1. Benefits to Topical Therapy
   a. Direct application to target organ
   b. Multiple delivery systems
   c. Lower dose of concurrent drugs
   d. Less risk of side effects

2. Downsides to Topical Therapy
   a. Labor intensive
   b. Time constraints
   c. Patient compliance
   d. Must get through haircoat
   e. Cats!
   f. What product to choose???

3. Delivery Systems
   a. Shampoos
   b. Rinses
   c. Lotions
   d. Sprays
   e. Wipes
   f. Mousse
   g. Spot-On
   h. Creams/Ointments

4. Types of Topical Therapy
   a. Antiseborrheic
      i. Mechanism of action
         1. Degreases & decreases scaling
         2. Keratolytic
         3. Keratoplastic
         4. Lipid-Replacement Therapy
         5. Restores epidermal barrier
      ii. Traditional antiseborrheic ingredients
         1. Sulfur
            a. Available in rinses & shampoos
            b. Properties
               i. Keratolytic
               ii. Keratoplastic
               iii. Antifungal
               iv. Antibacterial
               v. Antiparasitic
c. Caution
   i. Strong smell
   ii. Stains clothing & jewelry
   iii. Discolors fur

2. Salicylic Acid
   a. Commonly available in shampoos
   b. Properties
      i. Keratoplastic (0.1-2%)
      ii. Keratolytic (3-6%)
      iii. Bacteriostatic
      iv. Works synergistically with sulfur

3. Benzoyl Peroxide
   a. Available as shampoo
      i. Previously as a gel
   b. Properties
      i. Keratolytic
      ii. Mildly antimicrobial
      iii. Degreasing
      iv. Follicular flushing
   c. Caution
      i. Drying (>5%)
      ii. Bleaches hair, clothing, etc

4. Case #1 “Bentley”
   a. 4-year-old MC Boxer
   b. History
      i. Developed alopecia, pustules, and crusting
      ii. Lethargic
      iii. Decreased appetite
      iv. Not pruritic
   c. Exam:
      i. Febrile
      ii. Depressed
      iii. Papular to crusting dermatitis with alopecia on the face, ear pinnae, dorsum, and limbs
         1. Crusts thick and adherent
   d. Differentials
      i. Infectious
         1. Superficial bacterial pyoderma
         2. Dermatophytosis
      ii. Parasitic
         1. Demodicosis with secondary infection
      iii. Immune mediated
         1. Pemphigus foliaceus
   e. Diagnostics
i. Deep skin scrape: negative

ii. Cytology of crusted papule: neutrophils with acantholytic cells

iii. Punch biopsies
   1. Histopathology
      a. Subcorneal pustular dermatitis with acantholytic cells
   2. Bacterial culture
      a. Negative
   3. Fungal culture
      a. Negative
   4. CBC/Chemistry
      a. Mild neutrophilia

iv. Diagnosis:
   1. Pemphigus foliaceus
      a. Pustular to crusting disease

v. Initial treatment
   1. Prednisone 2mg/kg PO once daily
   2. Azathioprine 2 mg/kg PO EOD
      a. CBC/chemistry q2-4 weeks
   3. Sebahex Shampoo once weekly
      a. Chlorhexidine, sulfur, & salicylic acid
         Keratolytic & keratoplastic
         i. Helps remove crusting
   4. 30 days later- remission
   5. Tapered off prednisone

vi. Maintenance
   1. 0.5 mg/kg of azathioprine EOD
   2. CBC/chemistry every 6 months

iii. When to use antiseborrheics?
   1. Diseases
      a. Primary seborrhea
      b. Scabies
      c. Schnauzer comedone syndrome
      d. Feline chin acne
      e. Tail gland hyperplasia
      f. Sebaceous adenitis
      g. Vitamin A responsive
      h. Pemphigus foliaceus
   2. **Think crusting & scaling diseases**

iv. Newer antiseborrheic- Lipid- Replacement Therapy
   1. Epidermal barrier defect
      a. “Bricks & Mortar Theory”
      b. Decreases microorganisms in
c. Reduces transepidermal water loss

2. Available in shampoos, sprays, wipes, mousse, spot-on

3. Types
   a. Ceramides
   b. Free Fatty Acids

4. Lipid Envelope
   a. Free fatty acids
   b. Cholesterol
   c. Ceramides
      i. Amide linked fatty-acid containing a long-chain amino alcohol (aka sphingoid base)
      ii. Most important for barrier function in stratum corneum
      iii. Bind to protein envelope
         1. Provide scaffold for other lipids to bind
      iv. Phytosphingosine
         1. One of the sphingoid bases

5. Case #2 “Crystal”
   a. 4-year-old FS Samoyed
   b. History:
      i. 4-month history of thinning hair coat
      ii. Crusting and scaling
      iii. Not pruritic
   c. Exam:
      i. Multifocal to coalescing, moderate hypotrichosis with adherent scaling
      ii. Multifocal areas of follicular casting
   d. DDx
      i. Infectious
         1. Superficial bacterial pyoderma
         2. Dermatophytosis
      ii. Sebaceous adenitis
      iii. Vitamin A responsive dermatosis
      iv. Primary seborrhea
   e. Diagnostics
      i. Cytology: negative for organisms
      ii. DTM: negative
      iii. Biopsies
         1. Results: moderate to severe hyperkeratosis with follicular plugging; absence of sebaceous glands with pyogranulomatous inflammation at the level of the isthmus
   f. Diagnosis
      i. Sebaceous adenitis
ii. Scaling dermatitis

g. Initial treatment
   i. Atopica 5mg/kg PO once daily
   ii. Douxo Seborrhea Spot-On twice weekly
   iii. Oil baths weekly using Sulfur (Keratolytic) + Chlorhexidine (Antimicrobial) Shampoo
   iv. Fatty acids daily

h. Maintenance treatment
   i. Atopica 5mg/kg every 3rd day
   ii. Oil baths EOW
   iii. Fatty acids daily
   iv. Douxo Seborrhea spot-on once weekly

i. Sebaceous adenitis
   i. Destruction of sebaceous glands
      1. Inflammatory
      2. Idiopathic
         a. Inherited??
         b. Cell mediated immunologic reaction??
   ii. Breeds
      1. Samoyed, Standard Poodle, Akita, Vizsla
   iii. Mostly cosmetic disease

iv. Treatment
   1. Keratolytic topicals
   2. Salicylic acid
   3. Sulfur
   4. Benzoyl peroxide
   5. Barrier restoration

v. Oil baths
   1. Keratolytic or chlorhexidine shampoo -> soaking with propylene glycol or mineral oil for 1+ hours -> bathing with Dawn dish detergent
   2. Weekly

vi. Fatty acids daily

vii. Vitamin A?

viii. Cyclosporine
   1. 5-10mg/kg PO once daily, then taper

b. Antimicrobial
   i. Antibacterial
      1. Chlorhexidine
         a. Shampoos, sprays, wipes, mousse, solution, scrub
         b. Antiseptic & disinfectant
c. Most effective in studies
   i. Compared to ethyl lactate, chlorhexinol, and benzoyl peroxide
d. Antifungal
e. > 3% concentration
f. Antiviral
g. Non-drying

2. Ethyl lactate
   a. Shampoo
   b. Breaks down to lactic acid & ethanol
      i. In hair follicles & sebaceous glands
      ii. Lowers pH of skin -> inhibits bacteria
c. Efficacy similar to benzoyl peroxide
d. Nondrying

3. Benzoyl Peroxide
   a. Available as shampoo
      i. Previously as a gel
   b. Properties
      i. Keratolytic
      ii. Mildly antimicrobial
      iii. Degreasing
      iv. Follicular flushing
c. Caution
      i. Drying (>5%)
      ii. Bleaches hair, clothing, etc

4. Sodium hypochlorite
   a. Shampoo, rinse (1:10 dilution), gel, spray
   b. Bactericidal
   c. Fungicidal
d. Sporicidal
e. Viricidal
f. Can be an irritant
   i. Especially to cats
   ii. Avoid eyes

5. Nisin
   a. Wipes
   b. Antimicrobial peptide
   c. Used in to treat resistant S. aureus
      i. Also effective for S. pseudintermedius

6. Topical antibiotics
   a. Ointment/creams/sprays
      i. Often use otic preparations
   b. Targeted therapy
c. Examples
i. Mupirocin 2%
ii. Animax/Panalog/Entederm
iii. Otomax
iv. Amikacin 5% spray (compounded)

ii. Antifungals
   1. Azoles
      a. Shampoos, wipes, spray, mousse, lotion
      b. Azoles
         i. Ketoconazole
         ii. Miconazole
         iii. Climbazole
      c. Chlorhexidine (>3%)
      d. Selenium sulfide

iii. When to use antimicrobials?
   1. Recurrent & Resistant Infections
      a. Patients prone to recurrence
         i. Yeast pododermatitis
         ii. Mucocutaneous pyoderma
         iii. Chin acne
      b. Multidrug resistant pyodermas
         i. When no great systemic options
            1. Chlorhexidine baths 2-3+ times weekly
            2. Daily chlorhexidine spray, wipes, mousse
            3. Nisin wipes
            4. Mupirocin
            5. Compound antibiotics (gentamicin, amikacin) into spray
      ii. Bacterial culture MICs
         1. 1000+ times the concentration of parenteral antibiotics

2. Atopic dermatitis
   a. Two genetic prongs
      i. Th2 immune response
      ii. Epidermal barrier defect
   b. Chlorhexidine
      i. Treats active pyoderma/pododermatitis
      ii. Reduces bacteria residing on skin surface
   c. Azoles
      i. Treats active dermatitis/pododermatitis
      ii. Reduce Malassezia residing on skin
   d. Ceramides (phytosphingosine)
      i. Restores epidermal barrier defect
      ii. Decreases translocation of pathogens as well as transepidermal water loss
iii. Prevents further sensitization???

3. **Think infectious with possibility of recurrence**

iv. Case #3 "Capone"
1. Capone
2. 8-year-old MC mixed breed canine
3. HX:
   a. Crusting lesions around nasal planum
   b. Resolves with steroids & antibiotics
   c. Recurs when meds discontinued
4. Exam:
   a. Crusting dermatitis and erythema around nasal planum & lip folds
5. DDx
   a. Infectious (mucocutaneous pydoderma)
   b. Immune mediated (DLE vs. PE)
   c. Neoplasia (cutaneous lymphoma)
6. TX:
   a. 4-week course of cefpodoxime- lesions resolved
   b. Maintenance Douxo Chlorhexidine Wipes EOD
7. DX:
   a. Mucocutaneous pyoderma

c. Antipruritic
   i. Shampoo, lotions, rinses, sprays, ointments/creams
   ii. How they work
      1. Depletes or inactivates pruritic mediators
         a. Astringents
         b. Steroids
      2. May substitute hot/cold sensations for pruritus
         a. Menthol
      3. Anesthetizes the peripheral nerves
         a. Pramoxine
      4. Raises pruritic threshold by cooling or moisturizing
         a. Colloidal Oatmeal

iii. Case #4 “Rocco”
1. 9-year-old MC Miniature Schnauzer
2. History
   a. 6-month history of severe pruritus, alopecia, and erythema
   b. Minimally responsive to Atopica and Apoquel
   c. Failed to respond to food trial
   d. Serum allergy test was negative
   e. Previous deep skin scrape and DTM negative
3. Exam
a. Diffuse alopecia and erythroderma with severe excoriations on the head, neck, trunk, and limbs  
b. Depigmentation with loss of cobblestoning and crusting on the nasal planum  
c. Depigmentation with hyperkeratosis on the paw pads

4. DDX:  
a. Cutaneous lymphoma  
b. Infectious  
c. Demodicosis vs. scabies  
d. Immune mediated

5. Diagnostics  
a. Deep skin scrape: negative  
b. Cytology: 1+ cocci/oif  
c. Skin biopsies: epitheliotropic cutaneous lymphoma

6. Dx:  
a. Epitheliotrophic cutaneous lymphoma  
b. Secondary superficial bacterial pyoderma

7. Treatment:  
a. Owner declined oncology consultation and chemotherapy  
b. Prednisone 1mg/kg PO once daily  
c. Cefpodoxime 7mg/kg PO once daily  
d. Pramoxine shampoo daily  
   i. Combination lowered pruritus level from a 10+ out of 10, to a 5 out of 10  
   ii. Owner elected euthanasia after 2 weeks

iv. When to Use AntiPruriticS?  
1. Ingredients  
a. Astringents, steroids, pramoxine, oatmeal, etc

2. Diseases  
a. Atopic dermatitis  
b. Cutaneous adverse food reaction  
c. Flea allergy dermatitis  
d. Contact hypersensitivity  
e. Sarcoptic mange

3. **Think pruritic without infection**

d. Miscellaneous topicals  
i. Zinc  
   1. Antiseborrheic  
      a. Downregulates sebum production
   2. Used in humans  
      a. Wound healing  
      b. Treatment of viruses
   3. Found to be antimicrobial and antifungal  
   ii. Melaleuca Oil (Tea Tree Oil)
1. Antibacterial
2. Antifungal

iii. Tacrolimus ointment
   1. Calcineurin inhibitor
   2. Locally immunomodulatory

iv. Silver
   1. Antibacterial
   2. May promote wound healing
   3. Antifungal?
   4. Antiviral?

v. Aluminum acetate (Burow solution)
   1. Astringent/drying agent
   2. Antiseptic/antipruritic

vi. Case #6 “BB”
   1. BB, a 4-year-old FS mixed breed canine
   2. History:
      a. 2-3 week history of ulceration, crusting, and bleeding of the nose
      b. Started rubbing nose a week before presentation
   3. Exam:
      a. Crusting dermatitis with multifocal erosions to ulcerations on the dorsal nasal planum and nasal philtrum
      b. Depigmentation with loss cobblestone architecture on the ventral nares
   4. Ddx:
      a. Infectious
         i. Mucocutaneous pyoderma
         ii. Dermatophytosis
      b. Immune mediated
         i. Discoid lupus erythematosus vs. pemphigus erythematosus
      c. Neoplasia
         i. Cutaneous lymphoma vs. squamous cell carcinoma
   5. Diagnostics
      a. Cytology: negative for organism
      b. Biopsies
         i. Histopathology: lichenoid interface dermatitis with rare subcorneal pustule containing acantholytic cells
         ii. Bacterial culture: negative
         iii. Fungal culture: negative
   6. Diagnosis
      a. Pemphigus erythematosus
   7. Treatment
a. Prednisone
   i. PU/PD, aggression, weight gain, anxiety
b. Azathioprine
   i. Elevated liver enzymes
c. Doxycycline/niacinamide
   i. No improvement
d. Topical steroids
   i. PU/PD
e. Topical tacrolimus
   i. Controlled

vii. Nasal Planum Immune Mediated Diseases
1. Pemphigus foliaceus
   a. Haired bridge of the nose -> nasal planum
   b. Histopath: Subcorneal pustular dermatitis with acantholytic cells and neutrophils
2. Discoid lupus erythematosus
   a. Nasal planum -> haired bridge of nose
   b. Nose, face, ears
   c. Histopath: lichenoid interface dermatitis at dermoeipidermal junction
3. Pemphigus erythematosus
   a. Nasal planum -> haired bridge of nose
   b. Nose, face, ears
   c. Histopath: subcorneal pustular dermatitis + lichenoid interface dermatitis
4. DLE/PE Treatment
   a. Treatment in Dogs
      i. Corticosteroids
      ii. Azathioprine
      iii. Mycophenolate
      iv. Doxycycline/niacinamide
      v. Topicals
         1. Steroid
         2. Tacrolimus

b.

5. What Products to stock?
   a. Antimicrobial
      i. Chlorhexidine + Azole
         1. Shampoo
         2. Wipe
         3. Spray or mousse
   b. Antiseborrheic
      i. Salicylic acid +/- sulfur
         1. Shampoo
ii. Lipid-barrier replacement
   1. Shampoo and/or spray

c. Antipruritic/soothing
   i. Shampoo
   ii. Leave-on lotion

6. How to Pick Topical Agent?
   a. What are you trying to treat?
      i. Disease
      ii. Active ingredient
   b. Location on patient
      i. Delivery system
   c. Owner ability
      i. Delivery system
      ii. Frequency