

Drugs applied to the Skin



drugs

- **acting locally**
 - skin disease
 - otitis
 - external parasites
- **for systemic absorption**
 - anthelmintics
 - (anti-inflammatories)



principles

- is topical therapy appropriate?
- ancillary treatment?
- consider active ingredients and excipients
- systemic absorption?



penetration depends on

- surface area
- hair follicles
- blood flow
- ambient temperature
- skin thickness
- rainfall
- vehicle and formulation
- skin damage



preparation

- clip affected area
- clean area
- antiseptic?
- stop animal licking



a very rough rule

- If it is dry - wet it
If it is wet - dry it



vehicle

- affects hydration
- anti-inflammatory effects
- aids penetration
- controls spread
- ie, often as important as active!



vehicles

- aqueous cream
- emulsifying ointment
- hydrous ointment
- white soft paraffin (Vaseline)
- powders
- lotions
- gels
- sprays



emollients

- inert oils used to soothe irritated skin
 - vegetable oils
 - cocoa butter
 - lanolin
 - liquid paraffin
 - white soft paraffin
 - polyethylene glycols



demulcents

- inert substances used to soothe irritated mucous membranes
 - gums
 - glycerine
 - methylcellulose
 - etc



astringents

- used locally to precipitate proteins
 - salts of silver, iron & zinc
 - tannins



counter irritants

- irritate skin to "promote healing" of underlying tissue
- obsolete and unethical
- do not use



caustics

- use local anaesthesia and actual cautery / cryosurgery instead



keratolytics

- **dissolve keratin**
 - salicylic acid
 - selenium sulphide
 - benzoyl peroxide



anti-seborrhoeics

- selenium sulphide
- coal tars



anti-inflammatories

- topical steroids
- dimethyl sulphoxide
- methylsalicylate



topical steroids

- fluocinolone
- beclomethasone
- hydrocortisone
- triamcinolone
- betamethasone



DMSO

- solvent for both hydrophobic and hydrophilic drugs
- anti-inflammatory and antimicrobial
- carries other drugs across skin



DMSO

- used on dogs & horses
- often mixed with NSAIDs or steroids
- sometimes copper



DMSO side effects

- diuretic
- blocks collagen production
- erythema / pruritus



DMSO kinetics

- very rapidly absorbed
- distributes everywhere
- rapidly metabolised (especially cattle)
- eliminated by kidneys & lungs



DMSO toxicity

- convulsions
- dyspnoea
- pulmonary oedema
- teratogenic
- carcinogenic?



DMSO uses

- sprained tendons
- (CNS trauma)



otitis externa

- diagnose cause
- check eardrum
- flush thoroughly
- treat cause
- parenteral steroids?
- treat contact animals
- collars?



Back to the Future?

Old Drugs for Otitis
Externa



otitis externa

- 20% of dogs, 5% of cats
- numerous causes
- drugs are not always the answer



primary causes

- **ear conformation**
- **generalised skin disease**
 - atopy
 - endocrine problems
- **mites**
- **without correcting these, treatment is only palliative**



opportunistic pathogens

- bacteria
- yeasts



Not all ear irritation is
otitis!



bacteria

- **Staphs**

- 10 -20% normal ears
- 20 - 40% inflamed ears

- **Streps**

- 16% normal ears
- 10% inflamed ears

- **Proteus**

- 11% inflamed ears

- **Pseudomonas**

- 20% inflamed ears



yeast

- ***Malassezia pachydermatis***
– pathogenic?



mites

- ***Otodectes cyanotis***
 - 10% of dogs
 - 50% of cats



mites

- pyrethroids (1924)
- monosulphiram (1946)



yeast

- **nystatin (1950)**
- **natamycin (1960)**
- **miconazole (1969)**
- **clotrimazole (1969)**



bacteria

- **neomycin (1949) - St, Prot, Ps**
– (Framycetin = neomycin B)
- **gentamicin (1963) - St, Prot, Ps**
- **polymyxin (1951) - Prot, Ps**
- **bacitracin (1947) - St, Strep**
- **thiostrepton (1956) - St**



bacteria

- pathogens like sebum
- pus inactivates many antibiotics
- so clean ears first!



beware - toxic!

- aminoglycosides
- polymixin
- detergents
- chlorhexidine
- propylene glycol
- alcohol



2nd line antibacterials

- **amikacin**
- **ticarcillin**
- **cephalosporins**
 - ceftazidime etc
- **fluoroquinolones**
 - enrofloxacin etc





very old antibacterials

- 50% vinegar in water
- 1% silver sulphadiazine
- Tris - EDTA solution
- saline



Tris - EDTA solution

- 12g Tris
- 6.05g EDTA disodium
- water to 1L
- adjust to pH8 with HCl





inflammation

- **steroids usually useful**
 - reduce secretions
 - dry canal
- **use short acting steroids if possible**
- **systemic administration may be necessary**



The End

