

Physiology and Chemistry

Physiology and Chemistry of Skin and Pigmentation

Skin

Physiology of Skin

➤ Layers of Skin:

1. Epidermis

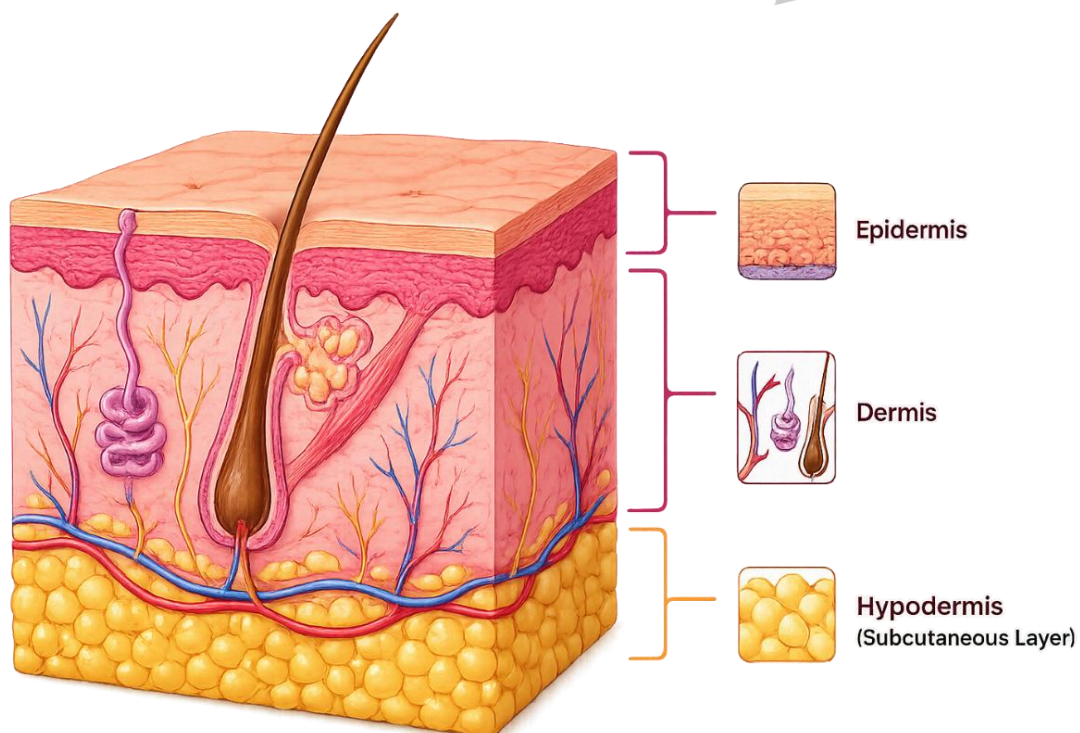
- The epidermis is the outermost layer of the skin.
- The epidermis protects the body from external damage.
- The epidermis contains cells called melanocytes that produce melanin pigment.

2. Dermis

- The dermis lies below the epidermis.
- The dermis contains blood vessels, nerves, sweat glands, and hair follicles.
- The dermis provides strength and elasticity to the skin.

3. Hypodermis (Subcutaneous Layer)

- The hypodermis is the deepest layer of skin.
- The hypodermis contains fat tissues that provide insulation and cushioning.



Chemistry of Skin

➤ Major Chemical Components:

- Water is the major component of the skin and helps maintain hydration.
- Proteins such as keratin provide strength and protection.
- Collagen provides firmness and structural support.
- Elastin provides elasticity and flexibility.
- Lipids help prevent moisture loss from the skin.

Pigmentation

Definition

- Pigmentation refers to the color of the skin produced mainly by melanin.

Melanin

- Melanin is a natural pigment produced by melanocyte cells.
- Melanin protects the skin from harmful ultraviolet radiation.

Types of Melanin

1. Eumelanin

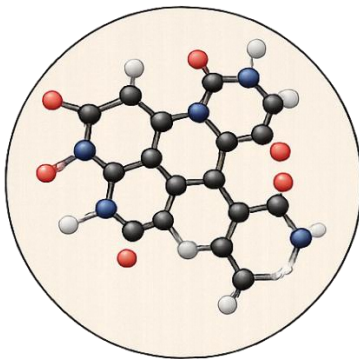
- Eumelanin produces brown to black color in the skin and hair.

2. Pheomelanin

- Pheomelanin produces yellow to reddish color in the skin and hair.

Eumelanin

Produces brown to black color



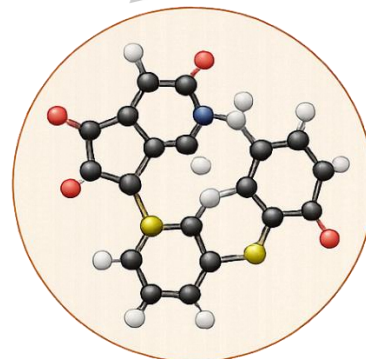
Skin

Hair



Pheomelanin

Produces yellow to reddish color



Skin

Hair



Factors Affecting Pigmentation

- Genetic factors influence skin color.
- Sunlight increases melanin production.

- Hormonal changes can affect pigmentation.
- Certain diseases and medications may alter skin color.

Physiology and Chemistry of Hair

- Hair is a thread-like structure that grows from hair follicles present in the skin.
- Hair contributes to appearance, protection, and insulation.
- Herbal hair care products are designed based on the structure and chemistry of hair.

Functions of Hair

- Hair protects the scalp from sunlight and environmental damage.
- Hair helps regulate body temperature.
- Hair contributes to personal appearance and beauty.

Structure of Hair

A. Hair Shaft

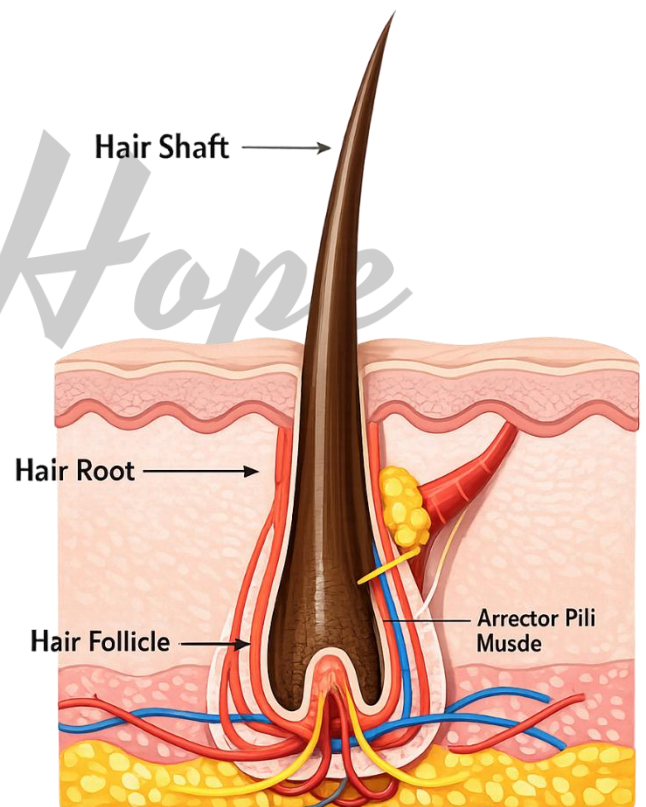
- The hair shaft is the visible part of the hair above the skin surface.
- It is composed mainly of keratin protein.

B. Hair Root

- The hair root is located beneath the skin.
- It anchors the hair within the follicle.

C. Hair Follicle

- The hair follicle is the structure from which hair grows.
- It provides nutrients necessary for hair growth.



Layers of Hair

A. Cuticle

- The cuticle is the outer protective layer of the hair.
- It protects the inner structures from damage.

B. Cortex

- The cortex forms the major portion of the hair shaft.

- It contains pigment and provides strength to the hair.

C. Medulla

- The medulla is the innermost layer of the hair.
- It is present mainly in thicker hairs.

Hair Chemistry

1. Keratin

- Keratin is the main protein present in hair.
- It provides strength, elasticity, and durability.

2. Melanin

- Melanin gives natural color to the hair.
- The amount and type of melanin determine hair color.

3. Water

- Hair contains a certain amount of water that helps maintain flexibility.

4. Lipids

- Natural lipids help maintain hair softness and shine.

Physiology and Chemistry of Scalp

- The scalp is the skin covering the upper part of the head where hair grows.
- It contains hair follicles, sebaceous glands, sweat glands, blood vessels, and nerves.
- Healthy scalp is essential for healthy hair growth.

Functions of the Scalp

- The scalp supports and nourishes hair follicles.
- It protects the underlying tissues of the head.
- It produces natural oils that help maintain hair condition.
- It provides blood supply to growing hair.

Structure of the Scalp

A. Epidermis

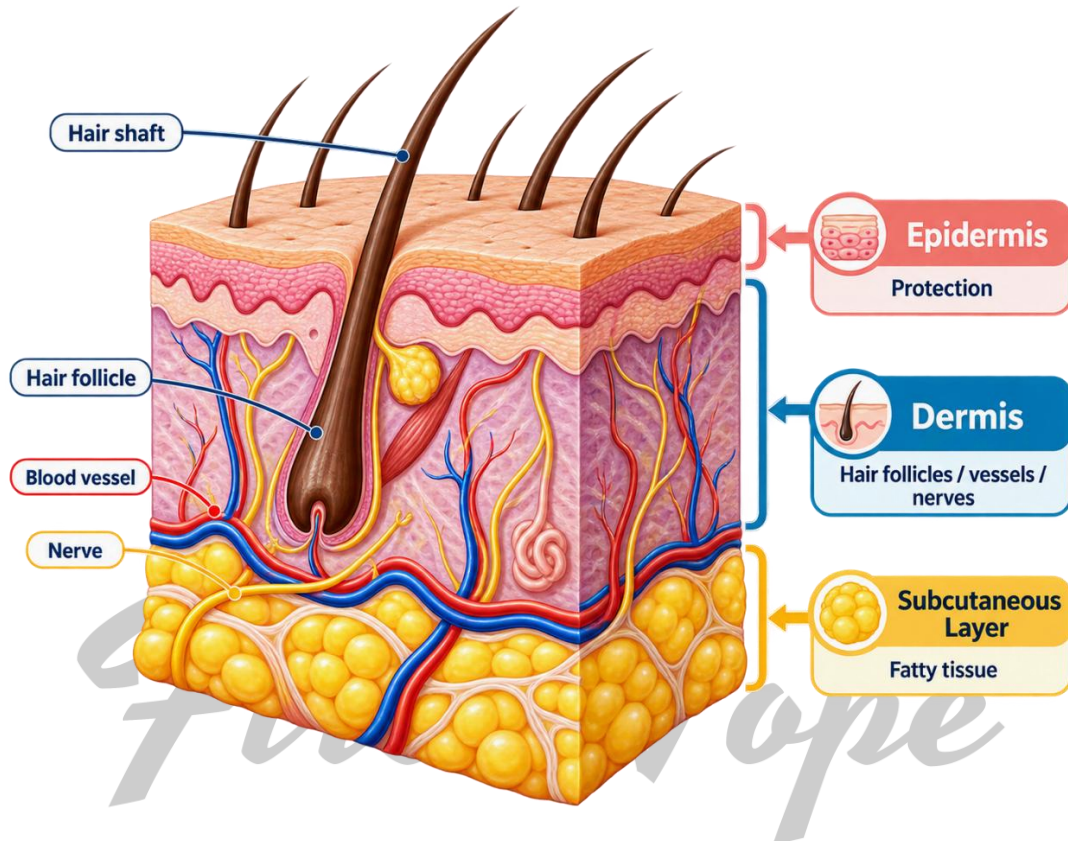
- The epidermis is the outer protective layer of the scalp.
- It protects against external damage and infections.

B. Dermis

- The dermis contains hair follicles, blood vessels, nerves, and glands.
- It supports hair growth and nourishment.

C. Subcutaneous Layer

- The subcutaneous layer contains fatty tissue.
- It provides cushioning and insulation.



Sebaceous Glands

- Sebaceous glands produce sebum, which is a natural oily substance.
- Sebum helps keep the scalp and hair moisturized.
- Excessive sebum production may result in oily scalp conditions.

Sweat Glands

- Sweat glands produce sweat to help regulate body temperature.
- Sweating also helps remove certain waste materials from the body.

Common Scalp Problems



Dandruff
Flakes



Dry Scalp
Itchy & flaky



Oily Scalp
Greasy



Scalp Infections
Infected



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