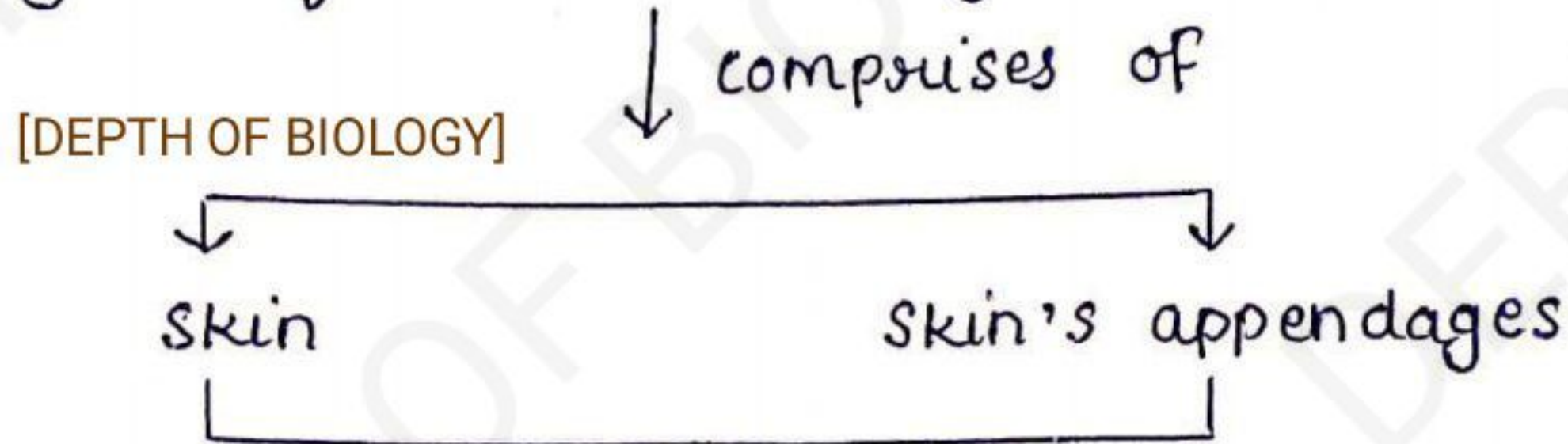


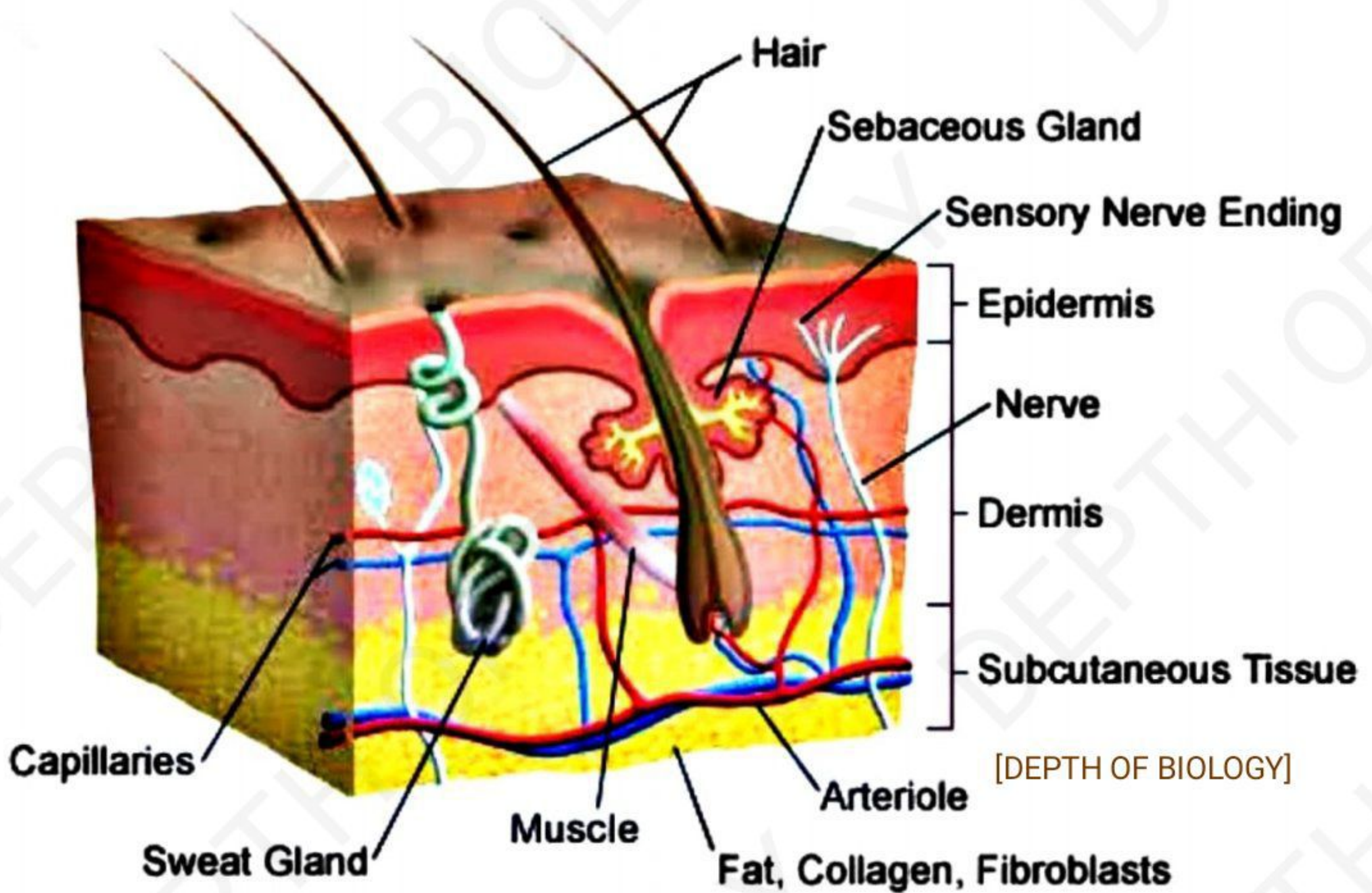
## Integumentary System

Concerned with the organ forming outermost layers of animal's body.



These acts as physical barrier between external and internal environment.

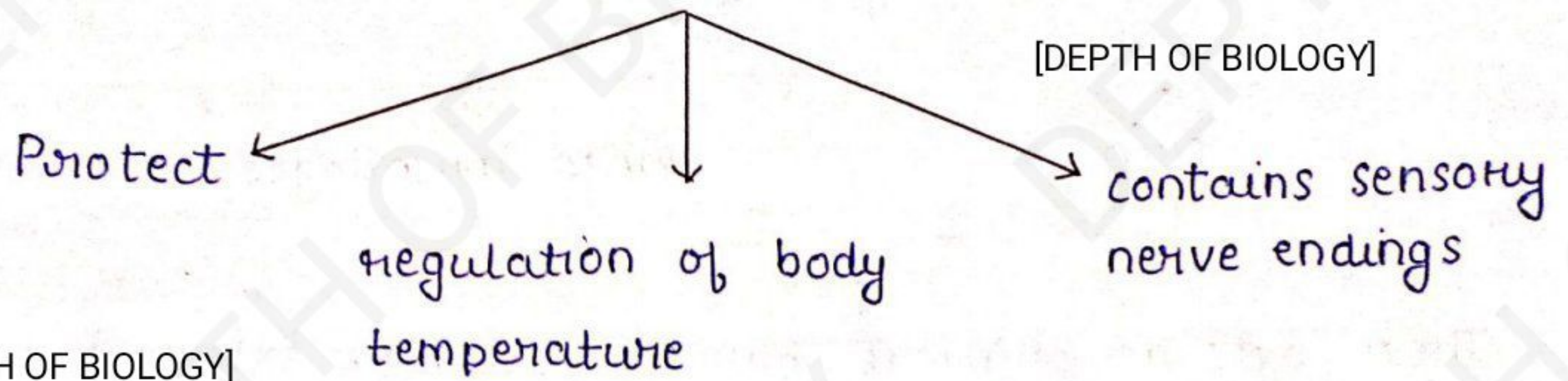
[DEPTH OF BIOLOGY]



Skin



Completely covers the body and its continuous  
with the membranes lining the body orifices.



[DEPTH OF BIOLOGY]

- largest organ → Surface area  $1.5 - 2 \text{ m}^2$  in adults.

- It has two main layers | Epidermis  
| Dermis

- Beneath these, we have subcutaneous and Muscularis.

[DEPTH OF BIOLOGY]

### \* Structure of Skin

[DEPTH OF BIOLOGY]

- Epidermis

- Most superficial

- ↳ stratified keratinized squamous  
epithelium

- Varies in thickness

↳ Thickest on palms and soles

- no blood vessel and nerve endings.

- But deeper layers are bathed in interstitial fluid from dermis. ↓

- Provide  $O_2$  and nutrients

[DEPTH OF BIOLOGY]

- Drains away as lymph

- Several strata

↳ Deepest Germinal layer

↳ Superficial - Stratum corneum

- Epidermis cells originate in germinal layer.

[DEPTH OF BIOLOGY]

↓  
undergo gradual change as they progress

[DEPTH OF BIOLOGY] toward skin surface.

- Surface cells are flat, thin, non-nucleated dead or squames.

↳ Cytoplasm  $\xrightarrow[\text{by}]{\text{replaced}}$  fibrous protein keratin.

- Surface cells are constantly rubbed off and replaced.

- Complete replacement → About a month
- Healthy epidermis depend upon 3 synchronised process.
  - desquamation
  - effective keratinisation
  - continual cell division
- Dermal papillae – anchor securely and allows passage and exchange – of nutrients and waste to lower part of epidermis. [DEPTH OF BIOLOGY]
- This arrangement stabilises the two layers preventing damage due to shearing forces.
- Blisters – develops when trauma causes separation of dermis and epidermis and serous fluid get collided in between. [DEPTH OF BIOLOGY]
- Areas where skin is subjected to more wear and tear.

- Epidermis is thicker
- Hairs are absent
- Dermal papillae are arranged

in parallel lines.

↓  
gives skin surface a ridged appearance.

↓  
This pattern of ridges on fingertips is unique →  
impression fingerprints.

[DEPTH OF BIOLOGY]

• Skin Colour is affected by :-

→ Melanin by melanocytes

↓

from deep germinative layer.

from here, it is absorbed by surrounding

epithelial cells. [DEPTH OF BIOLOGY]

• Amount is genetically determined and varies in different parts.

• No. of melanocytes is fairly const.

• Protects skin from harmful effect of UV rays in sunlight

• Exposure to sunlight promotes synthesis of melanin.

→ Normal Saturation of Hb

[DEPTH OF BIOLOGY]

→ Excessive level of bile pigments in blood.

\* Dermis : layer of skin beneath Epidermis

→ Consist of epithelial tissue and cushion the body from stress and strain.

→ Dermis tightly connected to epidermis by basement membrane.

Layer of Dermis

Papillary layer



Superficial layer

Reticular layer



Deeper layer

#### ① Papillary layer

- Lies directly beneath epidermis.

- Houses nerve ending

- It contains papillae



[DEPTH OF BIOLOGY]

Small cone shaped projection of elastic tissue pointing upwards.

- These papillae contain looped capillaries and

nerve ending. [DEPTH OF BIOLOGY]

## ② Reticular layer :-

- Contain fat cells, blood and lymph vessel, oil and sweat glands, hair follicles.

Hypodermis / subcutaneous [DEPTH OF BIOLOGY]

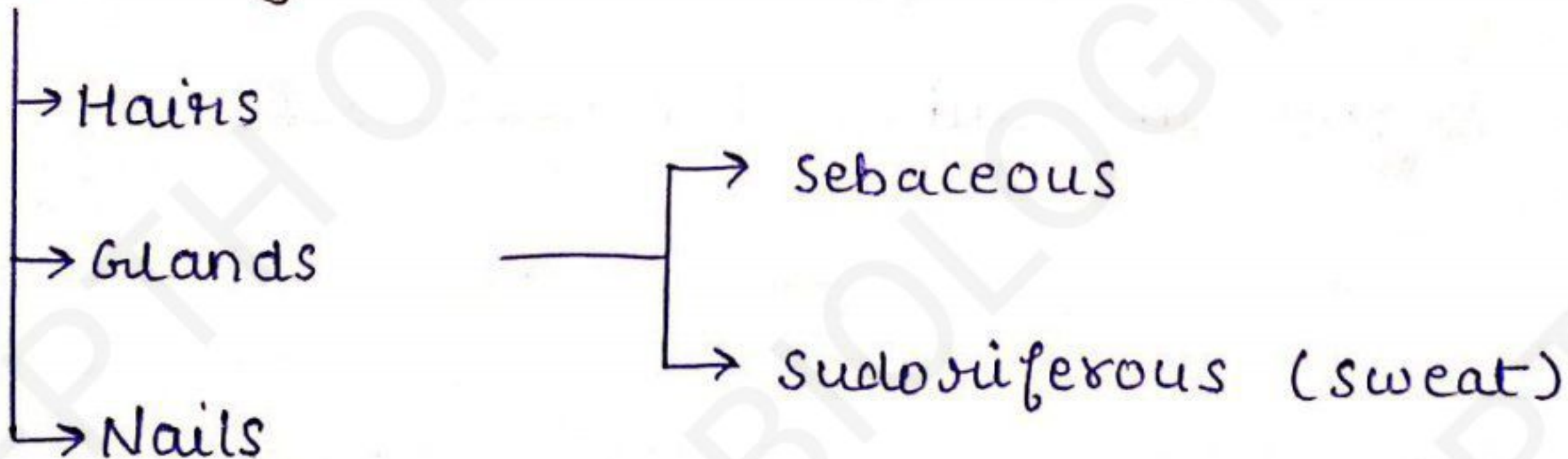


Not a part of skin and lies below dermis.

- Its purpose is to attach the skin with underlying bone and muscle and to supply it with blood vessels and nerve.

[DEPTH OF BIOLOGY]

## Appendages :-



[DEPTH OF BIOLOGY]

- Sweat
- blood filtrate
  - 99% water with some salts
  - traces of metabolic waste

Types → Eccrine gland



↳ Most numerous - produce sweat

Apocrine gland :-

→ confined to axillary, anal and genital areas

→ Produce special kind of sweat.

Sebaceous Glands

↳ over entire body except palms and soles

→ secrete sebum - oily substance

→ Holocrine secretion - entire cell breaks up to

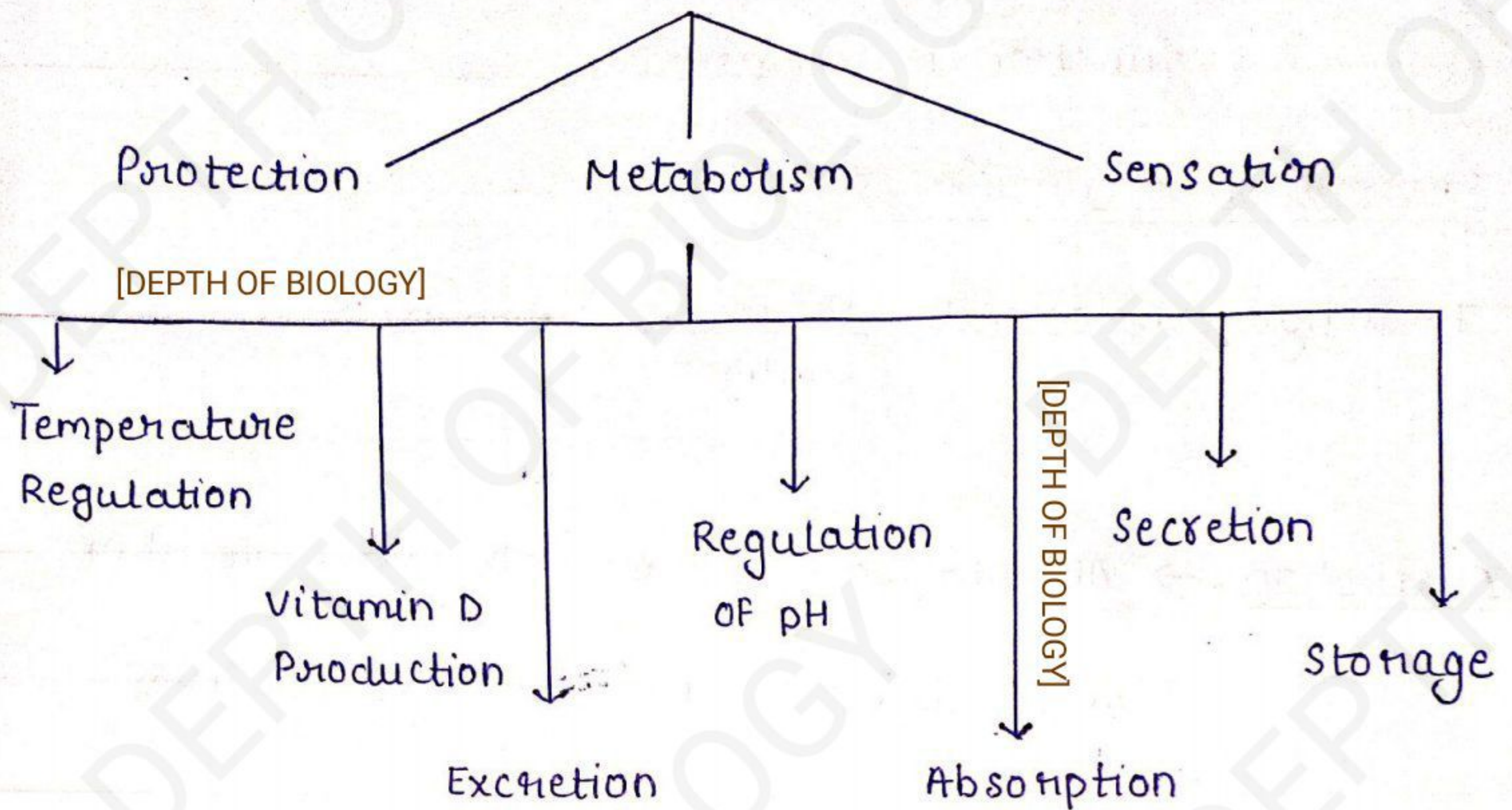
[DEPTH OF BIOLOGY]

form excretion.

Function → softens and lubricates hair and skin.

[DEPTH OF BIOLOGY]

## Functions of Skin



- Protection → Protection from invasion by microbes, chemical, physical agent.
- Sensation → Free nerve ending on skin  
↓  
sensitive to pain, touch, heat and cold.  
resulting either voluntary or reflex action.

### Metabolism :-

[DEPTH OF BIOLOGY]

Heat Regulatory function : Regulation of body temp. with sweating and cutaneous blood flow about  $36.9^{\circ}\text{C}$  variation of  $0.5^{\circ}\text{C} - 0.75^{\circ}\text{C}$

Excretion → Excrete NaCl in sweat, urea when kidney function is impaired.

### Preparation of Vitamin D

7-dehydrocholesterol  $\xrightarrow[\text{Sunlight}]{\text{UV in}}$  Vitamin D

[DEPTH OF BIOLOGY]

Absorption → Absorbs some drugs with low molecular weight and some toxic chemicals like mercury.

Storage → stores fats and water.

[DEPTH OF BIOLOGY]

Regulation of pH :-

pH of skin : 4.5 - 5.5

It is maintained by various glands in skin to maintain healthy skin. [DEPTH OF BIOLOGY]