

12/1/26

Ch-13
Skin - "The Jack of all Trades"

Notes

Skin: The skin is the outermost covering of the body. It is stretched all over in the form of a layer.

The skin is the largest organ of our body. i.e. 15% of an adult human's total weight.

Functions:

1. Protection: Protection from mechanical shock, against excess ultraviolet light, disease causing germs and prevents excessive loss of water.
2. Sensation: Sense organs for touch, pain, pressure, etc.
3. Temperature regulation: Prevents the loss of heat (cold weather) & facilitates loss of heat (hot weather).
4. Storage of food: Reserve food in the form of layer of fat.
5. Excretion: Through sweating.
6. Synthesis of Vitamin D: In excess sunshine, may cause tanning or skin cancer.
7. More efficient grip: In fingers and palm forms ~~acid~~ ridges and grooves.

A. Skin Proper

B. Deriva of SK

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Structure of Skin

A. Skin Proper

- Epidermis - ~~is~~ cornified, granular and germinative layers.
- Dermis - elastic fibres, blood vessels, nerves, etc.

B. Derivatives of Skin

- Hairs
- Nails
- Mammary glands
- Sweat glands
- Sebaceous glands

• Epidermis: → Outer thinner part of the skin, formed of stratified epithelium.

→ Devoid of blood vessels at all places.

a. → ~~Cornified~~ layer (Stratum corneum): Outermost layer of flattened dead cells, made up of ~~keratin~~ Keratin protein. It is resistant to mechanical damage, bacterial infection and loss of water by evaporation.

b. Granular layer: Very thin middle layer of two or ~~two~~ three sub-layers of flattened cells.

c. Malpighian layer (Stratum malpighi or germinative layer): Innermost region of epidermis, cells can actively divide.

→ Melanin pigment: present in malpighian layer.
Abnormalities: Leucoderma (Vitiligo), Albinism (Recessive trait)

• Dermis: → Inner thick layer of connective tissue made of elastic fibres.

- Contains blood vessels, nerve fibres, sensory organs, hair follicles, sweat glands etc.
- Papillae: Outer region of the dermis, next to epidermis, contain blood capillaries and nerve endings.

Hypodermis: → lowermost layer of connective tissue made of elastic fibres.

- Acts as shock absorber and anchors skin to bones and muscles.
- Common route for administration of injection.

Hair:

- (i) Hair shaft: Projects from the skin and slightly slightly below epidermis.
- (ii) Hair root: Part embedded within the dermis.
- (iii) Hair Bulb: Contains papillae of dermis.
 - Hair follicle: Enclosing hair root, composed of epithelial and connective tissues.
 - Pilorection: Goose flesh condition, by the erector muscle of the hair.
 - Duration of scalp hair: 2-5 years.
 - Duration of eyebrows and eyelashes: 3-5 months.
 - ~~Duration~~ Hairs provide a ~~sensat~~ sensation of touch too.
 - Eg. Eyelashes, hairs in the nose, facial hairs.

Nails:

- (i) Plate: Hard, outer part of nail. Dead and keratinized cells.

- (ii) Bed (Root)
- (iii) Matrix

Sebaceous Branch
→ Secret
Surface
pressure
evap

- (i) Melanin on the and pressure

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- (ii) Bed (Root): Lies below the nail plate.
(iii) Matrix: At the base of the nail, whitish half moon. Causes of the nail.

Sebaceous Glands:

- Branched glands open into a hair follicle.
- Secret sebum that makes hair and outer surface of the skin oily and waterproof to prevent the loss of water due to evaporation.

- (i) Meibomian glands: Modified sebaceous gland, open on the margins of the eyelids. Oily secretion and lubricate the margins and to prevent the overflow of tears.
- (ii) ~~Sebaceous~~ Ceruminous glands: Modified sebaceous gland, found in the auditory canal and secrete ~~the~~ wax like substance called cerumen or earwax.

Problems: a) Pimples: Sebum accumulation, growth of bacteria.

b) Acne: Sebaceous glands inflamed due to hormonal influence.

c) Black head: Sebaceous glands of face get enlarged due to accumulated sebum. Due to oxidation of melanin, they become black.

Sweat glands:

- Consists of deeper secretory part and an excretory part runs upwards to open on the surface.

- Secretory part absorbs fluids from the surrounding cells and blood capillaries of the dermis and passes to the excretory part of sweat duct.
- Sweat consists of 99% water, 0.2-0.5% salts, traces (urea).

Mammary glands:

- Modified sweat glands.
- In males, rudimentary state but in females at puberty, they enlarge in the form of a pair of breasts.
- Nipple: central conical projection.
- 15-20 milk ducts open on the nipple.
- Each milk duct is continued inward in a branching manner to join a cluster of 15 to 20 lobes of mammary glands.
- The activity of mammary glands is related to prolactin hormone and pregnancy.

Skin and heat regulation of body

- Homeostasis: The tendency of an organism or a cell to regulate its internal conditions, usually by a system of feedback controls.
- Warm-blooded animals | Endothermal: Body heat generated from inside.
Eg. Mammals, birds.

→ Cold-blooded
gained
or lost
Eg: other

Heat Production
Eg: Oxidation
muscle

Heat Loss
Eg: Skin
radiation
lungs (water)
water
urine
Foods (to heat)

Temperature
→ Hypothalamus
→ In cold
→ Vasoconstriction
(Narrow vessels)

Person
look pale
Bluish
→ In hot

Ectothermic

- Cold-blooded animals | ~~Endo~~ Ectothermal. Body heat gained from outside. Hibernates (winter sleep) or aestivate (summer sleep).
Eg: other than mammals, birds.

Heat Production:

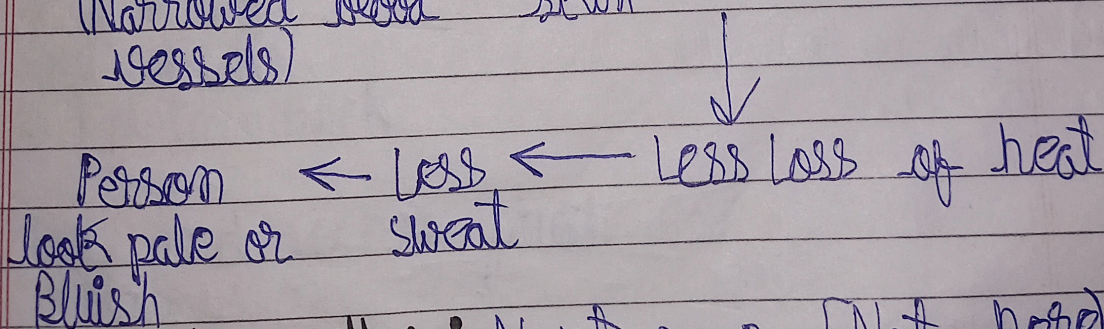
Eg: Oxidation of glucose in liver, activity of muscles, ingestion of foods, etc.

Heat Loss:

Eg: Skin (85% heat loss by convection, conduction, radiation, evaporation of sweat).
Lungs (warm air when breathed out, vaporisation of water from lungs).
Urine and faeces (eliminate at body temperature).
Foods (cold food, water, cold beverages leads to heat loss).

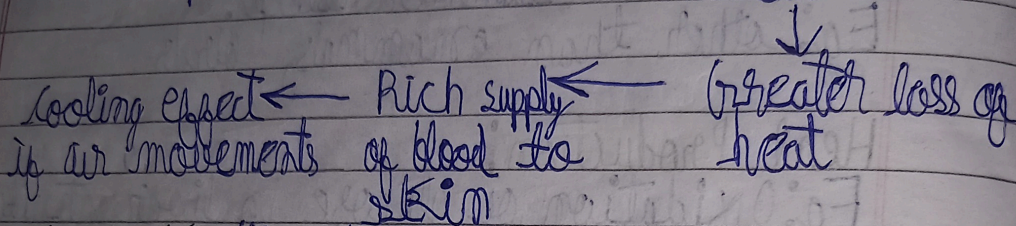
Temperature Regulation

- Hypothalamus: Thermostat centre in forebrain.
- In cold weather: Outside sweater cold (Low temperature)
 - Vasoconstriction → Reduce Blood supply to (Narrowed blood vessels) skin



- In hot weather: Next page. (Not here)

Outside weather hot (high temperature) → Vasodilation
strenuous physical work (Dilation of blood vessels)



→ Heat Stroke: "Sunstroke" in which sweat production is unable to keep pace with its evaporation in very hot winds. Rise in body temperature and can be fatal. Precaution: Drinking a lot of water and taking a little more of salt in summer.

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