# Integumentary System

Chapter 5

## Integumentary System

Integumentary system is formed of
**Cutaneous Membrane or Skin**
Epidermis – 1. Stratum basale 2 stratum spinosum 3. Stratum granulosum 4. Stratum lucidum (thick skin of hands and feet) 5. Stratum corneum
Dermis – Papillary layer and Reticular layer
Accessory Structures – hair & nails
**Sub-cutaneous layer = Hypodermis** – mostly adipose Tissue and some areolar tissue.
In some places hypodermis is replaced by superficial fascia

## Epidermis

**Epidermis** is stratified squamous epithelium formed of 4 or 5 layers
Stratum Basale or Germinativum – deep most layer of epidermis formed of stem cells that continuously divide to replace superficial layers of epidermis.
Stratum Spinosum – spiny layer, next to basal layer, may continue to divide.
Stratum Granulosum – grainy layer, produce keratin protein in large quantity
Stratum Lucidum – glassy layer, present only in thick skin of palms and soles.
Stratum Corneum – most superficial layer of epidermis has 15-30 layers of flattened dead cells.
Epidermis is completely replaced in about 6 weeks.

## Dermis

Dermis has outer Papillary layer and inner Reticular layer.
Papillary layer is loose connective tissue and has projections, Dermal Papillae interlocked with Epidermal Ridges. It has blood vessels, lymphatic vessels and nerve supply in it. Dermal papillae and epidermal ridges form grooves on palms (finger prints) and soles to increase grip.
Reticular Layer has rich mix of collagen and reticular fibers and form Dense Connective Tissue. This layer resists stretching of skin.

## Skin Color

Skin Color is due to blood supply and 2 pigments.
Melanin synthesized by spidery cells = melanocytes – gives dark brown to black color to skin.
Melanin protects the stem cells from effect of harmful UV Radiations. Overexposure to UV Radiations causes skin cancer.
Carotene – absorbed with food, gives orange-yellow color to skin.

## Skin Cancers

Skin Cancers include basal cell Carcinoma and Melanoma. Melanoma develops from a melanocytes cell and develops as a black patch in skin. Basal cell carcinoma develops from a basal cell in stratum Germinativum.

## Sensory Receptors

Papillary Layer – (Loose CT) superficial layer of dermis has
Touch – Tactile or Meissner's corpuscles

Pain – free nerve endings
Reticular layer – (Dense irregular CT) of dermis has
Deep Pressure – Lamellated or Pacinian Corpuscles

## Accessory Structures

Accessory Structures include hair, nails and glands.
**Hairs** grow in hair follicles formed of lower layers of epidermis but lying in dermis. Part of hair in follicle is Root and part of hair exposed out of skin is Shaft. Hairs grow only at base inside hair follicle. All hair is formed of dead cells with abundant Keratin protein. Hair follicles remain active or inactive in a cyclic manner of 2-5 years.

## Skin Glands

Glands are of 2 kinds – Sebaceous and Sweat.
Sebaceous Glands
Sebaceous Glands secrete an oily lipid = Sebum. Most sebaceous glands open into hair follicles but some open directly to outside – Sebaceous follicles. Sebaceous Glands are Holocrine glands. Sebum lubricates the hair and skin and protects it against growth of bacteria.

## Sweat Glands

Are unbranched tubular coiled glands
Apocrine Sweat Glands release sticky and cloudy secretion into hair follicles in armpits, groin and around nipples; bacteria develop odor from it.
Merocrine = Eccrine Sweat Glands discharge watery sweat on skin surface of body.
Sweat = Perspiration; Antiperspiration = ?
Odors play major role in reproductive behavior in animals but humans use artificial perfumes and deodorants.

## Nails

Nails are formed of protein keratin. Nail Body covers a nail bed with rich blood and nerve supply. At the base of nail cuticle or eponychium is present.

## Recap-1 Chap-5

Skin is formed of ----------, ----------, and accessory structures.
---------- and --------- are the accessory structures in skin.
------sweat glands open into hair follicles and get active at puberty
------sweat glands open on general skin surface and active since----
-------- tissue forms epidermis of skin.
Dermal papillae may have --------corpuscles and -----nerve endings.
----------corpuscles lie deep in dermis and are responsible for deep pressure.
Papillary layer of dermis is formed of --------C.T. and Reticular layer is formed of --------- connective tissue
---- layer mostly formed of adipose tissue or tough layer of ------ ----- is present below dermis.
Stratum ------- is present only in thick skin of hands and feet.

## Main Functions of Skin

Protection of deeper organs or tissues
Temperature Maintenance
Synthesis and Storage of nutrients – including Vitamin $D_3$
Sensory reception – touch, pressure, temperature
Excretion and secretion of salts, water and organic wastes