

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**

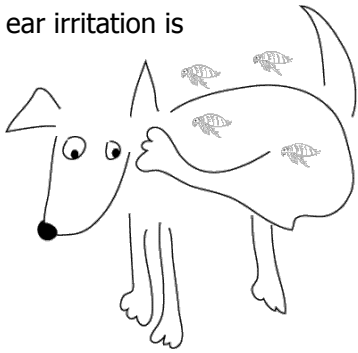
primary causes

- **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