Summary:

The physical and chemical barrier function of the skin protects the organism against harmful external influences, such as colonisation with bacterial pathogens. Due to their delicate and compact skin structure, dogs are predisposed to skin disease.

Chemical and Physical Barrier Function

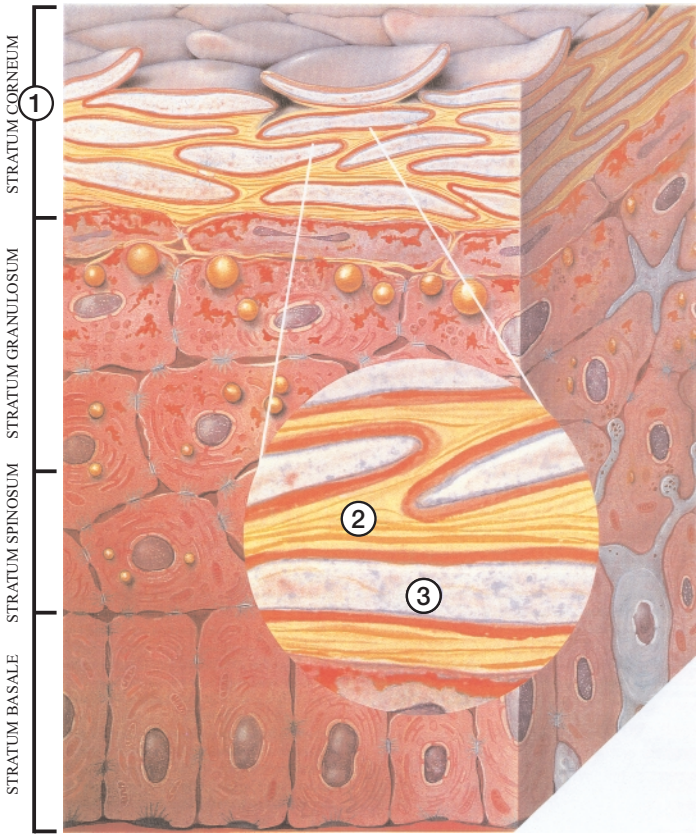
Skin represents a barrier composed of physical and chemical elements to protect the organism against harmful external influences. Although the coat is the first line of defense against pathogens, the major physical barrier appears to be the stratum corneum with a thick condensed layer of horny epithelial cells, soaked in an emulsion of sweat and sebum. Besides the physical barrier function, components of this emulsion such as linoleic acid also have chemical, e.g., antibacterial properties. Water soluble parts of the emulsion such as salts, proteins and immunoglobulins additionally have an inhibiting effect on bacterial growth.

Pyoderma is much more common in dogs than cats. It has been proposed that this is due to the delicate, compact structure of the canine stratum corneum and its paucity of intercellular lipid-rich material, the relatively high skin pH, as well as the absence of a lipid-squamous epithelium plug in the ostium of the hair follicle as seen in other species (2).

Resident Bacteria

The resident microbial flora on the skin surface and in the hair follicles contributes to the protective function of the epidermis. This flora consists of different apathogenic bacteria such as staphylococci, streptococci, micrococci and Acinetobacter species, which protect the skin's surface against the invasion of pathogens by their placeholder function and by the production of antibacterial substances (3).

Skin Infections / Ecology and Defense Mechanisms of the Skin / Canine Epidermis



(1) The thin stratum corneum of canine skin, composed of

(2) dead keratinocytes and

(3) sparse intercellular lipids, may account for a less efficient epidermal barrier against bacterial invasion than is seen in other species, leading to an increased frequency of pyoderma.

(From White PD: Essential Fatty Acids in Veterinary Medicine, Veterinary Learning Systems, Kansas USA, 1995 (modified))

References:

(2) Ihrke PJ: Bacterial skin disease in the dog: a guide to canine pyoderma. Veterinary Learning Systems Kansas USA, 1996

(3) Muller GH, Kirk RW, Scott DW: Bacterial Skin Diseases, in Muller GH, Kirk RW, Scott DW: Small Animal Dermatology, ed 4, W.B. Saunders Company Philadelphia: 211-246, 1989