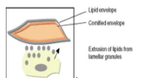


Stratum granulosum

-Consists of 3-5 cell layers of **flattened cells**
- cells are filled with:-

Keratohyalin granules
-intensely basophilic
- non-membranous bound masses of filaggrin cross-links with keratin tonofibrils

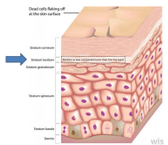
Lamellar granules
- discharge lipid material between cells and waterproof the skin



Lipids which are stored in cells won't remain inside cells, they will be released
Not like **keratin** , which remain inside cells(as we will end up with dead cells with no organelles filled with keratin)

Stratum Lucidum

- In thick skin only
- Is translucent and barely visible
- The tightly packed cells (desmosomes) lack nuclei or organelles and are dead



Stratum corneum

- Consists of dead, flattened cells with no nuclei and cell organelles
- The dead cells contain much keratin filaments with plasma membranes surrounded by lipid-rich layer
- the hydrolytic enzymes disrupt the nucleus and all cytoplasmic organelles, which disappear as the cells fill with keratin
- The cells from this layer are continually **shed**, or **desquamated**

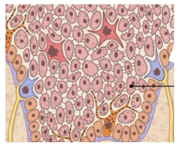
Continuous pressure on the skin will cause the stratum corneum to grow thicker as we see in **Calluses** of the hand and **corns** of the foot

Psoriasis is a common skin condition that speeds up the life cycle of skin cells. It causes cells to build up rapidly on the surface of the skin. The extra skin cells form scales and red patches that are itchy and sometimes painful

Types of the epidermal cells

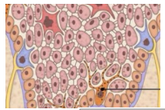
keratinocytes

- Approximately 90% of epidermal cells.
- Produce keratin
- Produce lamellar granules
- shed continuously and generate every 2-4 weeks



Melanocytes

- Are derived from the **neural crest cells.**
- Have protrusions that transfer melanin granules to the keratinocytes
- Are located in the stratum basale
- Synthesize the dark brown pigment melanin
- Melanin protects the skin from the damaging effects of ultraviolet radiation(SPF)

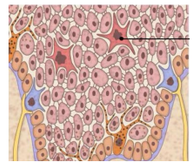


1 melanocyte for every 10 basal keratinocytes

Albinism

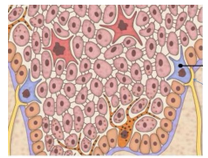
Langerhans cells

- Originate from bone marrow (monocytes)
- Mainly in the stratum spinosum
- Langerhans cells recognize, phagocytose, and process foreign antigens(**immune cells**)
- Represent 2-8% of epidermal Cells



Merkel cells

- Are found in the stratum basale
- Are most abundant in the fingertips
- Are closely associated with afferent (sensory) unmyelinated Axons
- Function as light touch receptors (mechanoreceptors



The 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**

Papillary layer of dermis (Loose connective tissue)

Reticular layer of dermis (Dense irregular connective tissue)

Is important in giving the skin it overall strength (collagen 1) and elasticity (elastic fibers)

The blood vessels form two major plexuses:-

For Thermoregulation

- **Subpapillary plexus**
- **Subdermal plexus**

Hemorrhage from the cutaneous blood vessels is called ecchymosis (bruise)

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