



### Ceramides & Canine Atopy

A study of human atopic dermatitis (AD) showed obvious reduction of protein-bound ceramides in AD skin compared with normal skin. The canine stratum corneum (SC) has a pattern of free and protein-bound ceramides like that in humans. The SC of atopic dogs shows decreased free lipids and a highly significant reduction of protein-bound fatty acids and ceramides compared to normal canine SC. Large amounts of glucosylceramides are present, although they are nearly absent in normal canine SC.

This study analyzed the changes that occurred in SC lipids of dogs after 3 weeks of topical treatment with an emulsion (skin lipid complex [SLC]) containing ceramides, free fatty acids (FFAs), and cholesterol. Nonlesional SC was collected from control and treated areas of both atopic and healthy dogs. Free and protein-bound lipids were purified, analyzed, and

assayed. Levels of cholesterol and FFAs were lower in atopic dogs, although differences were not significant. Total ceramides were significantly reduced in untreated atopic SC, and high levels of glucosylceramides were found, in contrast to their near absence in normal SC. Free ceramide content of atopic SC was significantly increased after treatment, near that of normal canine SC; glucosylceramides were barely detectable. Topical treatment with SLC resulted in significant improvement of lipid biosynthesis of keratinocytes in atopic dogs, potentially enabling the formation of a tighter epidermal barrier.

#### ■ Commentary

The clinical features of human and canine AD are similar and appear to result from an impaired skin barrier, resulting in increased transepidermal water loss. In this study, twice-weekly application of a sphingolipid-containing emulsion resulted

in significant increases in free ceramides and normalization of glucosylceramides within the SC of atopic dogs. There were also increases in some protein-bound ceramides within treated SC, suggesting treatment with this emulsion may stimulate biosynthesis of some ceramides rather than simply replenishing deficient quantities. Further studies are needed to show whether repair of deficient skin barrier function in atopic dogs results in reduced clinical disease.—*Lisa Akuccewich, DVM, DACVD*

#### ■ ■ Source

The lipid alterations in the stratum corneum of dogs with atopic dermatitis are alleviated by topical application of a sphingolipid-containing emulsion. Popa I, Remoue N, Osta B, et al. *CLIN EXP DERMATOL* doi: 10.1111/j.1365-2230.2011.04313.x.



### Terbinafine: Cross-Species Antifungal

Terbinafine, a synthetic allylamine antifungal used commonly in human and veterinary medicine, is efficacious against the 3 most common veterinary dermatophytes (*Microsporum canis*, *M. gypseum*, *Trichophyton mentagrophytes*), with a reported minimum inhibitory concentration of 0.03 µg/mL. Terbinafine also exhibits low minimal fungicidal concentrations against most dermatophytes, allowing for higher efficacy and lower relapse rates than those observed with itraconazole. Terbinafine absorbs well orally and, like azole antifungals, is lipophilic and concentrated rapidly in the stratum corneum, reaching high concentrations in the sebum, hair, and nails. The elimination half-life from these tissues is prolonged at 4–5 days, and terbinafine levels in nails and hairs have been shown to remain at mean inhibitory concentrations for 90 days in humans and 37 days in cats posttherapy. Thus pulsatile dosing may be useful for treating dermatophytes in these species. Topical ophthalmic preparations of terbinafine have been shown to be 89% effective in treating human fungal keratopathies, but topical formulations of terbinafine in horses

and rabbits exhibited varying results. Terbinafine is associated with a low index of toxicity and few adverse effects.

#### ■ Commentary

Although use of terbinafine, relatively new to veterinary medicine, is becoming more common in dogs and cats, use in exotics is limited by lack of data. Of note is the discussion of terbinafine against dermatophytosis, one of the most common causes of skin infection of small mammals and pocket pets. Data regarding efficacy to treat other fungal infections are limited, although small studies may support its use and safety. This report can be especially helpful for practitioners who treat wildlife, avian patients, and other exotic pets.—*William Oldenhoff, DVM*

#### ■ ■ Source

Therapeutic review: Terbinafine. Keller KA. *J EXOTIC PET MED* 21:181-185, 2012.