

## TOPICAL THERAPIES IN VETERINARY DERMATOLOGY

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### Shampoo/conditioner indications:

- Cleansing
- Moisturizing
- Antibacterial
- Antifungal
- Antiseborrheic
- Anti-itch

### Guidelines for shampoo use

- Choose the right products for the specific condition being treated
- Give specific instructions for use, ie. frequency of use, leaving lather on an adequate period of time, etc.
- If present, treat infections systemically as well
- Recheck regularly/modify therapy as needed

### Cleansing shampoos

- Normal dogs: bathe no more frequently than q 10-14 days
- Use mild shampoo +/- conditioner



### Moisturizing shampoos/conditioners

- Used for dry, mildly flaky skin
- Leave in products have better contact time
- Esp. use after drying benzoyl peroxide and tar shampoos



### A dog with a dry, dull coat



## Antibacterial products

- Used for bacterial skin infections/pyoderma
- In very mild infections, antibacterial shampoos and conditioners alone may be sufficient
- In most cases, topical products are used in addition to oral antibiotics to help speed resolution of infection.
- Antibacterial shampoos/conditioners are also helpful as preventative therapy in animals with recurrent pyoderma

## Superficial Pyoderma - Lipfold intertrigo



## Canine Pyoderma - Topical Treatment

- Topical therapy - Localized infections
  - Mupirocin BID
  - Chlorhexidine spray, wipe or flush BID
  - Silver sulfadiazene BID
- Less ideal: neomycin (increased risk of contact dermatitis), polymyxin B/bacitracin (inactivated by organic debris), gentamicin/betamethasone (cutaneous atrophy with long term use)



## A dog with staph pyoderma



## Antibacterial products

- Chlorhexidine 2%-4%
  - works well in organic debris, residual activity up to 2 days
  - higher concentrations also effective for yeast infections
  - Antimicrobial activity is superior to povidone iodine and ethyl lactate, and is non-drying compared to benzoyl peroxide
  - Available as shampoo, spray, wipes, conditioner, flush
- In vitro study demonstrated equivalent and excellent minimum bacteriocidal activities (MBC) of 2%, 3% and 4% chlorhexidine shampoos with MBC of 1:1024 - 1:2048 for *Staphylococcus pseudintermedius* (both methicillin-susceptible and methicillin-resistant) at 10 minutes incubation time.



## Post grooming furunculosis



## Miconahex

- MiconHex+Triz Shampoo, contains 2% miconazole and 2% chlorhexidine, TrizEDTA, and ceramides.
- TrizEDTA has been shown to provide antimicrobial and antibiotic potentiating activity by disrupting bacterial cell walls making the cell wall more porous.
  - G- bacteria more affected than G+ bacteria
- Ceramides aid in moisturizing, repairing, and restoring dry, damaged skin, improve epidermal barrier.
- Miconazole also has antibacterial effects on Staph bacteria
  - Mechanism of action not known, possibly direct Staph. membrane damage, induction of Staph intracellular reactive oxygen species
  - In vitro study of 202 MSSP, MRSP and MRSA isolates showed miconazole MIC was 1-8ug/ml, E. coli controls were not inhibited
  - 2% miconazole shampoo = 20,000ug/ml, though differences in vivo use including pH, temperature, organic debris etc. are unknown



## Antibacterial products

- Benzoyl peroxide
  - also degreasing, used for oily skin
  - removes scale
  - In vitro, compared to chlorhexidine, benzoyl peroxide shampoo required a longer period of incubation of 30-60 minutes for bacterial killing, and higher MBC of 1:64 – 1:256.
  - can be irritating/drying, follow with conditioner



## Antibacterial products

### Bleach compounds

- Hypochlorous acid damages bacterial cellular membranes in a similar mechanism of action as the neutrophil oxidative burst.
- Helpful for aggressive topical therapy for methicillin resistant skin infections in which oral antibiotic choices may be limited.
- Vetericyn VF spray
  - Active ingredient is hypochlorous acid (HOCl): 0.01%
  - Non-irritating, pH in the physiologically acceptable range, and shelf-stable for up to 24 months from the date of manufacturing.
  - Small in vivo study on pyoderma dogs indicated it was not superior to water





## Antibacterial products

Dilute bleach – Different dilutions recommended on VIN

- Full strength (0.5%) Dakin's solution: 1 part bleach to 10 parts water, or about 3 oz bleach to 32 oz of water (1 quart). Add 1/2 tsp baking soda for buffering. Use as whole body rinse after bathing daily.
- Most people use lower bleach dilutions of 0.125% to 0.25%
  - 1 tablespoon of bleach and add it to a gallon of water and sponge on or spray on daily.
  - 1:32 dilution of 6% household bleach, or 1 oz bleach per quart of water.
  - 1-2 tsp bleach per gallon, or 1/4 - 1/2 cup bleach per bathtub 1/4 full water. Soak for 5-30 min daily for 5 days then twice weekly until resolution.
- These recommendations are based on a concentration in the original bleach solution of ~ 5.25 %; some newer bleach solutions can be purchased that contain a much higher concentration of bleach. In that case it needs to be diluted out proportionately more:
  - Bleach concentration calculator: <http://www.sheltermedicine.com/node/381>



## Antibacterial products

- Compounded 2% Mupirocin spray
  - May be helpful for localized areas of infection, expensive
- Topical Amikacin spray?
  - VIN gemish: 5ml Amikacin 50mg/ml, 5ml Dex 2mg/ml, bring to 2oz with saline or 0.2% chlorhexidine and spray lesions BID
  - No stability or efficacy studies
  - Activity of aminoglycosides is diminished in the presence of pus and cellular debris
  - Expensive
  - Concern for owner exposure when treating extensive lesions

## Less effective antibacterial products

- Triclosan
  - disinfectant added to some antiseborrheic shampoos
  - Less effective than benzoyl peroxide against *Staphylococcus pseudintermedius* and is not effective against *Pseudomonas*
- Ethyl lactate
  - mild, non-drying
  - Some studies have shown it to be less effective than chlorhexidine, or even support bacterial growth. In vitro, ethyl lactate shampoo required a longer period of incubation of 30-60 minutes for bacterial killing, and a higher MBC of 1:2 - 1:1.
- Povidone-iodine
  - inactivated by organic debris, residual activity 4-6 hours
  - can cause contact dermatitis
- Chloroxylenol and acetic acid/boric acid have poor antibacterial effects



## Antifungal products

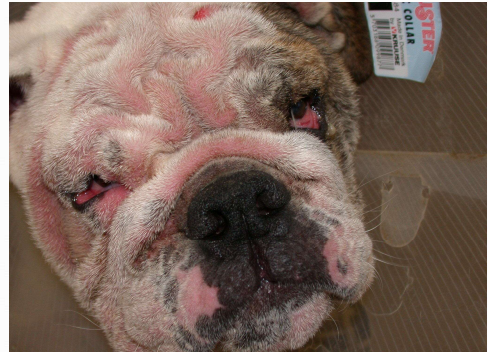
- Chlorhexidine 3-4%
  - used for yeast infections, also antibacterial
  - less effective for ringworm
- Miconazole/ketoconazole/climbazole
  - used for yeast/ringworm infections
- Povidone-iodine
  - Also antibacterial
  - Short residual activity, can cause contact dermatitis
- Selenium sulfide (Selsun Blue)
  - used for greasy skin/yeast infection
  - can be irritating
  - do not use in cats



### Malassezia dermatitis



### Malassezia facial dermatitis



### Antifungal products

- Sulfur (Lyme Dip)
  - best for ringworm
    - sterilizes hair that is shed into environment
  - also decreases itch and is antiparasitic
  - not degreasing
  - apply 1-2 times weekly until negative DTM



### A dog with dermatophytosis



### Antiseborrheic shampoos

- Seborrhea = excessive scaling
- Seborrhea is a symptom, not a diagnosis
- Two clinical types of seborrhea: dry and oily
- Look for underlying cause
  - allergy, skin infection (bacterial, fungal), parasites, nutritional imbalance, hormonal disease



Superficial pyoderma – Atopic long coated dog



Superficial pyoderma – Atopic cocker



Superficial Pyoderma - Atopy



Oily seborrhea-Options

- Benzoyl peroxide
  - degreasing, removes crusts, follicular flushing, antibacterial
  - potentially irritating--use conditioner
- Selenium sulfide
  - degreasing, decreases scaling
  - can be irritating--use conditioner
  - do not use on cats



Oily seborrhea due to demodex, bacterial, and yeast infections



## Oily seborrhea-Options

- Keratolux
  - tar-free antiseborrheic shampoo
- Tar shampoo
  - degreasing
  - decreases scaling
  - can be irritating-use conditioner
  - not antimicrobial
  - do not use in cats
  - use as last resort



## Dry seborrhea-Options

- Sulfur/Salicylic Acid shampoo
  - decreases scaling, mildly antibacterial
  - mild, nondrying
  - decreases itch
- Douxo Seborrhea shampoo/spray/spot on/mousse
  - Contains phytosphingosine, helps restore skin barrier, antibacterial and anti-inflammatory
  - Contains Fomblin® film, a film-forming agent that covers the skin and coat, maintains hydration of the superficial skin layers and limits sebum deposition on the skin surface



available in 200ml, 500ml and 1L

## Dry seborrhea due to Golden retriever ichthyosis



## Dry seborrhea due to sebaceous adenitis



## Sebaceous adenitis



## Anti-Itch Shampoos/Conditioners

- Look for underlying causes for itch
  - allergy, parasites, infection
  - make sure skin infections are treated
- Conditioners/leave-on products work best due to increased contact time



## Atopy



## Atopy and flea allergy



## Anti-itch product options

- Oatmeal
  - mild, often combined with other products



## Anti-itch product options

### Pramoxine

- topical anesthetic, often combined with oatmeal
- good residual activity

### Lidocaine

- Topical anesthetic, short duration of activity,
- Can cause contact sensitivity

### Diphenhydramine (Benadryl)

- can cause contact sensitivity



## Anti-itch product options

- Allermyl
  - Non-steroid-based
  - Linoleic acid – helps maintain epidermal barrier
  - Monosaccharides/Vitamin E – anti-inflammatory
  - Cleansing/hydrating/antipruritic



## Anti-itch product options

### • Calm (Douxo)

- Contains phytosphingosine, Avenanthramides (colloidal oatmeal), and Pseudofilaggrine
- SK-Influx V: ceramide complex, semi-synthetic cholesterol, free fatty acids and phytosphingosine.
- Stimu-tex: a patented plant-based complex of spent grain wax, shea extract and argan oil, has anti-histaminic effects and is rich in essential fatty acids.
- Pseudofilaggrine is a peptide that helps produce the Natural Moisturizing Factor, a critical element in maintaining skin hydration.
- Lipidure PMB is a polymer that helps retain moisture by binding with the lipids of the stratum corneum and forming a protective hydrogel.



Douxo Calm Shampoo available in 200ml, 500ml and 1L



## Anti-itch product options

- Topical steroids
  - Reliably effective to decrease pruritus
  - Use selectively
  - May worsen bacterial infection
  - May cause systemic or local side effects with long term use

## Localized skin atrophy due to excessive application of topical steroid



## Localized skin atrophy due to excessive application of topical steroid



## Anti-itch product options

- 1% hydrocortisone
- Mildest topical steroid
- Available in shampoo, spray, conditioner, lotion



## Anti-itch product options

### Genesis spray

- 0.015% triamcinolone acetonide spray, water/denatured alcohol base
- Efficacy:
  - 103 pruritic dogs treated for 4 weeks (52 treated, 51 untreated controls)
  - Treatment success: 67% of treated and 24% of untreated dogs

### Cortavance spray (Virbac)

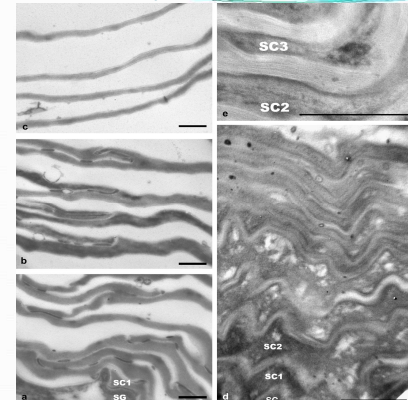
- 0.0584% hydrocortisone aceponate (HCA), stays in epidermis
- Efficacy:
  - 45 dogs treated for 84 days, 24 with HCA spray and 21 with Atopica
  - Similar proportions of HCA- and cyclosporin-treated dogs achieved  $\geq 50\%$  reductions in clinical signs and pruritus scores at 28 days, 56 days and 84 days
  - By Day 84, clinical disease was reduced by 75 and 85.7% respectively; pruritus reduced by 65.2 and 57.1%. By 84 days, every-other-day or twice-weekly therapy was achieved in 13 of 24 HCA- and 12 of 21 cyclosporin-treated dogs.
  - Not available in US yet



## Spot on lipids and atopic dermatitis

- Traditional inside-out theory of atopic dermatitis: a genetic defect causes an abnormal immune system, which leads to the inflammation and symptoms of AD.
- Outside-in theory: Atopic dogs (and humans) have decreased intercellular lipids, which increases transepidermal water loss and increases allergen and bacterial penetration through the skin barrier. Atopy involves genetic defects which cause a dysfunctional skin barrier leading to the signs and symptoms of atopic dermatitis.
- These findings have led to the development of topical products designed to help repair the abnormal allergic skin barrier.

## Skin EM: Atopic vs. normal dog



## Spot on lipids and atopic dermatitis

- In the skin, intercellular lipids are composed of free fatty acids, cholesterol, and ceramides. Ceramides are a complex group of sphingolipids containing derivatives of sphingosine bases linked with a variety of fatty acids.
- Ceramides: at least 9 types of ceramides have been identified, and they give the stratum corneum its resistance and protective function.
- Phytosphingosine: A ceramide precursor, with antibacterial and anti-inflammatory properties; it is hypothesized (by Sogeval) that applying a ceramide precursor on the skin, using a suitable vehicle, can lead to the de-novo production of ceramides by the skin.

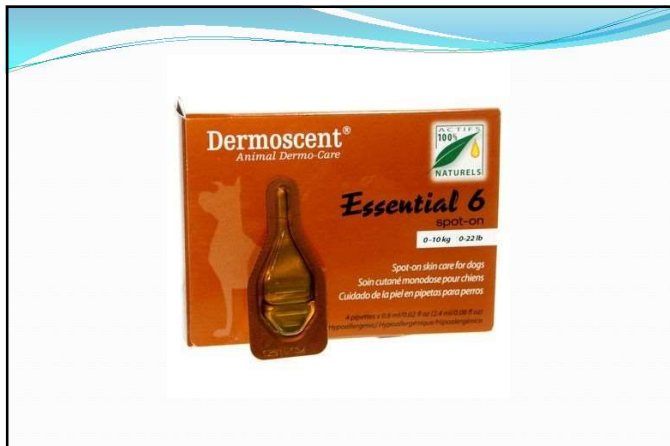
## Spot on lipids

Product	Ingredients	Label claims	Label instructions	Clinical uses
Douxo Seborrhea Spot on	Phytosphingosine 4% Transcutol (a bipolar expient to help surface diffusion of PS)	Restores stratum corneum Controls sebum production Controls microbial flora Controls inflammation	Localized or generalized seborrhea, use once a week for 3-4 weeks, then every 15 days.	Chin acne Stud tail Ear margin seborrhea Generalized seborrheic conditions
Virbac Allerderm Spot on	Ceramides Fatty acids	Helps repair and restore epidermal barrier/lipid layer Moisturizes and protects skin	Once a week for 4 weeks, then once a month	Atopic dermatitis Seborrhea sicca and other generalized seborrheic conditions; recurrent pyoderma?
Dermoscent	Essential oils rosemary, lavender, Malaleuca, cedar, oregano, omega 6 grain oils (hemp, neem), smoothing and purifying agents, Vit E, bio-diffusing vector	Restores skin hydrolipid film, maintains optimal hydration, favors natural cutaneous ecosystem balance, reinforces skin defenses/epidermal barrier, deodorizes, reduce hairloss, antioxidant effect	Once a week	Atopic dermatitis, seborrhea, odor control



## Allerderm study data

- 5 atopic dogs and 5 beagle controls
  - Treated with Allerderm q 3 days for 6 treatments
  - Lipid analysis performed on tape stripped skin samples pre and post treatment
  - Pre treatment atopic dogs: markedly reduced ceramides
  - Post treatment atopic dogs: ceramide levels near normal
- 8 atopic dogs
  - Treated with Allerderm spot on twice weekly, evaluated for clinical lesion severity at weeks 0, 6 and 12
  - Overall lesion severity scores decreased by 26%, erythema decreased by 46% by week 12, slight decreases in excoriation and alopecia scores



## Dermoscent study data

- 195 dogs, 73 cats (diagnoses not specified),
  - Dermoscent applied weekly for 4 weeks, animals evaluated at weeks 0 and 4
  - Hairshine improved by 81% in dogs, 69% in cats
  - Reduced shedding by 67% in dogs and 54% in cats
  - Reduced scaling by 83% in dogs and 72% in cats
  - Reduced odor by 71% in dogs
  - "Rebalance of either dry or oily coat" by 73% of dogs and 71% of cats



## Douxo study data

- No data about Seborrhea Spot on
- Douxo Seborrhea shampoo and Spray used in dogs with 1° or 2° keratinization disorders
  - 23 dogs bathed q 3 days with Seborrhea shampoo (7 baths)
  - 24 dogs bathed twice with Seborrhea shampoo, then sprayed q 3 days with Seborrhea spray
  - 20 control dogs bathed q 3 days with control shampoo
  - Evaluated at Days 0, 10 and 21: clinical scores decreased in all groups, no significant differences present between groups
  - Conclusion: Douxo Seborrhea spray q 3 days was as effective as shampooing

## So what do I keep in my clinic?

- There are a lot of products out there, and I try to keep one shampoo per condition on hand.
- Bacterial infection: a chlorhexidine shampoo (ie. TrizChlor and TrizChlor HC) and mousse (Douxo chlorhexidine). For localized infections: TrizChlor spray, Miconahex pads, Mupirocin ointment.
- Yeast or combination infections: Miconahex shampoo and spray; Douxo chlorhexidine/climbazole mousse.
- Dry scaling (dry Dobie, or sebaceous adenitis): Sebolut or Bioseb shampoo and a conditioner such as Humilac or Hylyt.
- Oily seborrhea: I use benzoyl peroxide shampoo very rarely, and don't even stock it, as it kept expiring.
- Pruritus: TrizChlor HC shampoo and spray
- Dermatophyte: lime sulfur dip (also good for scabies, cheyletiella, and feline demodex)
- Allerderm spot on for recurrent pyoderma cases, dry scaling, cats (available on Amazon.com); Dermoscent for itchy, smelly dogs

## Questions?

