INTEGUMENTARY SYSTEM

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Structure and Function

- Integumentary system is composed of the skin and accessory structures (hair, hair follicles, nails, glands & nerves)
- Functions of the integumentary system
  - Protects the other body systems from injury and infection:
    - Mechanical damage (cuts & bruises)
    - Chemical damage (acids & bases)
    - Thermal damage (heat & cold)
    - Ultraviolet damage (sunlight)
    - Defense against microorganisms
  - Helps the body maintain homeostasis by regulating temperature, retaining body fluids, and eliminating wastes
  - Insulates and cushions deeper organs

Skin

- Outer covering of body
- Largest organ of integumentary system (The integumentary system is the set of organs forming the outermost layer of an animal's body.)
- **Dermatology:** Branch of medical science that deals with the diagnosis and treatment of skin disease.
- The skin is composed of three layers:

1. **The outer- epidermis –** superficial, composed of epithelial tissue.
2. **The middle – dermis-** deeper, composed of connective tissue
3. **The inner- subcutaneous tissue (Hypodermis)-** composed of areolar and adipose tissue.

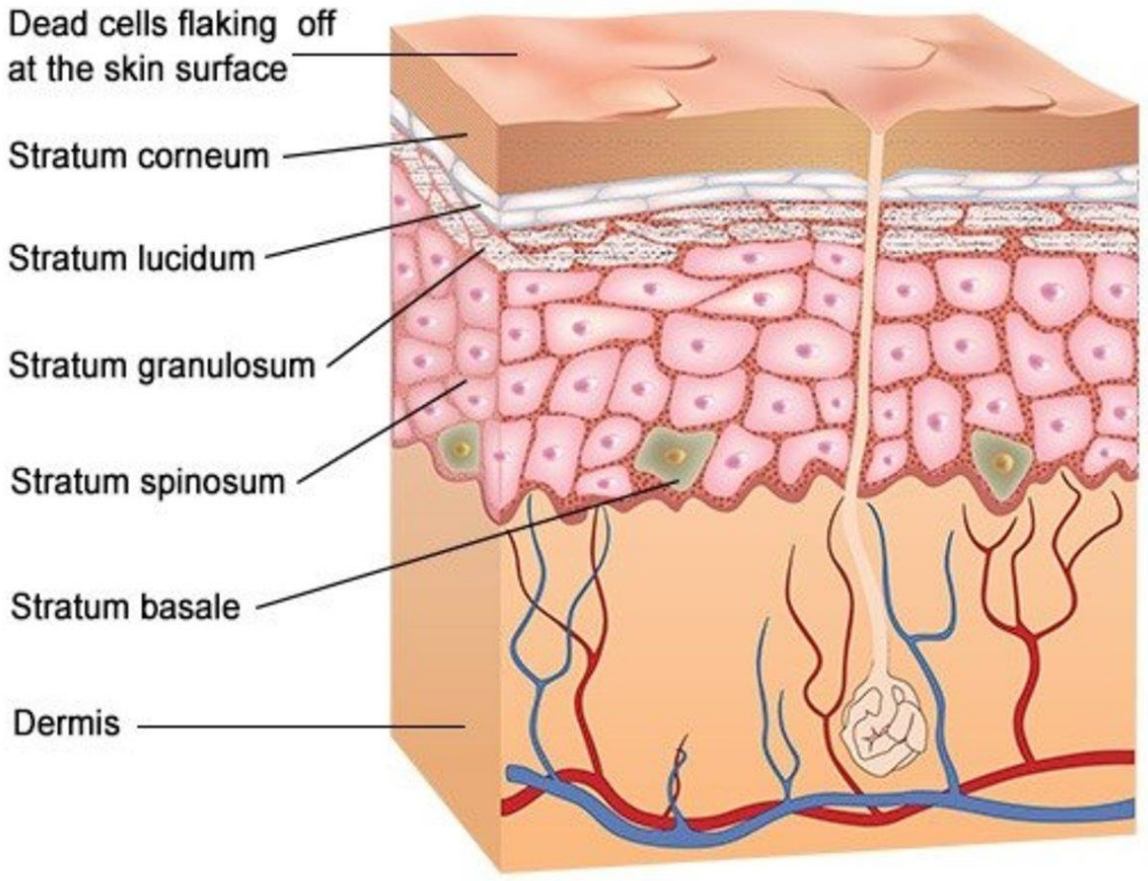
Epidermis

- Outermost layer of skin
- Composed of **keratinised stratified squamous epithelium.**
- Four principle type of cells:

1. ***Keratinocytes-*** ***Produce protein keratin, Protect from heat, microbes, chemicals***
2. ***Melanocytes-*** ***Produce pigment melanin, Protect from UV lights***
3. ***Langerhans cells-*** ***Participate in immune response against microbes.***
4. ***Markel cells-*** ***Deepest layer of epidermis.***

Epidermis is composed of five layers:

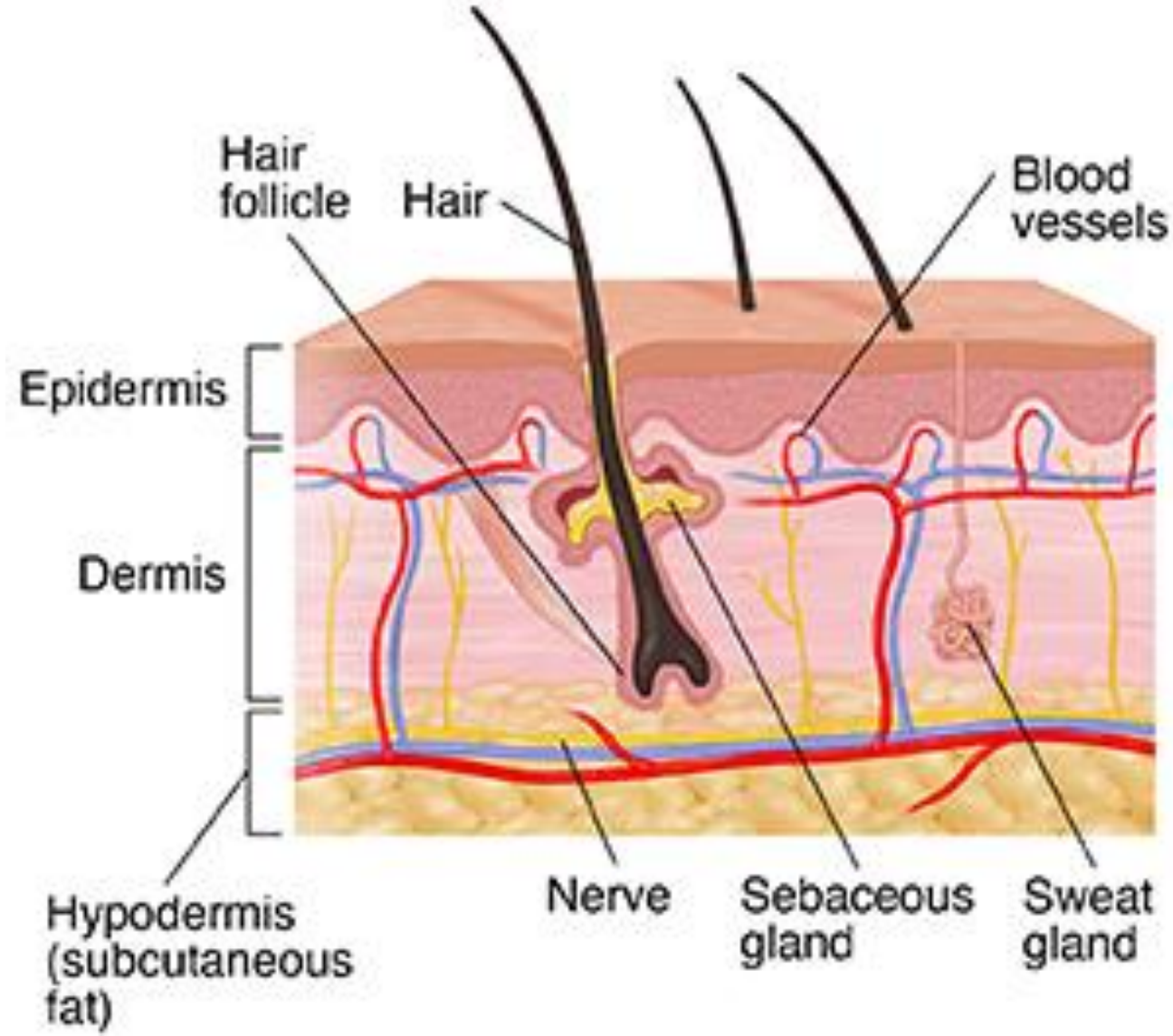
- **Stratum corneum :** 25-30 layers of flat, dead cells completely filled with keratin.
- **Stratum lucidum:** 3-5 layers of flat, dead cells lacking granules and nuclei.
- **Stratum granulosum:** 3-5 layers of flattened keratinocytes.
- **Stratum spinosum:** 8-10 layers of keratinocytes closely packed.
- **Stratum basale:** single layer of cubical or columnar keratinocytes.



Anatomy of the Epidermis

Dermis

- The **dermis** is the inner layer that includes the following:
- **Sweat glands** – produce sweat that travels via sweat ducts to openings in the epidermis called pores. They play a role in temperature regulation.
- **Hair follicles** – are pits in which hairs grow. Hairs also play a role in temperature regulation.
- **Sebaceous glands** – produce sebum (an oil) to keep hairs free from dust and bacteria. Sebum and sweat make up the 'surface film'.
- Divided into two region:
- **Papillary region:** It contains blood vessels, glands, hair follicles, lymphatics, nerves and fat cells.
- **Reticular region:** It consists of collagen fibers, fibroblast cells, fat cells, blood vessels (capillary loops), nerve fibers, touch receptors (Meissner corpuscles) and cells that fight bacteria (phagocytes).


Hair follicle
Hair
Blood vessels
Epidermis
Dermis
Hypodermis (subcutaneous fat)
Nerve
Sebaceous gland
Sweat gland

Functions of the skin

- Provides a protective barrier against mechanical, thermal and physical injury and hazardous substances.
- Prevents loss of moisture.
- Reduces harmful effects of UV radiation.
- Acts as a sensory organ (touch, detects temperature).
- Helps regulate temperature.
- An immune organ to detect infections
- Production of vitamin D.