

Introduction The major functions of the skin are:

- To maintain a normal body temperature
 - To maintain a normal fluid and electrolyte balance within the animal
 - To create a mechanical barrier to protect the body from noxious agents and organisms
 - To act as a sensory organ perceiving those features of the environment that are important to the subject's survival
- In general,

these functions are not greatly impeded by most diseases of the skin of large animals, with the exceptions of failure of the sweating mechanism, which does seriously interfere with body temperature regulation, and severe burns or other skin trauma, which may cause fatal fluid and electrolyte loss.

The major effects of skin diseases in large animals are esthetic and economic but can also present a considerable animal welfare concern.

Discomfort and scratching interfere with normal rest and feeding, and when the lips are affected, there may be interference with prehension.

The unsightly appearance of the animal distresses the owner. There is loss of the economic coat, and the sales value and acceptability of animals for transport and appearance in exhibitions is greatly reduced.

Primary/Secondary Lesions Diseases of the skin may be primary or secondary in origin. In primary skin disease the lesions are restricted initially to the skin, although they may subsequently spread from the skin to involve other organs. Conversely, cutaneous lesions may be secondary to disease originating in other organs. Differentiation between primary and secondary skin diseases should be attempted by seeking evidence that organs other than the skin are affected. If there is no such evidence produced during a thorough clinical examination of the patient, it is reasonable to assume that the disease is primary.

Even if involvement of other organs is diagnosed, it is still necessary to determine whether the involvement constitutes the primary state or whether it has developed secondarily to the skin disease. This decision can be based on the chronology of the signs, elicited by careful history taking, and a detailed knowledge of the individual diseases likely to be encountered. Taking an accurate anamnesis and doing a complete clinical examination must precede the careful examination of the skin itself, using the proper technique of examination.

The veterinarian may need to employ advanced diagnostic procedures such as histopathological examination of a biopsy specimen to define the type of lesion present.

The purpose of this semester is to describe the basic skin lesions so that the differential diagnosis, up to the point of defining the type and nature of the lesion, the pathoanatomical diagnosis, can be accomplished. A definitive etiologic diagnosis requires further examination and is included in the discussion of the specific diseases

Clinical Signs and Special Examination A general clinical examination is followed by a special examination of the skin and must include inspection and, in most cases, palpation. Additional information can be obtained by taking swabs for bacteriologic examinations, scrapings for examination for dermatophytes and metazoan parasites, and biopsy for histopathological examination. Biopsy material should include abnormal, marginal, and normal skin.

Artifacts are common in biopsy specimens, including nonrepresentative sampling, crushing the specimen by forceps or hemostat, and inadequate fixation.

-A Wood's lamp finds a special use in the examination of the skin for dermatophytes.

-Descriptions of lesions should include size, depth to which they penetrate topographic distribution on the body, and size of the area affected.

- Abnormalities of sebaceous and sweat secretion, changes in the hair or wool coat, and alterations in color and temperature of the skin should be noted, as should the presence or absence of pain or pruritus.

- Abnormal Coloration The parameter of abnormal coloration includes jaundice, pallor, and erythema. In animals these conditions are rarely visible in light-colored skins.

-Red-purple discoloration of the skin of septicemic, white pigs may be dramatic, but no diagnostic significance can be attached to its degree.

-Early erythema is a common finding where more definite skin lesions are to develop, as in early photosensitization.

- The blue coloration of early gangrene (e.g., of the udder and teat skin in the early stages of peracute bovine mastitis associated with *Staphylococcus aureus*) is characterized by coldness and loss of elasticity.

- Hypopigmentation of the skin may be general, as in albino, pseudoalbino, and lethal white animals. Local patches of hypopigmentation are characteristic of vitiligo and leukoderma.

-Pruritus

- Pruritus or itching is the sensation that gives rise to scratching.
- Hyperesthesia is increased sensitivity to normal stimuli.
- Paresthesia is perverted sensation, a subjective sensation, and not diagnosed in animals. All sensations that give rise to rubbing or scratching are therefore included with pruritus, more properly defined as scratching.

Pruritus can arise from peripheral or central stimulation. When it is peripheral in origin, it is a primary cutaneous sensation, similar to heat, cold, pain, and touch; it differs from pain because it is purely epidermal, whereas pain can still be felt in areas of skin denuded of epidermis.

-Thus itching does not occur in the center of deep ulcerations or in very superficial lesions, such as those of ringworm, where only the hair fibers and keratinized epithelium are involved.

-Itching can be elicited over the entire skin surface but is most severe at the mucocutaneous junctions. **Common causes include the following.**

Cattle

- Sarcoptic and chorioptic mange
- Lice infestation
- Nervous acetonemia
- Aujeszky's disease Sheep
- Lice, mange, ked, blow-fly, and itch-mite infestations
- Scrapie Horses
- Chorioptic mange on the legs
- Queensland (sweet) itch along the dorsum of the body
- Lice infestation
- Perianal pruritus from *Oxyuris equi* infestation Pigs
- Sarcoptic and chorioptic mange
- Lice infestation All Species

- Early stages of photosensitive dermatitis
 - Urticarial wheals in an allergic reaction
 - “Licking syndromes,” such as those that occur in cattle on copper-deficient diets, are accompanied by pica and the licking of others as well as themselves. They are examples of depraved appetites developed in response to nutritional deficiency and are not a response to pruritus.
 - Itching of central origin derives mainly from the scratch center below the acoustic nucleus in the medulla. It may have a structural basis, as in scrapie and pseudorabies, or it may be functional in origin, as in the nervous form of acetonemia. The only lesions observed are those of a traumatic dermatitis with removal of the superficial layers to a variable depth, breakage or removal of the hairs, and a distribution of lesions in places where the animal can bite or rub easily.
- **Secretion Abnormalities of Skin Glands** The activity of the sweat glands is controlled by the sympathetic nervous system and is for the most part a reflection of body temperature.
- **Excitement and pain may cause sweating as a result of cerebral cortical activity.**
- **A generalized form of hyperhidrosis**, apparently inherited, has been recorded in Shorthorn calves. Local areas of increased or decreased sweating may arise from peripheral nerve lesions or obstruction of sweat gland ducts.
- **A generalized anhidrosis is recorded in horses and occasionally in cattle.**
- Excess secretion of sebum by sebaceous glands causes oiliness of the skin or **seborrhea**, but its pathogenesis is poorly understood.
- **Abnormalities of Wool and Hair Fibers** Deficiency of hair or wool in comparison to the normal pilosity of the skin area is alopecia or hypotrichosis.
- **Hirsutism, abnormal hairiness**, manifested by a long, shaggy, and usually curly coat, is most common in aged ponies with adenomas of the pars intermedia of the pituitary gland. The character of the fiber may also vary with variations in the internal environment. For example, in copper deficiency the crimp of fine wool fibers is lost, and the wool becomes straight and “steely.”
- Alternation in coat color, achromotrichia**, may be generalized or segmental along the fiber.

Principles of Treatment of Diseases of the Skin

Primary treatment for a specific treatment, accurate diagnosis of the condition and the identification of underlying cause must precede the selection of any topical or systemic treatment.

-Hair coat and debris on and around the affected area must be removed to enable topical applications to come into direct contact with the affected skin.

-In bacterial diseases susceptibility tests on cultures of the organism are advisable. Bacterial resistance to antimicrobials used in veterinary dermatologic practice is a concern.

-The uncritical use of antimicrobials either locally or systemically should be avoided to contain the development of bacterial resistance to microbials.

-Specific skin diseases caused by bacteria, fungi, and metazoan parasites are reasonably amenable to treatment with the appropriate specific remedy.

-Identification of the fungal or parasitic organism presumably causing the disease allows for selection of a pharmacologic substance and route of administration with documented efficacy against the agent in question and can prevent frustrating treatment failures.

-Removal of the causative agent in allergic diseases and photosensitization may be impossible, and symptomatic treatment may be the only practicable solution.

- Symptomatic treatment may also be indicated for welfare reasons in cases where the underlying cause of the disorder could not (yet) be identified. The veterinarian must be aware that in these cases antiinflammatory treatment, although indicated, may complicate further diagnostic workup. In some instances the primary disease may be confounded by the presence of a secondary agent, which can lead to confusion in diagnosis.

SUPPORTIVE TREATMENT

Supportive treatment may include prevention of secondary infection by the use of bacteriostatic ointments or dressings and the prevention of further damage from scratching.

- Effective treatment of pruritus depends on the reduction of central perception of itch sensations by the **use of ataractic, sedative, or narcotic drugs administered systemically or on successful restraint of the mediator between the lesion and the sensory end organ.**

-In the absence of accurate knowledge of the pathogenesis of pain, it is usual to resort to local **anesthetic agents**, which are short-lived in their activity, and **corticosteroids, which are longer-**

acting and effective, provided that vascular engorgement is part of the pruritus-stimulating mechanism.

- When large areas of skin are involved, it is important to prevent the absorption of toxic products by **continuous irrigation or the application of absorptive dressings.**

-Losses of fluid and electrolytes should be compensated by oral or parenteral administration of fluids containing the necessary electrolytes.

- Ensure an adequate dietary intake of protein, particularly sulfur-containing amino acids, to facilitate the repair of skin tissues.

- Boredom contributes significantly to an animal's response to itch stimuli, and close confinement of affected animals is best avoided.