

## **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**

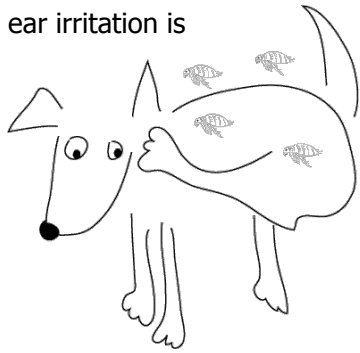
primary causes

- **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