# Drugs applied to the Skin



### drugs

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

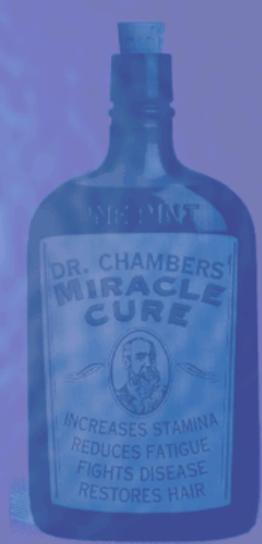


## principles

- · 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 itIf 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 / cryosurgey instead



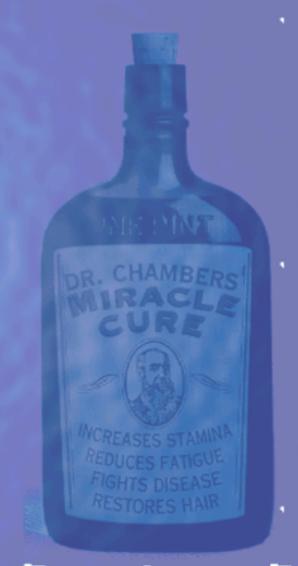
### keratolytics

- 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

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

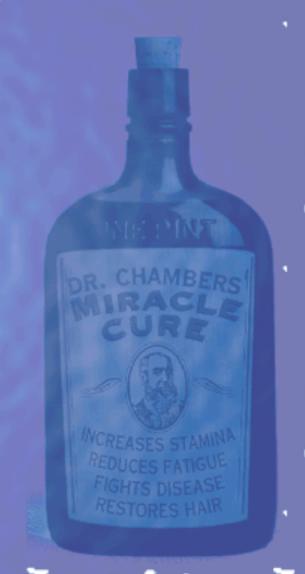
## DMSO toxicity

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



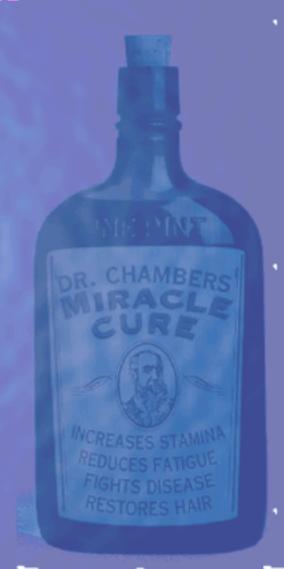
## DMSO uses

- sprained tendons
- (CNS trauma)



### otitis externa

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





#### 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

## opportunist pathogens

- bacteria
- yeasts





#### 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



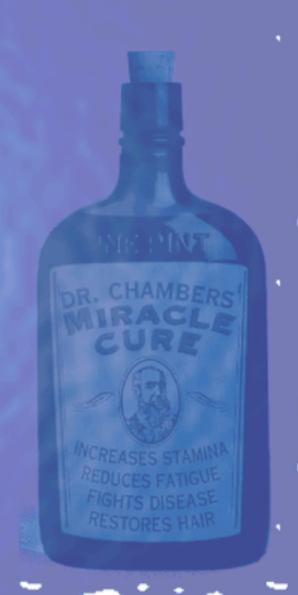
### yeast

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, Rs
- 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





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

