

Al- Mustaqbal College University

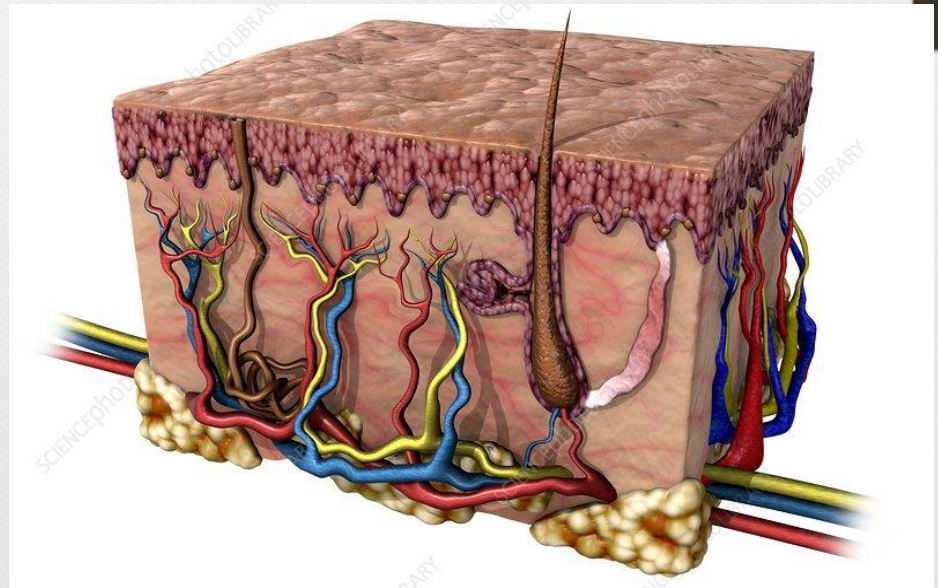
Department Of Medical Instrumentation

Techniques Engineering

Anatomy and Physiology

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Integumentary system



Introduction

- The Integumentary System is one of the system of the body which act as integument (The covering) to the body.
- So, covering will act as protective barrier between body and environment .

Division of Integumentary System

- This system consists of following parts

1. Skin
2. Hairs
3. Nails
4. Exocrine glands

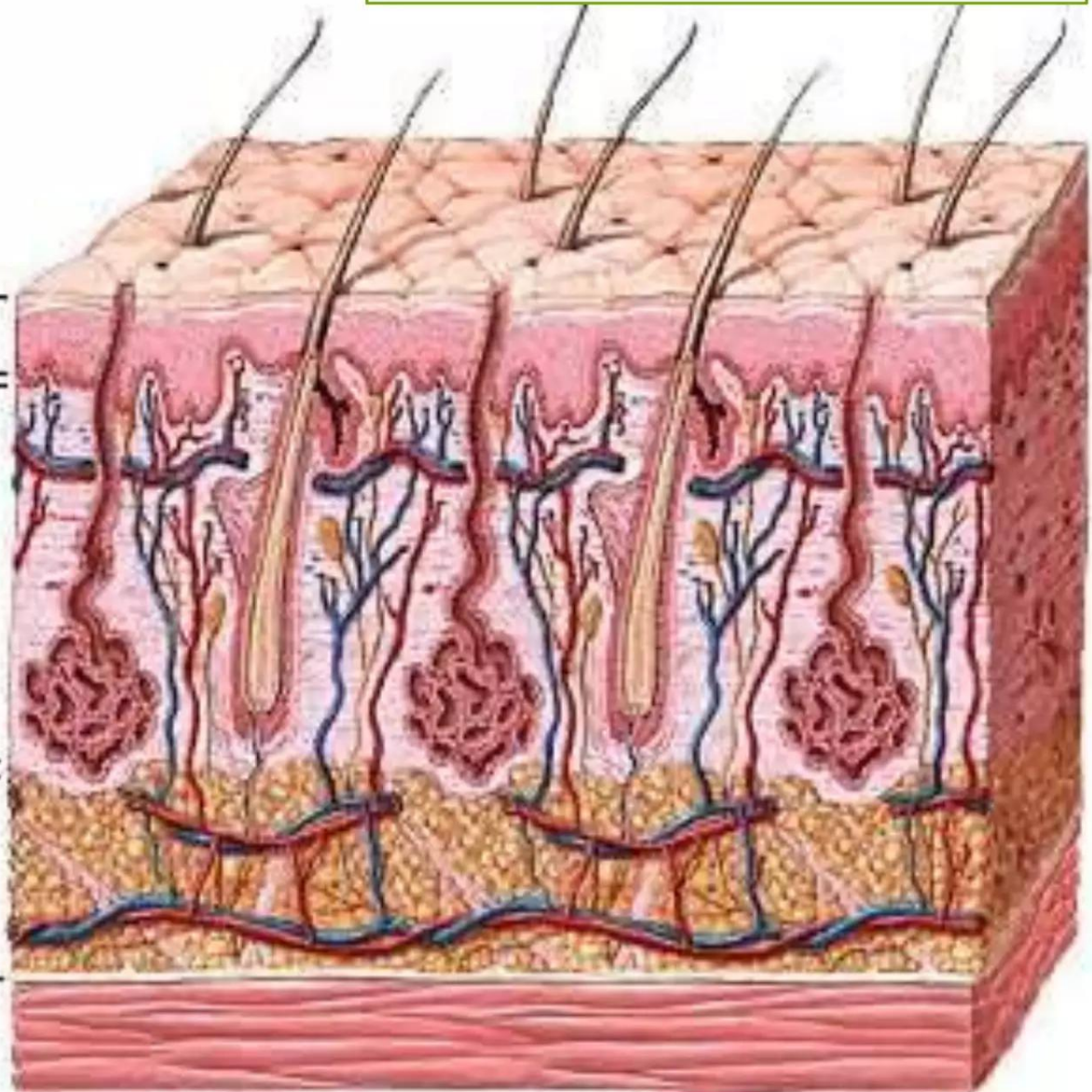
1.Skin

- Skin is most important part of integumentary System.
- It consists of 3 Layers
 1. Epidermis
 2. Dermis
 3. Hypodermis

Epidermis

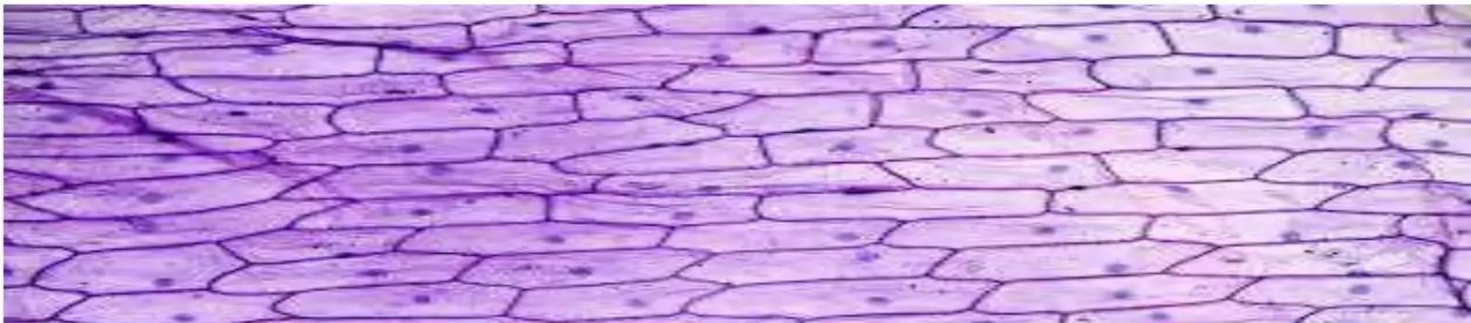
Dermis

Hipodermis



1. Epidermis

- Epidermis is the outer most layer of the skin.
- Layer of the skin which we can touch and feel.
- Totally consists of dead keratinocytes.
- Epidermis= keratin layer



The Layers of Epidermis

Layers of Epidermis are known as strata of Epidermis and are following:

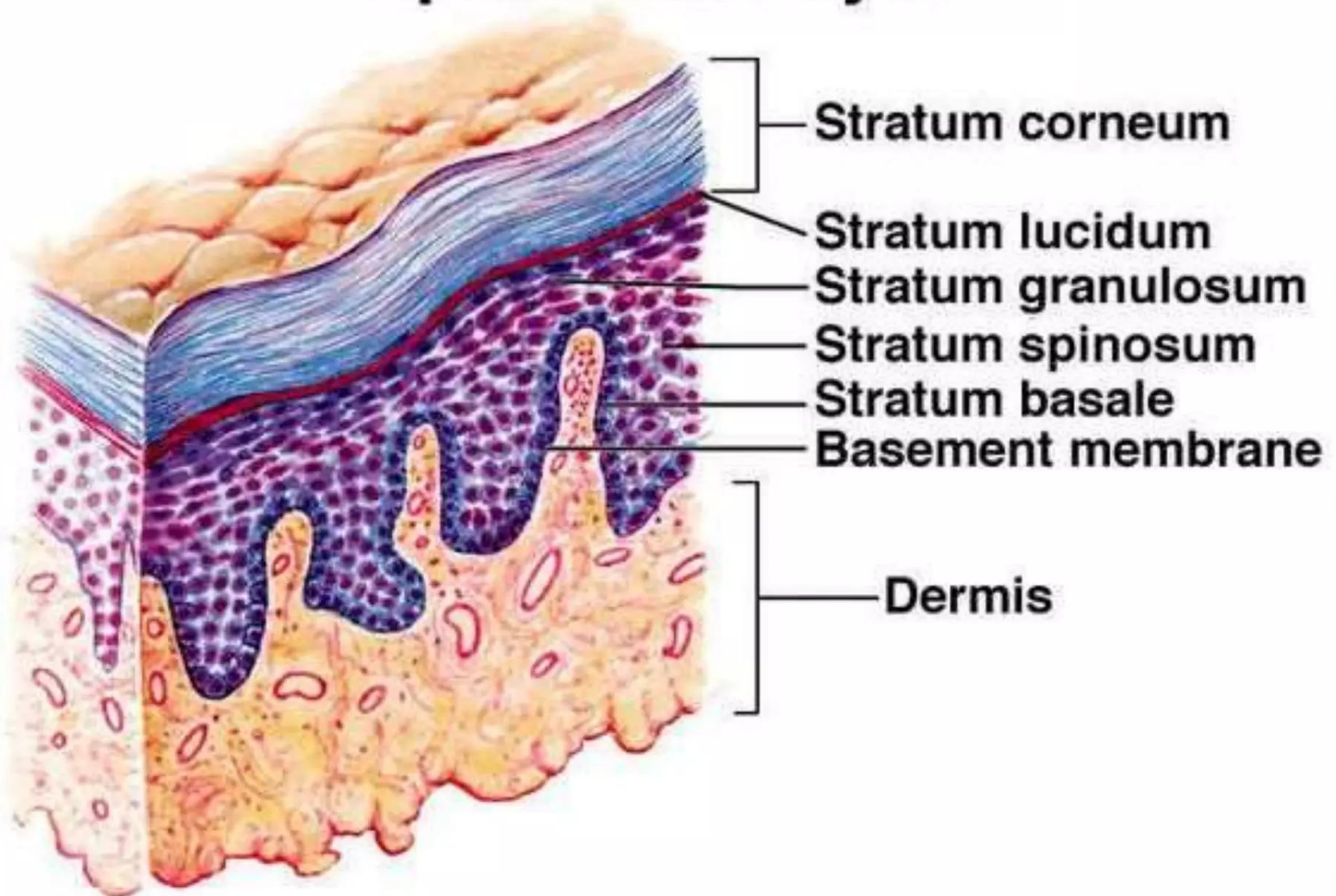
1. **Stratum Basale**
2. **Stratum Spinosum**
3. **Stratum Granulosum**
4. **Stratum corneum**

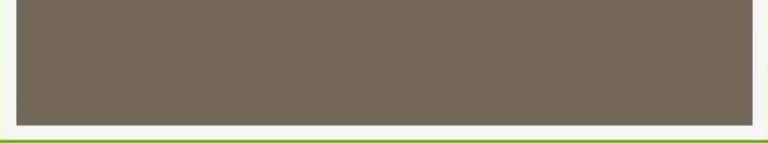
5th Layer is present at thicker portions of the skin (At palms and soles)

Known as

5. Stratum Lucidum

Epidermal Layer



- 
1. Stratum basale is act as basement of epidermis. Here Living cells are present known as keratinocytes.
 2. Stratum Spinosum also consists of keratinocytes containing keratin within.
 3. Stratum granulosum contains more keratin than previous layer.
 4. Stratum Cornium contains abundant amount of keratin which is outer most layer of epidermis.

Conclusion of Epidermis

- Epidermis is divided into layers depending upon the amount of keratin present in cells called keratinocyte.
- There are 4 types of cells present in epidermis.
 - i. Keratinocytes (keratin containing cells)
 - ii. Melanocytes (responsible for melanin production)
 - iii. Langerhans cells (provide immunity)
 - iv. Merkel cells (provide sensation)

The Dermis

Layer of skin consists of two sub-layers:

1: Papillary Layer

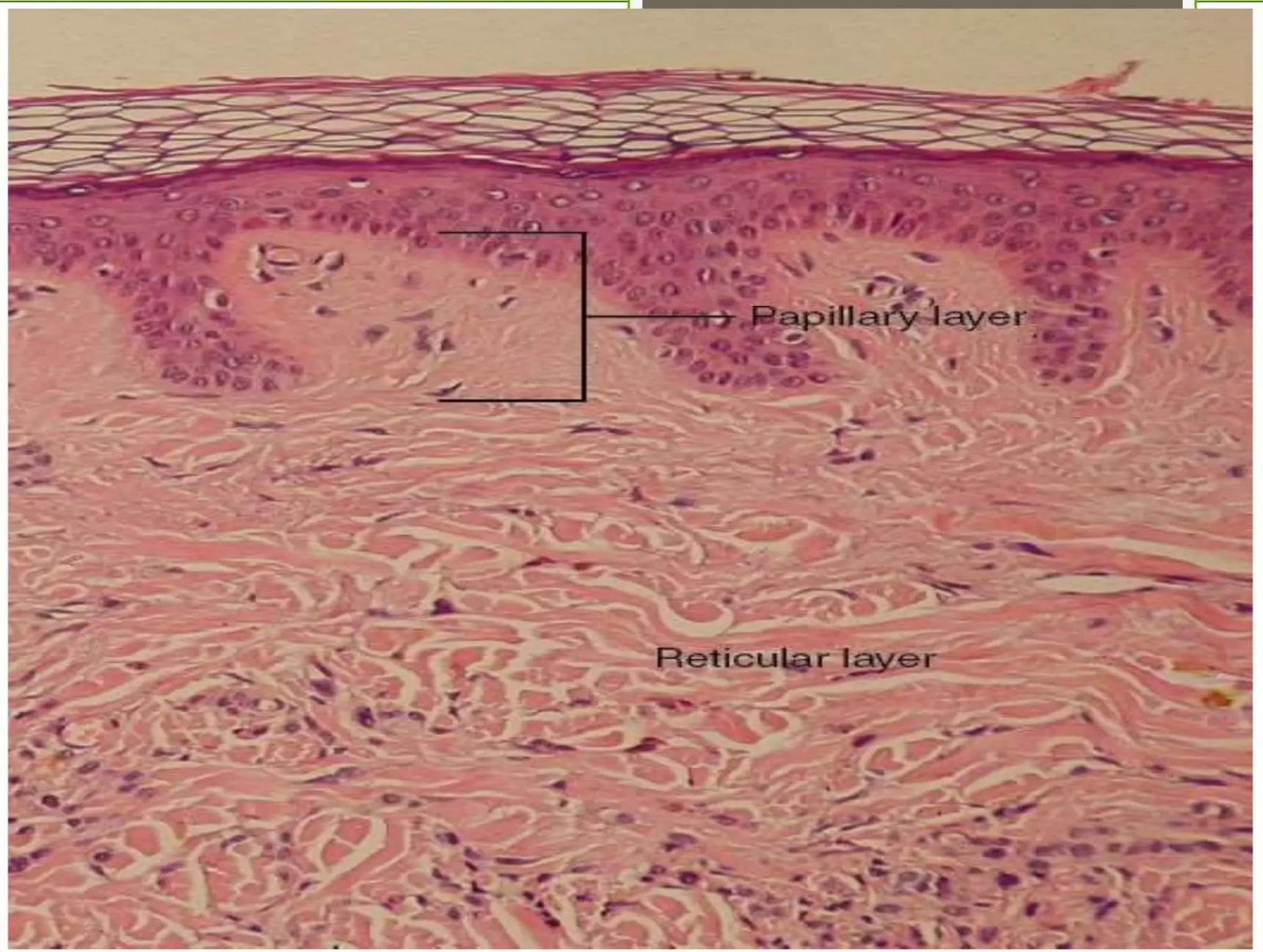
2: Reticular Layer

PAPILLARY LAYER

- ✓ Consists of loose fibrous connective tissue
- ✓ Contains smaller capillaries, lymphatic's and sensory neurons.
- ✓ Has dermal papillae(projections) projection between epidermal ridges.(peaks)

RETICULAR LAYERS

- It consists of dense irregular connective tissues.
- It contains larger vessels, lymphatics and sensory neurons.
- It contains collagen and elastic fibers.



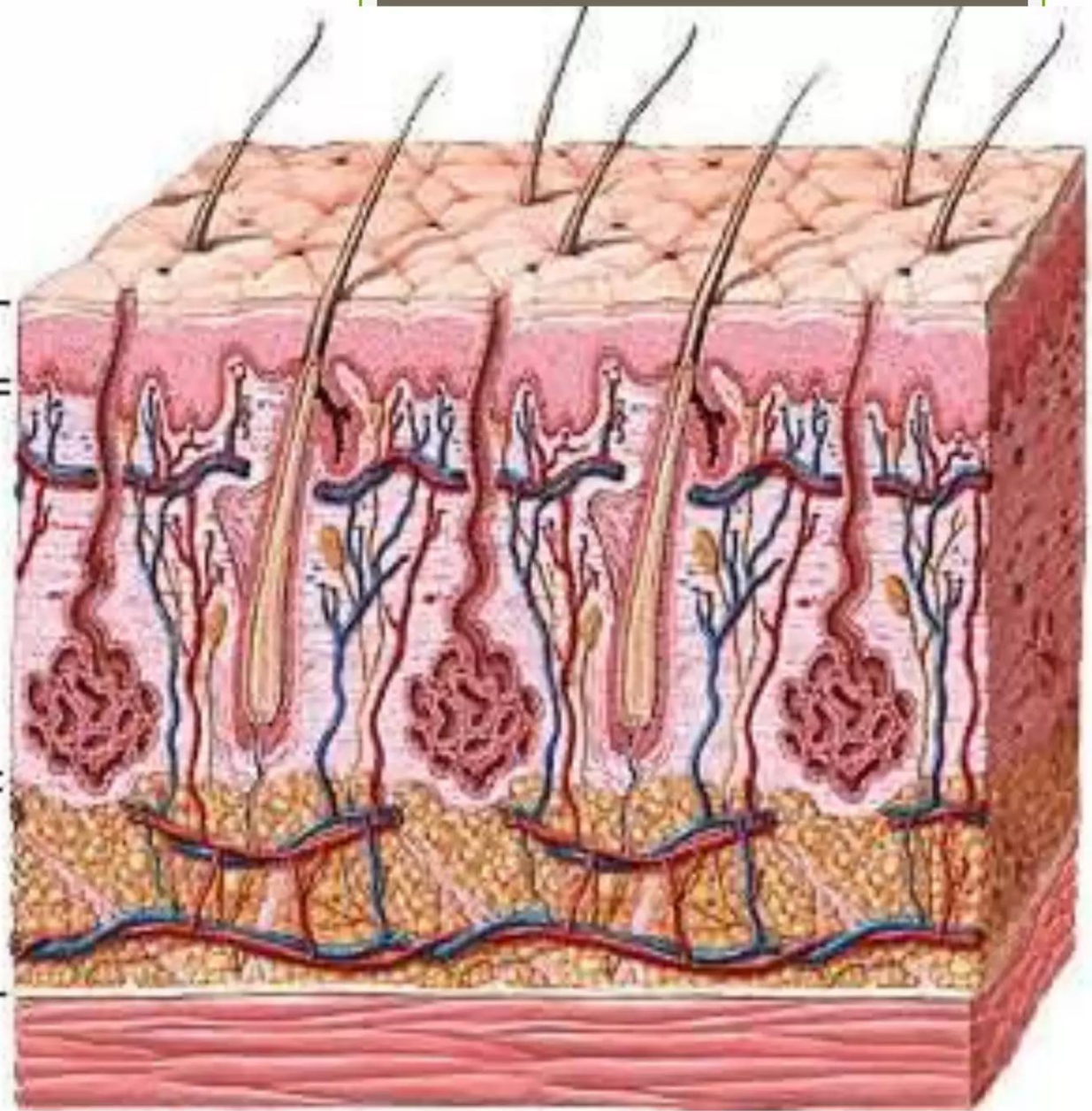
3. The Hypodermis Layer

- It consists of loose elastic connective tissues and adipose tissues.
- Connected with Reticular layer via connective tissue fibers.
- It Stabilizes the skin.

Epidermis

Dermis

Hipodermis



Nails:

- Structure of Nails

- Body of Nail:

The visible portion of the skin.
covers the nail bed.

Lunula:

The crescent like shape at the base
of the nail is called lunula.

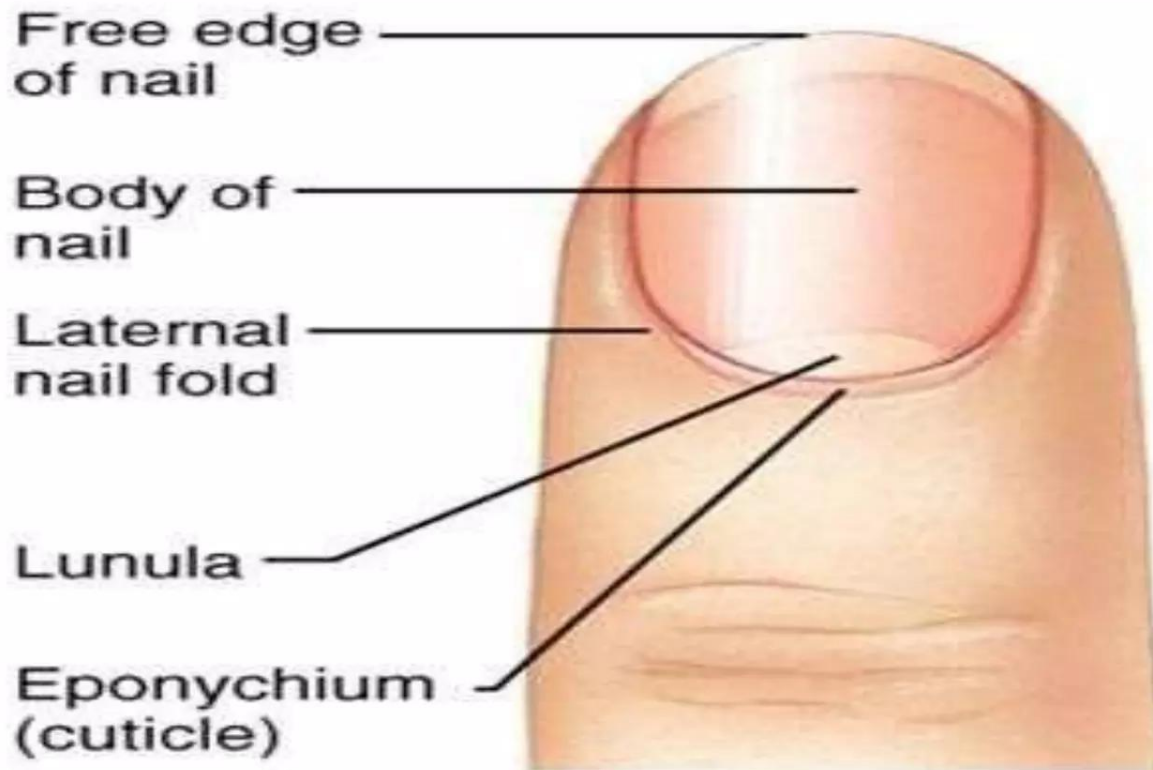
Free edge of Nail:

Free edges of nails is the portion of
nails that we can cut without any sensation of pain.

● Sides of Nails:

These sides lie in lateral nail groves .

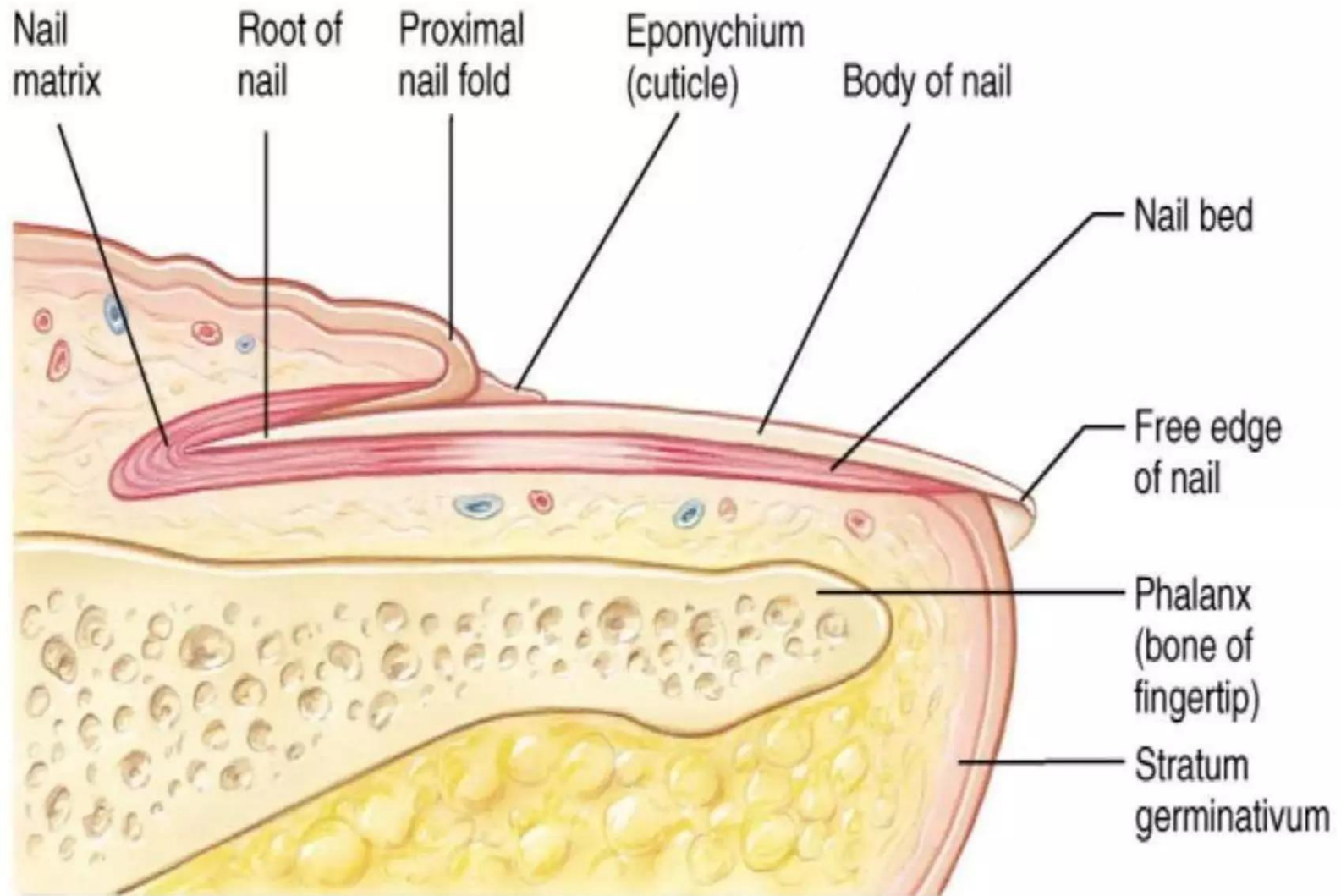
These sides covered by lateral nail folds.



(a)

Function of the Nails:

- Nails protect fingers and toes.
- Helping in gripping and holding things.
- Nails are made up of dead cells filled with keratin that's why very hard structures.
- Metabolic disorder can change the Nails structures, that's why important in physical examination of the patient with some metabolic disorder.



(b)

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Hairs:

- Introduction:

- ❖ One of the appendages of skin.
- ❖ Hair follicles are the organs which make the hairs.
- ❖ Hair follicles are present deep in dermis.
- ❖ Hairs are non-living.
- ❖ They are wrapped in dense connective tissue sheath.

Structure of the Hair:

- There are 2 main parts of a hair:

1: Hair Root

2: hair Shaft

Hair Root

Lower part of the hair

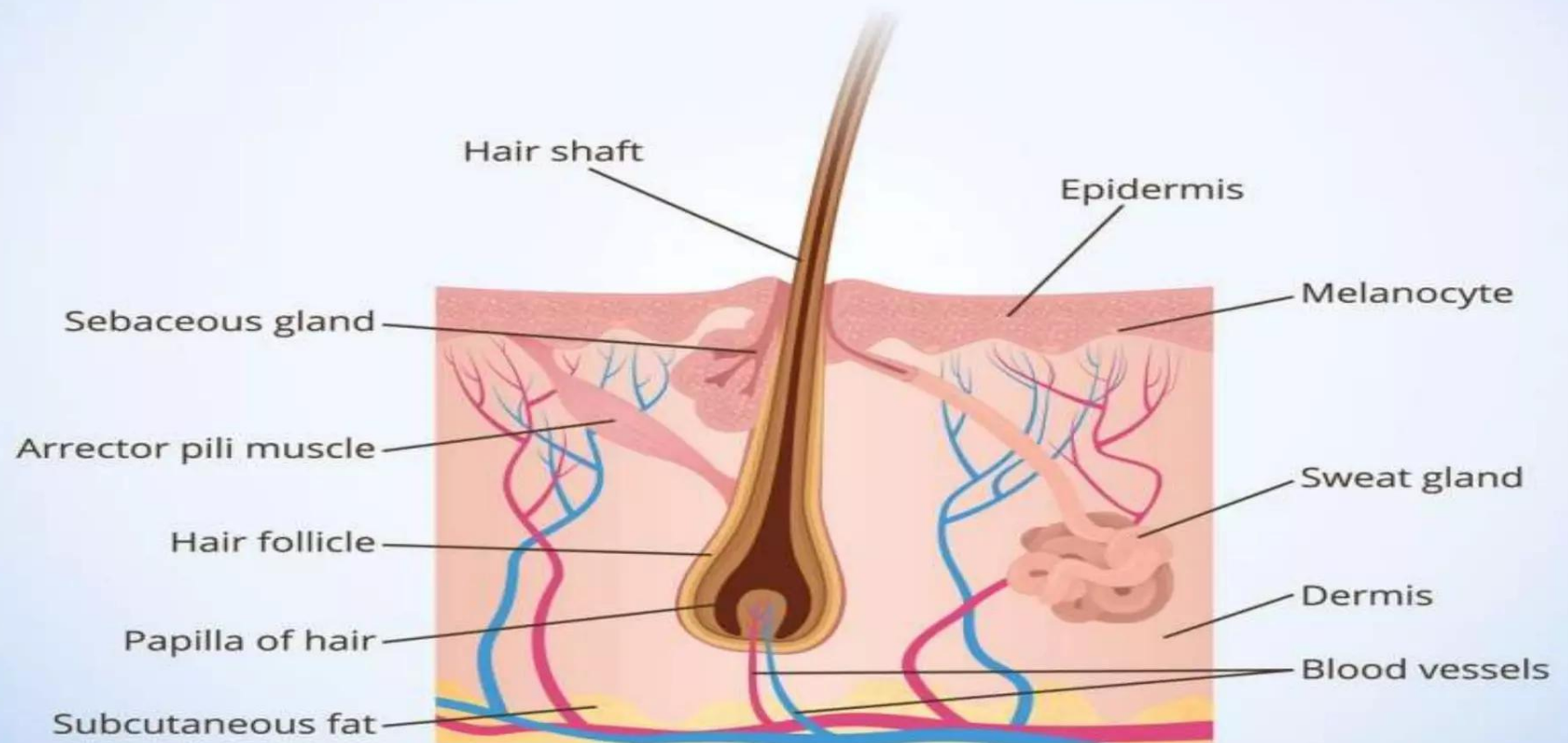
Originate from the hair follicle

Hair Shaft

Upper visible part of the hair

Thin and long portion of the hair.

THE HAIR STRUCTURE



Functions:

- Hairs of the Head:

- provide UV light protection

- Cushion from trauma

- Nostrils, ears and eyelashes Hairs:

- Prevent entry of foreign material

- Hairs of body

- Sensory detection

- Root of every hair:

- Have sensory nerves at the base of hair follicles that detects slight movement of hairs.

○ Glands found on Skin

- There are 3 main types of glands found on human skin:
 - 1) • Eccrine glands - secrete sweat through pores found in the palms of hands, soles of feet, and forehead
 - 2) • Sebaceous glands - secrete oily sebum and are found on the chest, back, scalp, face, and forehead
 - 3) • Apocrine glands - secrete sweat via canals along hair follicles in the underarms, pubic area, anus, and nipple area

