paw®
PURE ANIMAL WELLBEING
By BLACKMORES

SKIN HEALTH

in Dogs & Cats

2022 edition for professional reference only

Skin: A fundamental barrier

The skin's most vital function is to form an effective anatomical and physiological barrier between the organism and its environment.[3] It serves to protect against chemical, physical and microbial afflictions, as well as the unregulated loss of water and solutes.[3, 4]

Did you know?

Dermatological disorders are the second most presented complaints in veterinary practice.[1, 2]

UNDERSTANDING THE NORMAL STRUCTURE OF THE SKIN

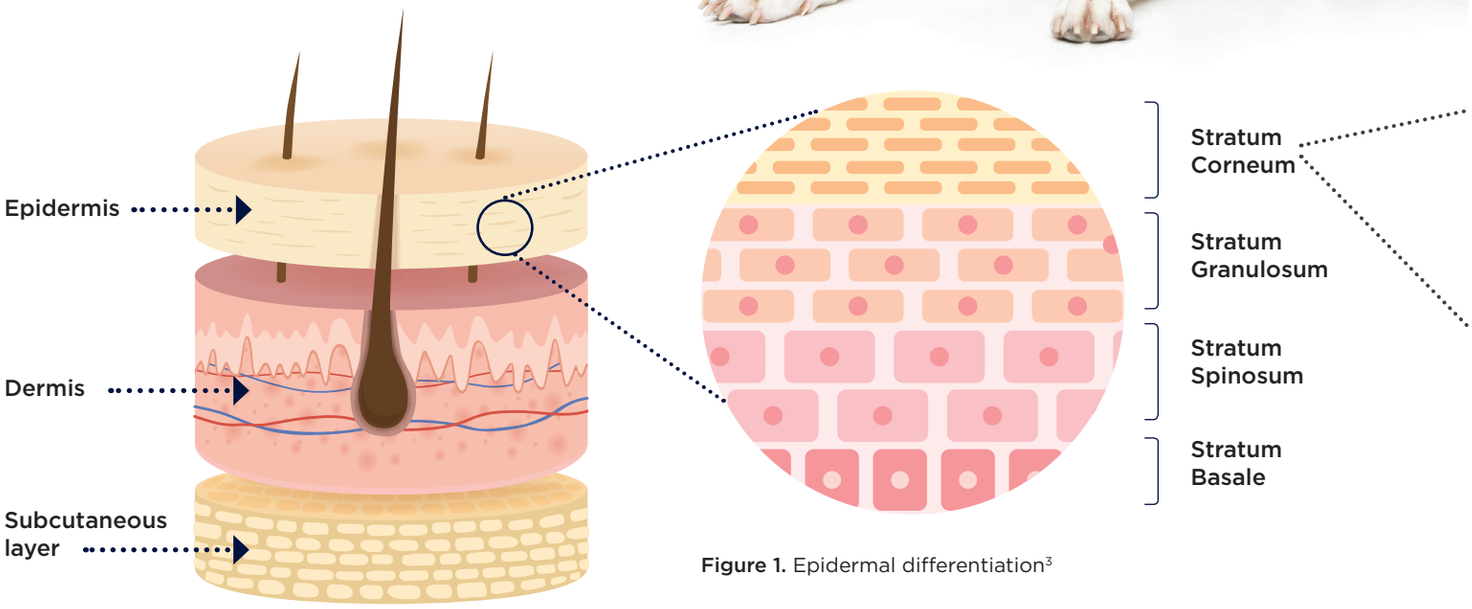
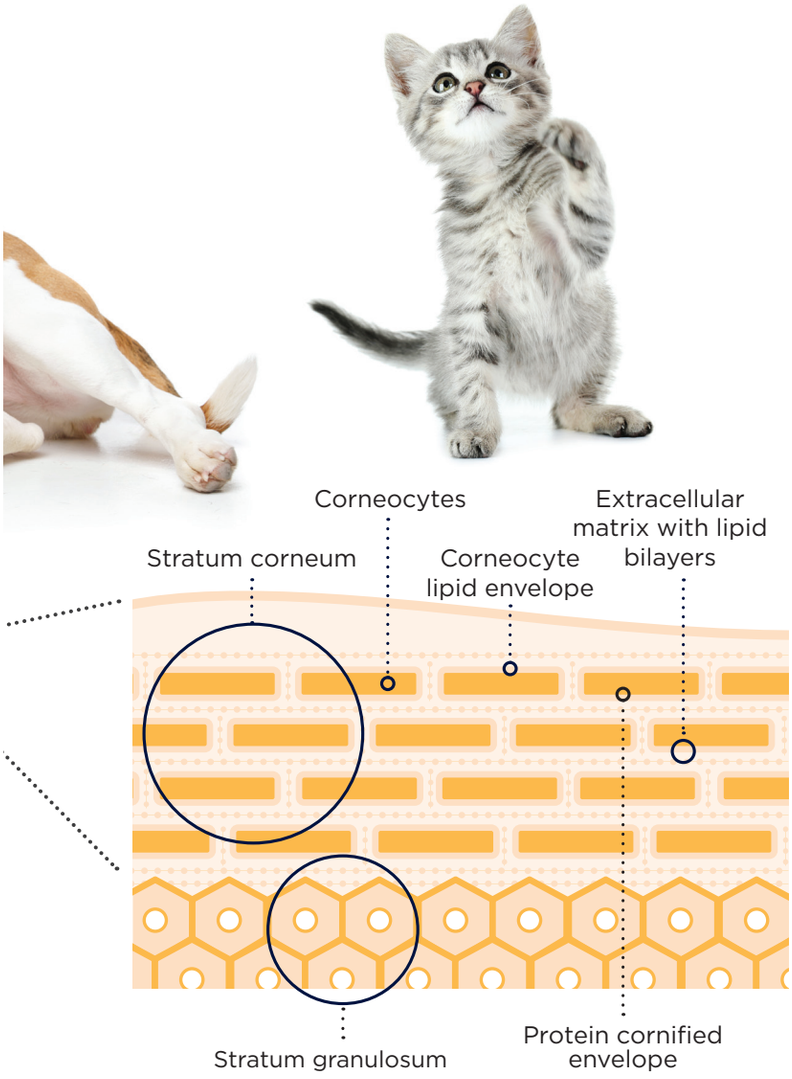


Figure 1. Epidermal differentiation[3]

EXPLORING THE EPIDERMIS IN MORE DETAIL

EPIDERMAL LAYER	DESCRIPTION
Stratum Corneum	Permeability barrier of the skin, which is made up of continually shedding corneocytes.
Stratum Granulosum	Formed by flattened nucleated keratinocytes which synthesise filaggrin, a structural matrix protein responsible for aggregating keratin into macrofilaments.
Stratum Spinosum	Here, lamellar granules are synthesised by the keratinocytes.
Stratum Basale	Formed by a single row of cuboidal cells, most of which are germinative keratinocytes. These keratinocytes are constantly reproducing and migrating upwards, differentiating through the layers to replenish the epidermal cells that are lost from the skin surface.



UNDERSTANDING THE ALL-IMPORTANT LIPIDS THAT CONSTITUTE THE EXTRACELLULAR MATRIX

1

Ceramides

Ceramides are the most important lipid component in the stratum corneum, accounting for 40-50% of the total lipids found in the stratum corneum. Ceramides play an essential role in barrier function and in limiting transepidermal water loss.[5,6] By fluidising the barrier lipids in the stratum corneum, they enable stretching and bending of the skin.[7]

2

Phytosphingosine

A key molecule in the natural defence mechanism of the skin, responsible for controlling local flora and maintaining the correct moisture balance.[8]

3

Cholesterol

Acts to optimise barrier function and to improve skin elasticity.

COMPONENT OF THE STRATUM CORNEUM	DESCRIPTION
Corneocyte	Layers of flattened terminally differentiated keratinocytes.
Extracellular matrix with lipid bilayers	Composed of ceramides, free fatty acids and cholesterol in a lamellar structure. Vital for effectively cementing the corneocytes together.
Protein cornified cell envelope	Each corneocyte is surrounded by this tough, proteinaceous envelope which provides structural integrity to the cells, while acting as a mechanical and permeability barrier.
Corneocyte lipid envelope	This ceramide rich lipid envelope is bonded to the outer surface of the cell envelope and is essential for normal skin barrier function.

An overview of problem skin

Skin issues are a common and frustrating problem frequently encountered in small animal practice.[9] Canine and feline skin may be impacted by many conditions including but not limited to allergies, endocrinopathies, ectoparasites and immune mediated conditions. These conditions are also associated with a compromise in the integrity of the skin barrier, either as a primary or secondary event.[10] Once barrier disruption has transpired, the skin consequently becomes more permeable to allergens and pathogens, leading to pruritis, inflammation, secondary infection and ultimately, perpetual barrier dysfunction.[11]

HEALTHY VERSUS DISRUPTED SKIN BARRIER

A healthy skin barrier effectively protects the host from invading pathogens and allergens, as well as excessive transepidermal water loss. However, when barrier dysfunction is present, the skin becomes more permeable to allergens and pathogens from the environment, and is susceptible to extensive water loss.

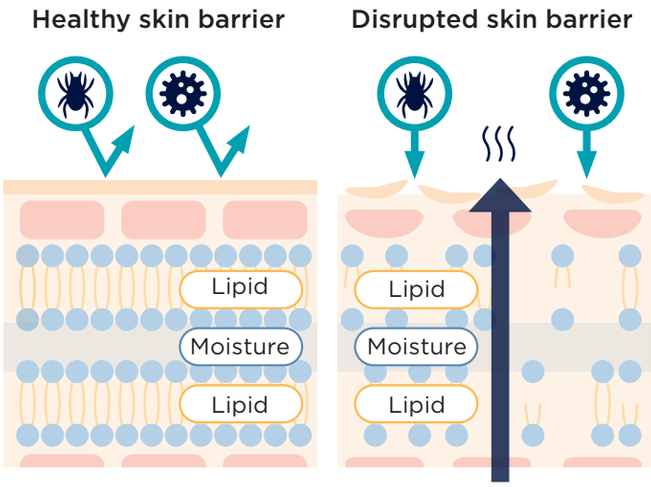
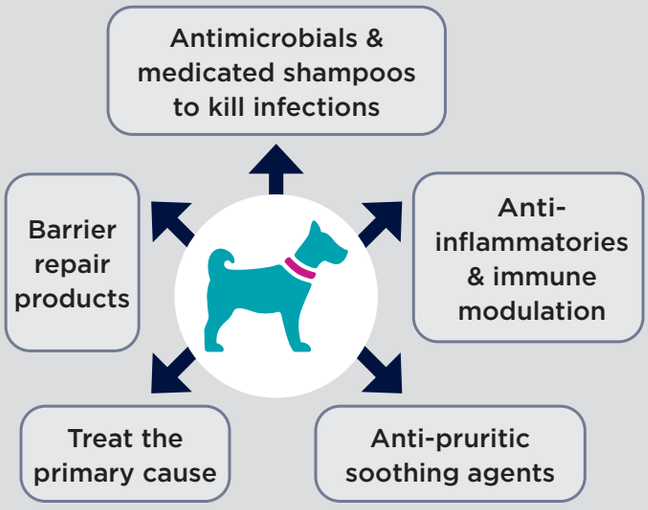


Figure 2. Healthy versus disrupted skin barrier

THE PILLARS OF MANAGEMENT

Due to the variability of the underlying causes, management of dermatological conditions requires a complex approach. As such, a combination of different forms of intervention are necessary to address the barrier dysfunction, inflammation, pruritis and secondary complicating infections that ensue.[2, 12, 13]



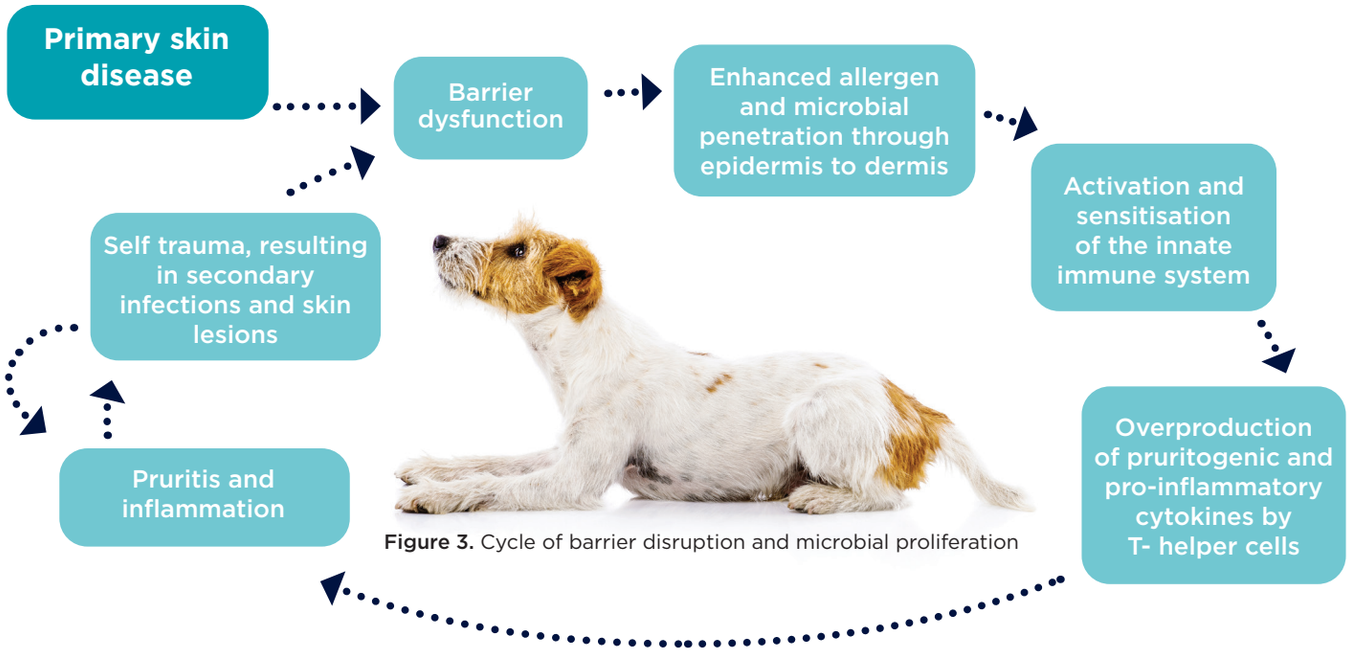


Figure 3. Cycle of barrier disruption and microbial proliferation

Allergic skin disease: Focusing on atopic dermatitis

It has been widely accepted that a significant skin barrier dysfunction exists in both human and canine atopic dermaxatitis (CAD). This in turn, critically increases cutaneous sensitivity to environmental irritants and pathogens and results in accelerated transepidermal water loss.[3, 5, 14, 15, 16]

THE PATHOGENESIS OF CANINE ATOPIC DERMATITIS

CAD is characterised by the presence of disrupted corneocyte layers, filaggrin abnormalities and most importantly, disorganised intercellular lipids due to a ceramide deficiency.[5, 6, 9, 15, 17]

An increase in free and protein-bound glycosylceramides suggests that an abnormality in the metabolism of ceramides may also play a role.[15] These changes lead to a significant disruption in the skin barrier, which in turn facilitates allergen penetration from the environment and sensitisation.[15, 21] Aside from the fundamental barrier abnormality, complex interactions between genetic, environmental and immunological factors also contribute to the multifactorial pathogenesis of atopic dermatitis. [4, 5, 11, 13, 18]

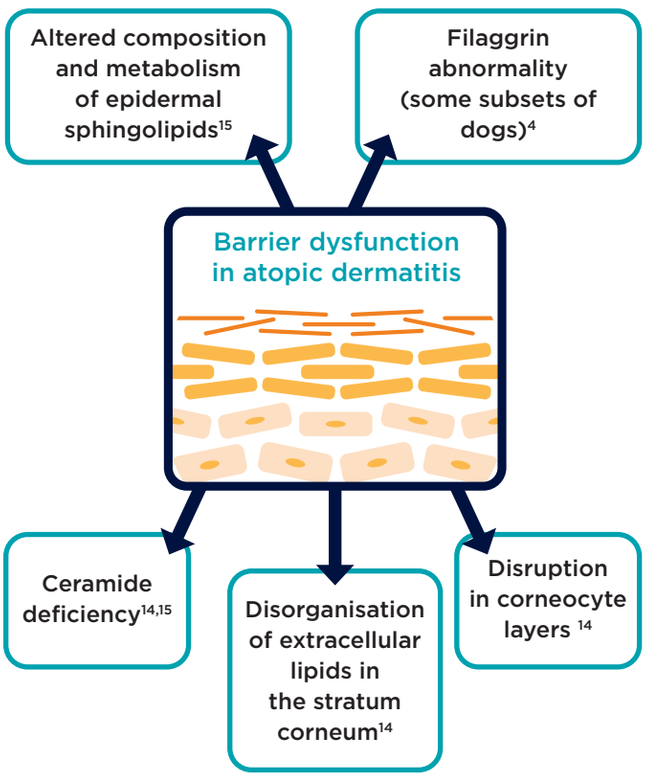


Figure 4. Factors contributing to barrier dysfunction in atopic dermatitis

THE DYSFUNCTION OF THE STRATUM CORNEUM IN PATIENTS WITH ATOPIC DERMATITIS RESULTS PRIMARILY FROM A CERAMIDE DEFICIENCY.[14]

Significant decreases in ceramides have been identified in human and canine atopic patients, leading to serious disruptions in extracellular lipid formation. It has been demonstrated that the continuity and overall thickness of the stratum corneum extracellular lipid lamellae, which is a prerequisite for optimal barrier function has been found to be significantly decreased in CAD.[16] **Most spaces were found to be devoid of lipid and when present, the lipid lamellae usually exhibited an abnormal and incomplete structure.[5]** Keeping in mind that ceramides are the most important lipid component in the stratum corneum, it is clear that this deficiency consequently leads to the increased permeability and significant transepidermal water loss observed in CAD.

INHERITED BARRIER ABNORMALITIES - FILAGGRIN

There is strong evidence to indicate that the inherited structural abnormalities of the stratum corneum in atopic dermatitis also involves filaggrin, a crucial component in epidermal barrier function. Filaggrin is a structural matrix protein that is essential for the aggregation and alignment of keratin into filaments to form the flattened corneocytes of the stratum corneum.[17] Loss of this quantitatively important protein could alter corneocyte flattening sufficiently to contribute to the disorganisation of the extracellular lipid bilayer.[4] In addition, filaggrin is a source of free amino acids (natural moisturising factors) that are essential for the normal hydration and barrier function of the stratum corneum.

BREAKING THE ITCH SCRATCH CYCLE

Did you know?

CAD is the most common cause of pruritic allergic skin disease in dogs with approximately 10% of the canine population affected globally. [5, 17, 18]

Canine atopic dermatitis has been shown to affect the quality of life of both pet and owner, not only due to the intense pruritis and irritation that many dogs endure, but also owing to the chronic relapsing nature of the disease.[9, 21] Thus, addressing pruritic discomfort is essential in the management of these patients.

A SPOTLIGHT ON TOPICAL THERAPY

Topical therapy such as shampoos, play an essential role in the management of all cases of CAD.[9] In many instances, they can even be used as a sole therapeutic agent or alternatively, as adjunctive therapy, effectively minimising the need for systemic therapy.[8, 9]

Shampoo therapy can provide immediate pruritic relief via the following means:[8]

- Allergen removal
- Desensitisation of the skin
- Moisturising effects
- Other direct anti-pruritic effects

OATMEAL, A NATURAL ANTI- INFLAMMATORY

Oatmeal is a centuries old topical treatment which has been used for a variety of human skin conditions including skin rashes, erythema, burns, itch and eczema. Colloidal oatmeal, created by boiling finely ground whole oat kernels to extract the colloidal material, has been highly effective in the management of human and animal dermatological conditions due to its anti-inflammatory, anti-pruritic, antioxidant and moisturising properties.[9, 12, 22] When applied, fine particles of polysaccharide starch are deposited on the skin to form an occlusive and water binding colloidal film that retains moisture in the stratum corneum, thus improving dry skin conditions.[23] Whilst enhancing the skin barrier, it also helps to soothe pruritis and alleviate scratching.[4, 24]

PAW Nutriderm® Replenishing Shampoo

Benefits

Hypoallergenic, sulphate free and soap free cleansers for an effective, gentle clean without stripping natural oils from the skin.

Soothing colloidal oatmeal for immediate **relief from pruritis**.

Key moisturising nutrients including **rosehip oil and vitamin B5** to optimise skin hydration and **maintain the skin barrier**.

No artificial fragrances

Active Ingredients:

Colloidal Oatmeal: 21g/L
Rosehip Oil: 1g/L

Size: 200mL tube and 500mL bottle. Also available as duo pack with PAW Nutriderm® Replenishing Conditioner.

Application: Use for bathing every 1 to 2 weeks. Leave on for 5 minutes, and then rinse with clean water.

Warnings/safety: Store below 30°C (room temperature).

ADDRESSING BARRIER DYSFUNCTION WITH CERAMIDES

Given that the integrity of the skin barrier is fundamentally compromised in CAD, a therapeutic approach should focus not only on the control of inflammation and pruritis, but also on the restoration of the defective barrier.[21] Indeed, excellent skin care remains a cornerstone of management.[25] Skin barrier repair involving the topical application of ceramides is a promising approach to management.[4, 5] Ceramide therapy is directed at addressing the prominent lipid abnormalities responsible for the barrier defects in atopic dermatitis through the restoration of the physiological skin lipid profile.[4, 6, 9]

A topical treatment containing sphingolipids improved the clinical signs of dogs with atopic dermatitis.[6]

Twelve dust mite allergic beagles were randomised into control or treatment groups. Treatment dogs had a topical combination of sphingolipids (providing high amounts of sphingomyelin, a ceramide precursor) and hyaluronic acid applied for 8 weeks.

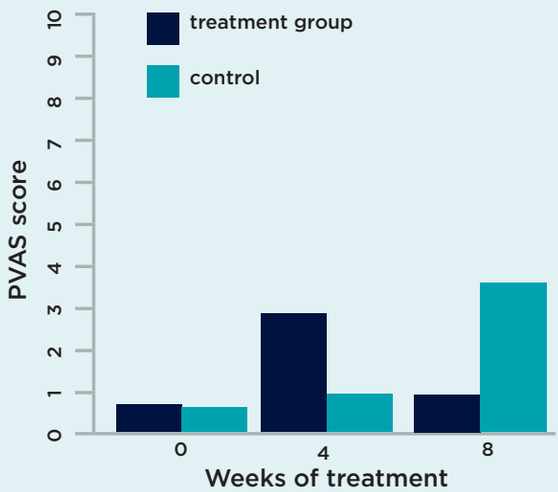
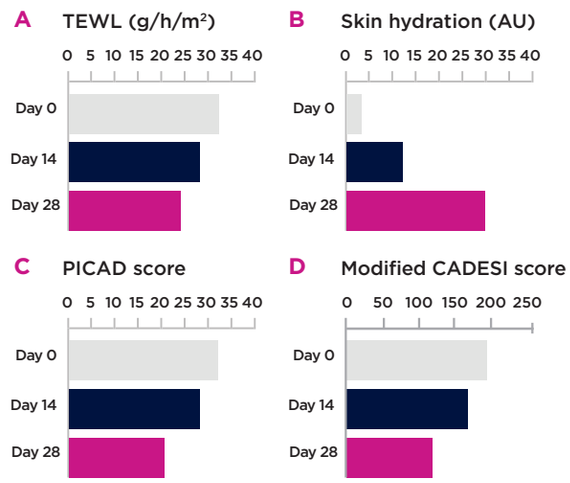


Figure 5: Pruritis scores in the treatment and control groups over the 8 week period.

A significant reduction in the pruritis visual analog scale (PVAS) scores was observed after 8 weeks. Furthermore, the treatment group presented a significantly lower mean CADESI (Canine Atopic Dermatitis Extent and Severity Index) after 1 week and fatty acid levels in the skin were enhanced as a result of the application, suggestive of an improvement in the skin barrier.

Application of a moisturiser containing ceramides, fatty acids and cholesterol can effectively improve barrier dysfunction and ameliorate clinical symptoms associated with atopic dermatitis.[5]

- Twenty dogs with mild to moderate clinical signs of atopic dermatitis.
- A ceramide containing moisturiser was applied all over the body once daily for 4 weeks.
- TEWL, skin hydration, PICAD and CADESI obtained on Day 0, Day 14 and Day 28.



A Transepidermal Water Loss (TEWL) decreased significantly after application of the moisturiser.

B Skin hydration was increased more than four-fold at both 2 and 4 weeks after moisturiser application.

C The Pruritus Index for Canine Atopic Dermatitis (PICAD) scores for most canine participants showed gradual improvement over time.

D The modified Canine Atopic Dermatitis Extent and Severity Index (CADESI) scores improved after 2 and 4 weeks of treatment with moisturiser containing physiological lipids.

Figure 6 : Changes in score for clinical characteristics and functional parameters.

Skin punch biopsies were examined by electron microscopy on day zero and one day after final moisturiser application.

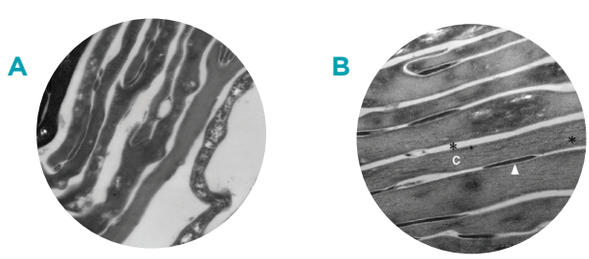


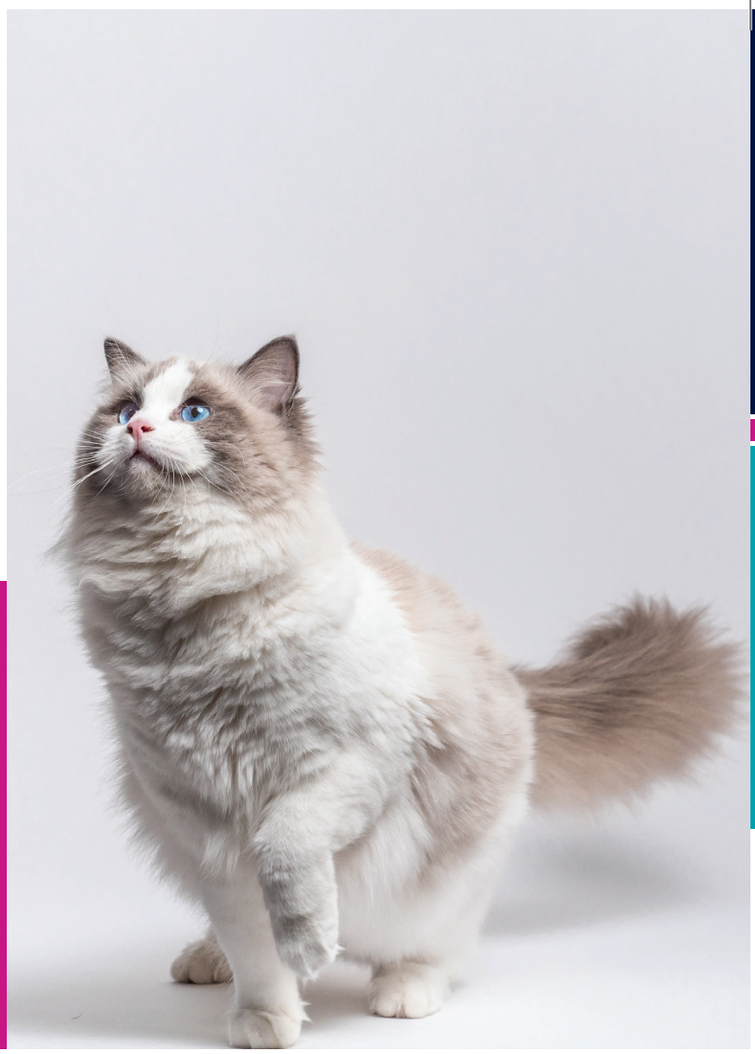
Figure 7: Transmission electron micrographs of the upper epidermis before and after moisturiser treatment.

A Prior to treatment, corneocyte arrangement was highly disorganised with wide intercellular spaces.

B After moisturiser application, corneocyte organisation became regular and compact within the stratum corneum.

TOPICAL CERAMIDE APPLICATION CONFERS MULTIPLE BENEFITS

- Improves the ultrastructure of the stratum corneum
- Restores the disorganised and abnormal lipid lamellae in the stratum corneum by increasing the number of lipid lamellae[5, 15]
- Increases ceramide content in the skin[15, 21]



Did you know?

Topical creams with skin barrier enhancing properties increase the time between flare-ups and reduce relapses by about one-third compared with no treatment[15]

PAW Nutriderm® Replenishing Conditioner

Benefits

Colloidal oatmeal for immediate **soothing effect.**

Contains **Cerasine®**, a skin nutrient complex containing **ceramides, essential fatty acids and phytosphingosine** to intensively nourish and hydrate the skin, thus improving **skin barrier health.**

Ceramides, in particular, act to effectively **cement the skin cells together**, enabling the conditioner to fulfill the function of a **barrier cream.**

Highly versatile with three different application options - leave on, spray on or rinsed off as per a normal conditioner.

Active Ingredients:

- **Colloidal oatmeal: 21g/L**
- **Cerasine® complex: 5g/L**
- **Jojoba oil: 5g/L**
- **Avocado oil: 5g/L**
- **Shea butter: 5g/L**
- **Rosemary leaf extract: 1g/L**
- **Rosehip oil: 3g/L**

Size: 200mL tube and 500mL bottle. Also available as duo pack with PAW Nutriderm® Replenishing Shampoo OR as duo pack with PAW Mediderm® Gentle Medicated Shampoo.

Application: Use for bathing every 1 to 2 weeks. Wet animal thoroughly with clean water. Leave on for 5 minutes and then rinse with clean water. Alternatively, use as a leave on straight from the tube/ bottle or diluted and sprayed on (1 part conditioner: 2 parts water). For best results when used as a leave on, apply daily.

Warnings/safety: Store below 30°C (room temperature).

Skin: A fundamental barrier

When skin infections occur, it is typically secondary to underlying cutaneous, metabolic, or immunologic abnormalities, with allergies being the leading cause of recurrent pyodermas.[26] The inflamed and damaged skin of atopic dogs is often further complicated by secondary bacterial and yeast infections, leading to intense pruritis, self- trauma and further aggravation of the barrier abnormality.[18]

Did you know?

Up to 66% of dogs affected with atopic dermatitis show evidence of secondary bacterial skin infection.[27]

In atopic dermatitis, the defective permeability barrier predisposes to pathogen colonisation and proliferation. This occurs as a consequence of reduced levels of free fatty acids and the loss of normal defence mechanisms such as phytosphingosine, which exhibits potent antimicrobial activity.[4] The effect of systemic immunosuppressive drugs given to treat the primary disease also contribute to the vulnerability of patients with atopic dermatitis to bacterial skin infections, especially ones caused by Staphylococcal species.[4, 5, 16] Likewise, Staphylococcal and *Malassezia* infections are very common in allergic cats.[19]

The lowdown on topical antimicrobial therapy

Management of recurrent bacterial infections in dogs and cats is becoming a major challenge due to the rise in multidrug resistance.[21] As such, chronic use of systemic antibiotics should be minimised, and topical antimicrobial therapies selected preferentially in these patients.

Why use topical antimicrobial shampoo therapy?[1]

- Effective in decreasing microbial counts
- Reduces the surface colonisation of microbes, thus aiding in the prevention of relapses
- Allows a more rapid response to therapy
- Leads to a decrease in the duration of antimicrobial administration when used in conjunction with systemic therapy for deep pyodermas

PIROCTONE OLAMINE

Piroctone olamine belongs to a class of broad-spectrum antimicrobials known as the hydroxypyridones. It possesses a broad spectrum of antimicrobial activity, including both gram positive and gram negative bacteria, dermatophytes and yeasts.[28] Piroctone olamine exhibits a unique mode of action that affects iron dependent enzyme systems (e.g. cytochromes, catalase, peroxidase) and the transport mechanisms of the cytoplasmic membrane.[29, 30] Furthermore, it has an extremely wide safety margin as seen in toxicity studies across several species, including dogs.

Did you know?

Piroctone olamine has a high affinity for keratin in hair and skin and has been observed to show persistent efficacy for at least four days post administration.[31, 32]

PAW Mediderm® Shampoo effectively kills *Staphylococcus* and *Malassezia spp*.[33]

Controlled studies have shown that PAW Mediderm® Shampoo, with piroctone olamine as its key active, has a broad spectrum of activity against a range of clinically important bacterial and fungal species, including the major veterinary pathogens that cause superficial dermatitis, pyoderma, and seborrhoea, namely *Staphylococcus spp*. and *Malassezia spp.*.

In a controlled study PAW Mediderm® Shampoo was shown to have high efficacy rates.

THE MEAN INHIBITORY CONCENTRATIONS (MIC) OF PIROCTONE OLAMINE[34]

TARGET ORGANISMS	MIC (ug/mL)
Staphylococcus pseudintermedius	25.0- 31.5
Malassezia pachydermatis	62.5
Microsporum canis (leading cause of ringworm)	1.95

Mediderm® contains 7,000 ug/mL piroctone olamine which well exceeds the MICs of target microbes even when diluted 1 in 10 (700ug/mL).

PAW Mediderm® Shampoo is as efficacious as chlorhexidine/ miconazole whilst exerting much gentler effects on skin and hair[34]

In a multicentred, randomised efficacy study, 97 dogs with superficial pyoderma due to *Malassezia* were treated with either Mediderm® or chlorhexidine/miconazole for a period of 3 weeks. Efficacy rates for clinical dermatitis and skin and hair scores were measured over this timeframe.

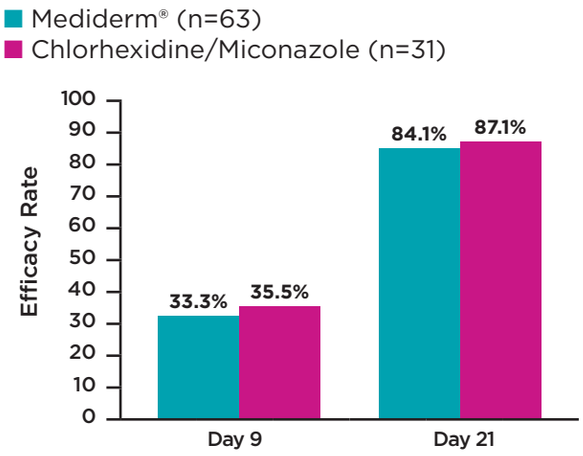


Figure 8: Efficacy rates for clinical dermatitis scores

Mediderm® was as effective as chlorhexidine/ miconazole for clinical dermatitis, with no statistical differences at all timepoints.

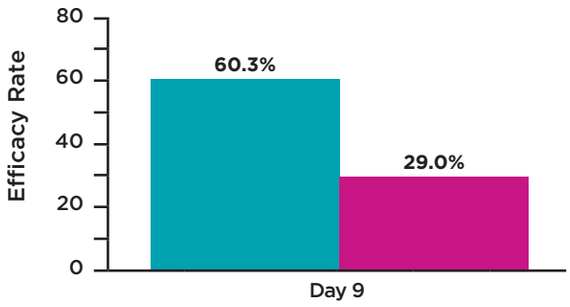
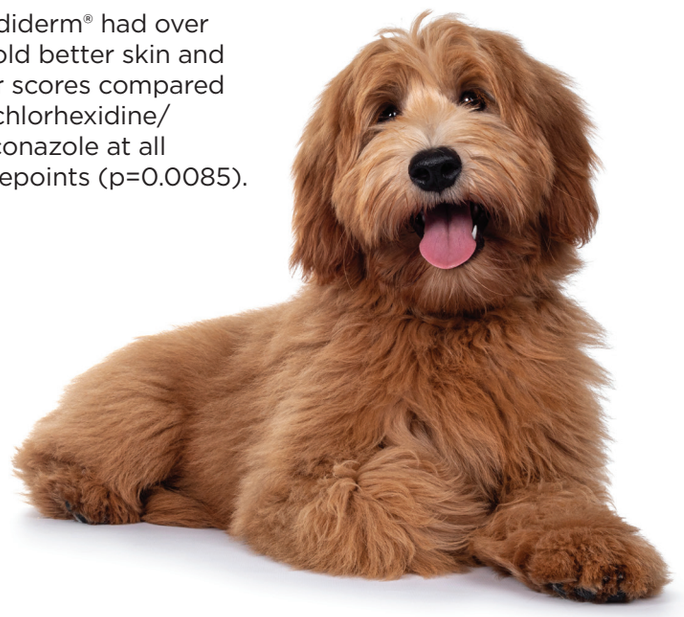


Figure 9: Efficacy rates for skin/hair scores

Mediderm® had over 2-fold better skin and hair scores compared to chlorhexidine/ miconazole at all timepoints (p=0.0085).



PAW Mediderm® effectively treats superficial dermatitis[35]

PAW Mediderm® Shampoo was evaluated in a placebo controlled clinical trial featuring twelve dogs, three of which were control animals. Nine dogs were treated with Mediderm® Shampoo for 21 days to assess its efficacy in the treatment of superficial bacterial or yeast dermatitis.

A 100% improvement was recorded with regards to pruritis, seborrhoea and odour.

% Improvement in clinical signs at day 21
PAW Mediderm® Shampoo & placebo

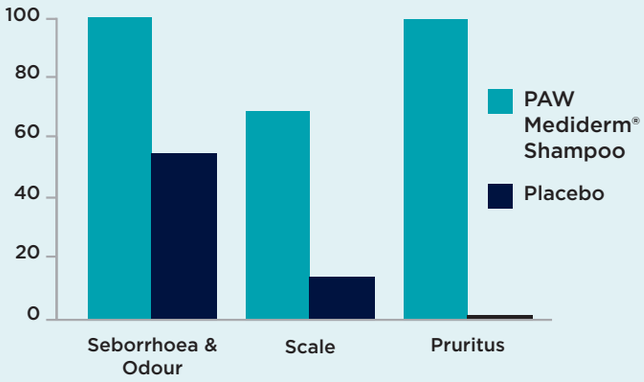
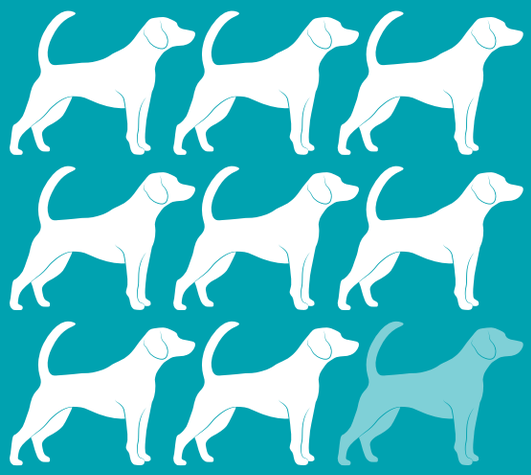


Figure 10: % improvement in clinical signs at day 21 in test (PAW Mediderm®) and control animals.

8/9 dogs



were classed as responding effectively or very effectively to treatment.

Over 70% improvement in relation to the extent and severity of skin lesions (erythema/ papule/ pustules, crusts, and hair loss) was considered effective or very effective treatment.

PAW Mediderm® Gentle Medicated Shampoo

Benefits

- **Piroctone olamine** treats **bacterial** and **fungal** skin infections.
- **Gentle low-irritant formula** containing hypoallergenic, sulphate and **soap free** cleansers.
- Piroctone olamine is **not scheduled** and is therefore **very safe** to use - no gloves required.
- **5 minute contact time** makes bathing faster and so much simpler for pet and owner alike.
- **APVMA registered.**

Active Ingredients:

Piroctone olamine: 7.21g/L

Size: 200ml tube & 500ml bottle. Also available as duo pack with PAW Nutriderm® Replenishing Conditioner.

Application: Wet animal thoroughly with clean water. Leave on for 5 minutes, and then rinse with clean water.

Acute treatment: Use twice weekly for 3 weeks.

Regular treatment: Use once a week for 6 weeks for infection prone skin.

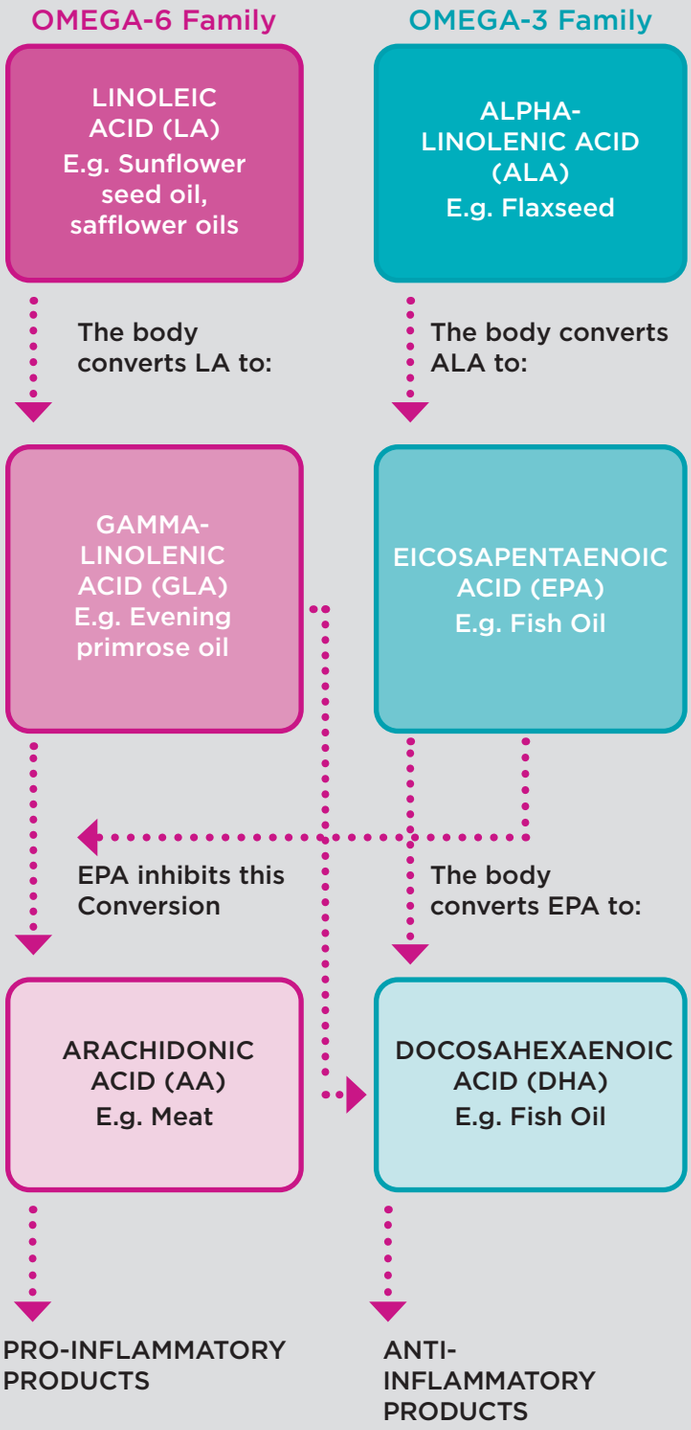
Warnings/safety:

- For animal use only.
- Wash hands after use.
- No data has been provided for use on pregnant or lactating dogs.
- Avoid contact with eyes. If product gets in eyes, rinse well with water.
- Store below 30°C (room temperature).

Addressing inflammation and a dysfunctional skin barrier with essential fatty acids

Oral essential fatty acid supplementation has been widely studied in canine atopic dermatitis.[11] As normal constituents of the stratum corneum, essential fatty acids can alter skin's structural and immunological status and therefore the integrity of its permeability barrier. They also act to inhibit the production of pro-inflammatory eicosanoids, as well as reactive oxygen species and cytokines, thus impacting the inflammatory response.[2, 11, 36]

ESSENTIAL FATTY ACID PATHWAYS



THE ROLE OF FATTY ACIDS AS AN ANTI-INFLAMMATORY

Essential fatty acid supplementation with omega-3 fatty acids (EPA and DHA) in combination with omega-6 fatty acids (LA) has been proven to decrease skin inflammation and provide relief for pruritis associated with canine atopic dermatitis.[2, 24]

This is accomplished via the following means:

- Shifting the arachidonic acid cascade towards the production of anti-inflammatory eicosanoids, whilst concurrently decreasing the synthesis of pro-inflammatory counterparts[9, 12, 24, 37]
- Modulation of cytokine production (particularly IL- 2), cellular activation and secretion[2, 24, 37]
- The production of resolvins (cell signalling molecules) with anti-inflammatory and immunoregulatory properties as a consequence of EPA and DHA metabolism

As inflammation impacts the integrity of the skin barrier, the control of inflammation is imperative in addressing atopic dermatitis.[15]

Did you know?

It has been estimated that approximately 20% of dogs with allergic pruritis can be adequately controlled by essential fatty acid supplementation alone, with no other treatment necessary.[37]

Essential fatty acid supplementation has a steroid sparing effect[37]

In a randomised, double blinded, placebo controlled, multicentred clinical trial of 60 dogs with atopic dermatitis, an essential fatty acid supplement significantly reduced prednisolone consumption by approximately 50% after administration for 8 weeks in dogs with atopic dermatitis.

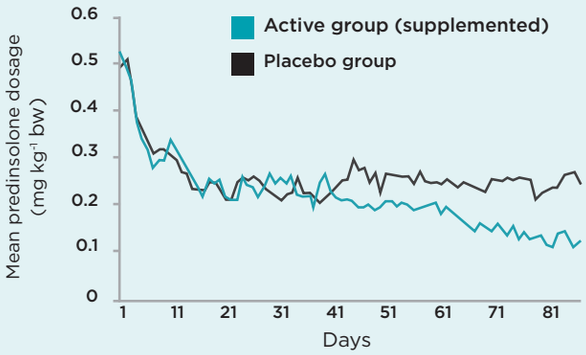
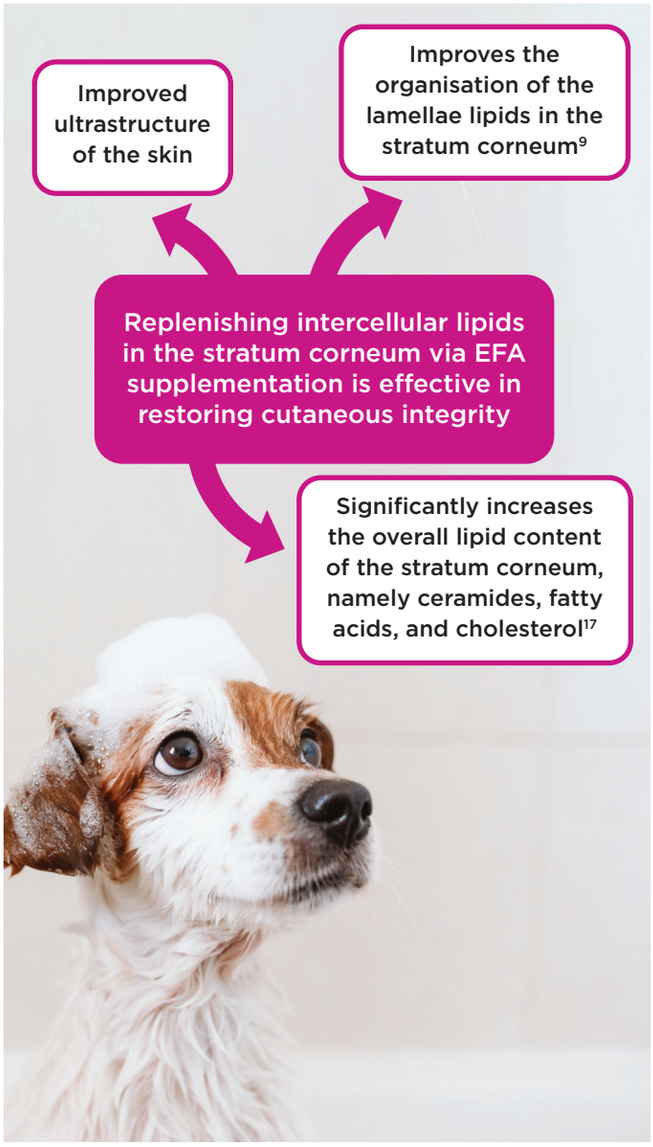


Figure 11: The mean dose of prednisolone in mg/kg body weight received in the active and placebo groups during the test period (day 1 to 84).

In short, essential fatty acids (EFAs) have a synergistic effect in decreasing the clinical signs of pruritic dermatitis when used in combination with glucocorticoid therapy, and thus have a steroid sparing effect.

Unwanted side effects are common in both long and short term glucocorticoid treatment, whereas the therapeutic use of EFAs seldom leads to undesirable side effects.[21, 37]



THE ROLE OF FATTY ACIDS IN BARRIER REPAIR

Along with the topical application of products containing a combination of ceramides and fatty acids, oral essential fatty acid supplementation has also been used to address barrier repair.[21] Systemic administration of EFAs, particularly those rich in omega-6 fatty acids has been shown to improve lipid deficiencies in the skin of dogs and cats with allergic dermatitis, as well as gloss and coat quality.[16, 20] One proposed mechanism of action is the incorporation of EFAs into the skin barrier and therefore improvement of skin barrier function.[7, 27]

In particular, it has been well documented that linoleic acid (LA) is essential for barrier function, with supplementation resulting in a significant decrease in transepidermal water loss.[2, 37]

Optimal barrier function is dependent upon the LA content of the epidermal ceramide fraction given its role in enhancing the cohesion between lipid sheets that make up the intercellular lamellae.[12, 38]

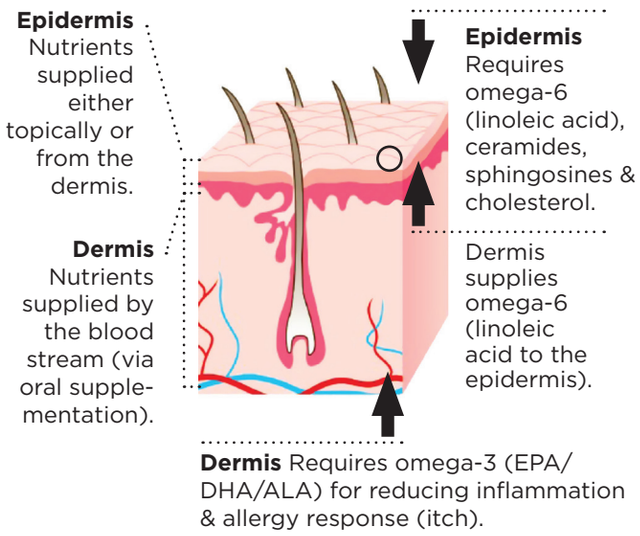


Figure 12. Omega-3 and omega-6 essential fatty acids are required in the dermal and epidermal layers of the skin, respectively, to support overall skin health.

PAW Fish Oil 500: Veterinary strength

Benefits

- **Rich in omega-3 fatty acids, EPA & DHA** to maintain optimal health and wellbeing in dogs.
- Formulated with an **optimal 55:45 ratio of EPA to DHA for dogs**, according to the US National Research Council.
- Provides support for **joint, skin, heart, kidney and brain health.**
- **Sustainably sourced and rigorously tested** to meet mercury, dioxin and PCB standards.
- **Simple & easy dosing** in the form of a pump bottle.

Active Ingredients (1 pump = 0.5ml)

- **Eicosapentaenoic acid (EPA): 275mg**
- **Docosahexaenoic acid (DHA): 225mg**

Size: 200ml pump bottle.

Dosage: 125mg/kg$^{0.75}$ (effectively 1.5mL/10kg dog for atopy).

Warnings/safety:

- The most commonly expected adverse events are mild, self-limiting gastrointestinal signs.
- Other uncommon or rare side effects may include platelet inhibition, delayed wound healing, weight gain and altered immune function. Consider discontinuing high doses for 2-3 weeks prior to and following surgery.
- Hyperglycaemia is a potential adverse effect and caution should be used in diabetic patients receiving insulin concurrently.
- Store below 25° (air conditioning).
- Protect from light & store in a dry place.

PAW Dermega® Omega 3 & 6 oral supplement

Benefits

- **Contains omega 3 & 6** fatty acids to aid in the treatment of **allergic skin conditions.**
- Ideal for dogs with **inflamed, allergic and/or itchy skin.**
- Beneficial for dogs with **dry, flaky skin** for **long term skin barrier support.**
- Suitable for dogs with normal skin to **maintain a healthy shiny coat.**
- **Easy dosing** in the form of a pump bottle.

Active ingredients/1ml (1 pump = 0.5ml):

- **Eicosapentaenoic acid (EPA): 85mg**
- **Docosahexaenoic acid (DHA): 59mg**
- **Alpha-linolenic acid (ALA): 120mg**
- **Linoleic acid (LA): 38mg (Sourced from fish oil & linseed oil)**

Size: 200ml pump bottle.

Dosage: 1ml (2 pumps) per 7kg body weight.

Application: Pump directly onto dog's food once daily.

Warnings/safety:

- If used in the treatment of flea-allergy dermatitis, flea control measures should also be used.
- Store below 25° (air conditioning).
- Protect from light & store in a dry place.

CHOOSING THE RIGHT DERMATOLOGY SOLUTION

Step 1. Choosing the right shampoo

Is there an active skin infection?

YES

Potential infections may include:
- Superficial dermatitis with Staphylococcal *+/- Malassezia spp.*
- Superficial pyoderma or 'hot spot.'
- Juvenile pustular dermatitis or 'puppy pyoderma.'
- Seborrhoea.

Mediderm® Gentle Medicated Shampoo

Low irritant, antibacterial and antifungal shampoo to aid in the treatment of canine skin infections whilst minimising the impact on the protective skin barrier. With a short contact time of only 5 minutes, it utilises the active, piroctone olamine, to treat infections safely and effectively.

NO

Is there a history of or predisposition to recurrent skin infections?

YES

Predispositions that may require long term preventative management include:
- Parasitic skin disorders: including flea allergy dermatitis, demodicosis, sarcoptic mange.
- Immunologic skin disorders: including atopic dermatitis, adverse food reactions, contact allergies.
- Metabolic skin conditions: including hypothyroidism and hyperadrenocorticism.
- Neoplastic skin conditions.

NO

- Dry and flaky skin.
- Itchy skin.
- Normal skin.

Nutriderm® Replenishing Shampoo

Instantly soothing colloidal oatmeal and moisturising rosehip oil helps gently clean and provides relief from inflammation and itchiness while maintaining a healthy skin barrier.

Step 2. Always follow with conditioner

Mediderm® Gentle Medicated Shampoo **OR** Nutriderm® Replenishing Shampoo

Nutriderm® Replenishing Conditioner

Containing a skin nutrient complex with ceramides, essential fatty acids and phytosphingosine, Nutriderm® Conditioner intensively nourishes the skin to ensure optimal skin hydration and supports the function of a healthy skin barrier. Can be used short-term but recommended for long-term skin barrier support for all dogs.

Step 3. Oral skin support with essential fatty acids

Does the patient require treatment for inflamed skin or long term management for itchy, dry or flaky skin?

INFLAMED

Fish oil 500

Contains anti-inflammatory omega- 3 fatty acids EPA and DHA to provide relief from inflammatory skin conditions.

LONG-TERM MANAGEMENT

Dermega®

Omega 3 and 6 essential fatty acids to target inflammation and for long term support of barrier health. Use in chronic skin cases to further protect from allergen penetration and to prevent skin infections.

Introducing the PAW Practitioner Range

Developed for vets, by vets.

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