Histological lab.

First lab.

Skin

There are three main layers of the skin :

- Epidermis :outer keratinizing stratified squamous epithelium and cells produced by mitosis in the germinal basal layer the outer keratinised layer is shed continuously and is replaced by the progressive movement and maturation of cells from germinal layer thus all of the cells of this lineage are called keratinocyte .the process of maturation of a basal cell through of desquamation takes from 15-30 days. Epidermis consist from four layers from the bottom to top :

  1-stratum basale : basal layer is germinal layer of the epidermis .mitotic activity in this layer provide a constant supply of new keratinocytes to replace those lost .The cells of this are cuboidal or low columnar and form a single layer separated from the dermis by a basement membrane . desmosome bind these contact points .

  2-stratum spinosum : spinosal layer or prickle cell layer is relatively and polyhedral in shape and have numerous cytoplasmic prickles bound by desmosome to adjacent cells .there is intracellular fibrils known as tonofibrils which converge upon the desmosomes of the cytoplasmic prickles it become more prominent towards the stratum granulosum and are also found in small numbers in the cells of the stratum basale

  3- stratum granulosum : granular layer is characterized by intracellular granules which contribute to the process of keratinization .. the cells of this layer are this granule are numerous ,dense basophilic granules . the chemical nature of these kertohyaline granule is distinct from that of the fibrous protein of the tonofibrils .

  4-stratum corneum : dead cell or dying cell of the surface layer are flattened ,devoid of nuclei and other organelles and filled with mature

keratin . towards the surface the desmosome and internal structure of the cells becomes completely disrupted .

There are other cells found in epidermis : melanocytes ,merkel cells ,Langerhans cell.

Melanocytes : are responsible for synthesis and release the brown pigment melanin which is responsible f+or the coloration of the skin . they are located in the basal layer of epidermis and appear cells with pale staining cytoplasm scattered between the low columnar basal cells .from the body of the cell there are numerous long cytoplasmic process which run in the spaces between the keratinocyte of the stratum spinosum .

Merkle cell : are specialized touch receptors scattered very sparsely among the cells of the basal layer .they are difficult to distinguish by light microscope from melanocyte .they contain round neuroendocrine vesicles at their base and have a synaptic junction with fine nerve ending in the papillary dermis .

Langerhans cell : are antigen presenting cells and are important component of immune defense mechanism .

- Dermis :dermal layer provide a flexible but robust base for epidermis and contain a generous vascular supply the metabolic support of the vascular epidermis and thermoregulation .Dermis consist from two layers :

  1-papillary dermis : superficial layer and it loose and contain very interlacing collagen fibers and contain venules ,arteriole and capillary loops as well as lymphatic and fine nerve twigs from the sensory nerve ending (meissners corpuscles).

  2-reticular dermis :consist of coarse irregularly situated bundles of collagen within which are the blood vessels that join the pluxes of vessels in the papillary dermis with the larger deeper vessels at the junction between dermis and subcutis .

  Elastin is an important constituent of both layers of the dermis . in the reticular layer the elastic fibers are long and thick and follow the course of the collagen bundles . in papillary dermis the elastic fibers are very fine ,scanty . the cellular component of the dermis is mainly fibroblast which

are responsible for the production of collagen and elastin but lymphocytes ,mast cell and tissue macrophages involved in non-specific defense are also present .

Skin appendages :

- **Hair follicle** :

  Hair follicles are tubular invaginations of the epidermis, that develop as downgrowths of the epidermis into the dermis. Hair is made up of columns of dead keratinised cells.The hair has three layers:

  A central medulla, or core (not seen in fine hairs), surrounded by a keratinised cortex, and the outer third layer, which is highly keratinised and forms the thin hard cuticle on the outside of the hair. These keratinised layers are made by proliferating cells in the hair matrix at the base of the hair follicle.Surrounding the hair, towards the base of the hair follicle is the internal root sheath, which consists of keratinised cells from the hair matrix. The type of keratin here is softer than that of the hair, and is the same as that found on the surface of the skin.This layer of cells disintegrates where the ducts of the sebaceous gland enters the hair. Surrounding the internal root sheath is the external root sheath. This is a tubular invagination of the epidermis which doesn't take part in hair formation. Finally, it is separated from the surrounding connective tissue by a glassy basement membrane.At the base of the hair follicle/hair bulb, there is a dermal papilla, which contains the blood supply for the hair. The hair matrix, which contains the proliferating cells that generate the hair and the internal root sheath, is just above the dermal papilla, and separated from it by a basement membrane. Like the basal layer of the epidermis, the cells in the hair matrix proliferate and move upwards, gradually becoming keratinised to produce the hair.The ducts of the sebaceous glands discharge sebum onto the hairThe arrector pili muscle is a small bundle of smooth muscle cells associated with the hair follicle. Contractions of this muscle elevate the hair, forming goose bumps, to release heat and help sebum to be released from gland into duct

Sebaceous gland : it found at a point about one –third of its length from the surface each hair follicle is surrounded by one or more sebaceous glands which discharge their secretion onto the hair shaft then the skin surface. The gland lie within the sheath surrounding the hair follicle and the glandular epithelium represents an outgrowth of the external root sheath. Sebaceous gland has a branched acinar form ,the acini converges upon a short duct which empties into the hair follicle beside the maturing hair .Each acinus consists of mass of rounded cells which are packed with lipid –filled vacuoles ; during tissue preparation the lipid removed leaving the cytoplasm of these cells poorly stained .

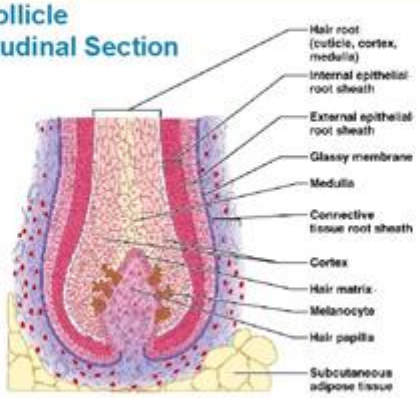
Merocrine (eccrine)sweat gland : distributed in the skin of most parts of the body with exception of areas such as the margins of lip and the glans penis .it secrete a watery fluid ,hypotonic with respect to plasma, the evaporation of which plays an important role in thermoregulation . it unbranched tubular glands ,the secretory portion forming a compact coil in the more superficial part of the fatty hypodermis . the gland appear as a mass of tubules cut in various planes ;secretory portion are interspread with section of the first part of the excretory duct . the secretory portion consist of a single layer of large cuboidal or columnar cells ,whereas the excretory duct is lined by two layers of smaller cuboidal cells .

The secretory portion of sweat gland is pyramidal cells which rest on a prominent basement membrane . these cells are believed to pump sodium ions into the gland lumen . A second less numerous darkly stained cell type , which is difficult to identify with light microscope ,has ultrastructure features typical of protein secreting cells . the dark cell are believed to secrete a glycoprotein . Myoepithelial cells form a discontinuous layer between the secretory cells and basement membrane ,contraction of these cells expels sweat into the excretory ducts . the excretory ducts has narrower lumen ,double layer , no underlying myoepithelial

Apocrine sweat gland : are confined to the areolae of the breast ,axillae and genital regions where they produce a viscid ,milky secretion which becomes malodorous after the action of skin commensal bacteria .

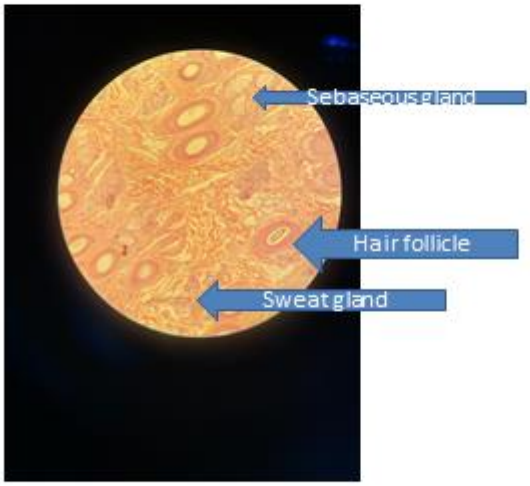
Apocrine sweat gland are large gland which always secrete into an adjacent hair follicle via a duct which is histologically similar to that to merocrine sweat gland . the secretory portion of the gland is of the coiled ,tubular type with widely dilated lumen and the cell are low cuboidal . the budding appearance of the apical cytoplasm of some cells gave rise to the belief that the mode of secretion was of the apocrine type ,but the recent evidence suggest that this appearance may be due to a fixation artefact and that the original interpretation were erroneous . like merocrine this gland have a discontinuous layer of myoepithelial cells .

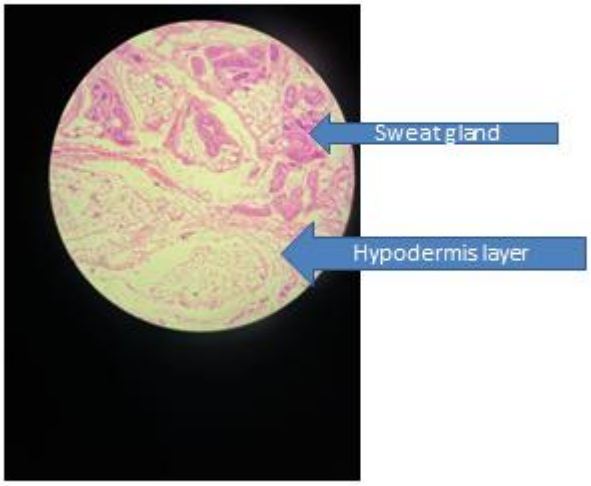
Hair Follicle
Longitudinal Section

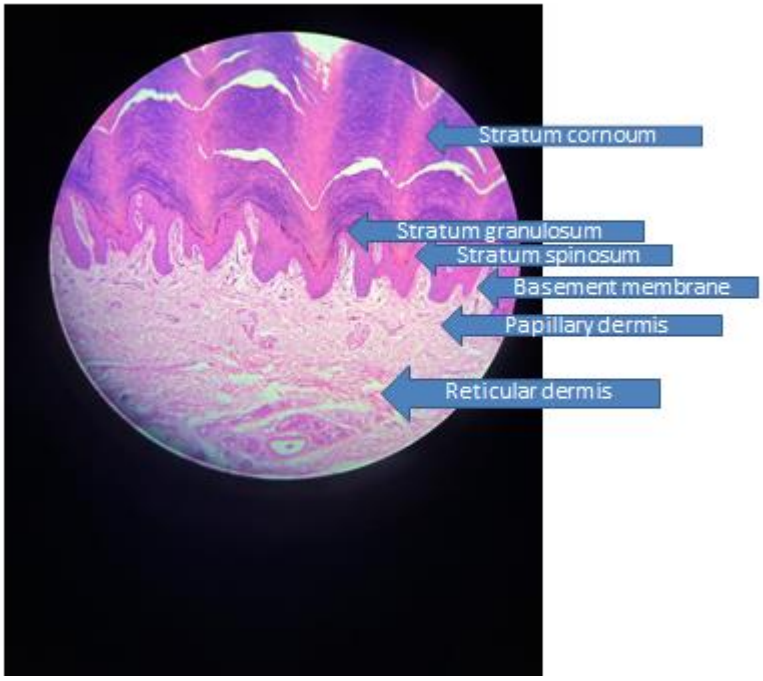


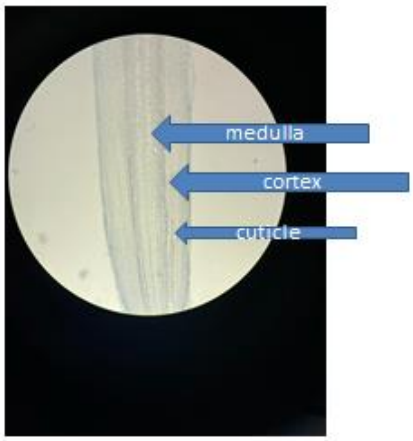
(c)

Figure 5.5c




Sweat gland
Hypodermis layer


Stratum cornoum
Stratum granulosum
Stratum spinosum
Basement membrane
Papillary dermis
Reticular dermis


medulla
cortex
cuticle