



A Monthly e Magazine  
ISSN:2583-2212

Jan 2024 Vol.4(1), 356--357

Popular Article

## Integumentary Systems in Animals

Vijay Kumar Yogi<sup>1</sup>, Ram Kumar Gahlot<sup>2</sup>, Raj Kumar Siyag<sup>1</sup>

<sup>1</sup>Department of Veterinary Anatomy, CVAS, Bikaner (RAJUVAS, Bikaner) Rajasthan

<sup>2</sup>Department of Veterinary Biochemistry, CVAS, RAJUVAS, Bikaner

<https://doi.org/10.5281/zenodo.10564059>

**SKIN**-The skin is the largest organ of the body and, depending on the species and age, may represent 12%–24% of an animal's body weight.

The skin has many functions, including serving as an enclosing barrier and providing environmental protection, regulating temperature, producing pigment and vitamin D, and sensory perception.

Anatomically, the skin consists of the following structures: epidermis, basement membrane zone, dermis, appendageal system, and subcutaneous muscles and fat.

**EPIDERMIS**- The epidermis is composed of multiple layers of cells consisting of keratinocytes, melanocytes, Langerhans cells, and Merkel cells.

Keratinocytes function to produce a protective barrier. They are produced from columnar basal cells attached to a basement membrane.

The rate of cell mitosis and subsequent keratinization are controlled by a variety of factors, including nutrition, hormones, tissue factors, immune cells in the skin, and genetics. Keratinocytes play a key role in the skin immune system and in regulating the growth and renewal of cells.

**DERMIS**- The dermis may also exert significant control over the growth of the epidermis. It has been hypothesized that photoperiod and reproduction cycles may affect the epidermis in animals. Glucocorticoids decrease mitotic activity; disease and inflammation also alter normal epidermal growth and keratinization.

**BASEMENT MEMBRANE**- The basement membrane zone serves as a site for attachment of basal epidermal cells and as a protective barrier between the epidermis and dermis.

A variety of skin diseases, including several autoimmune conditions, can cause damage to this zone. Vesicles are an example of a damaged basement membrane zone. The basement membrane zone has important functions:

- Anchors the epidermis to the dermis
- maintains a functional and proliferative epidermis
- maintains tissue architecture
- participates in wound healing
- acts as a physical barrier
- regulates nutritional support between the epidermis and underlying connective tissue



**DERMIS-** The dermis is a mesenchymal structure that supports, nourishes, and to some degree, regulates the epidermis and appendages. The dermis consists of ground substance, dermal collagen fibers, and cells (fibroblasts, melanocytes, mast cells, and occasionally eosinophils, neutrophils, lymphocytes, histiocytes, and plasma cells).

Blood vessels responsible for thermoregulation, nerve plexuses associated with cutaneous sensation, and both myelinated and unmyelinated nerves are present in the dermis. Motor nerves are primarily adrenergic and innervate blood vessels and arrector pili muscles. Except in horses, apocrine glands do not appear to be innervated.

Sensory nerves are distributed in the dermis, hair follicles, and specialized tactile structures. The skin responds to the sensations of touch, pain, itch, heat, and cold.

#### **APPENDAGEAL SYSTEM**

These structures grow out of (and are continuous with) the epidermis and consist of hair follicles, sebaceous and sweat glands, and specialized structures (eg, claw, hoof).

The hair follicles of horses and cattle are simple, ie, the follicles have one hair emerging from each pore.

The hair follicles of dogs, cats, sheep, and goats are compound, i.e, the follicles have a central hair surrounded by 3–15 smaller hairs all exiting from a common pore.

Animals with compound hair follicles are born with simple hair follicles that develop into compound hair follicles.

