

## **Analgesics**

**Less Important Drugs**

### **analgesics**

- opioids
- local analgesics
- NSAIDs
- $\alpha$ 2 adrenergic agonists
- psychotropics
- odds & sods

### **NSAID effects**

- anti-inflammatory
- analgesic
- antipyretic
- antithrombotic
- antiendotoxic?

### **NSAID mechanism**

- COX inhibition
- free radical scavenging
- receptor antagonism
- lipxygenase inhibition
- etc



### **NSAID side effects**

- **gastric ulceration**
  - common – not usually serious
  - limits use to about 5 days
- **kidney failure**
  - rare – often fatal
  - occurs when blood pressure drops
- **lots of minor side effects**

### **analgesic NSAIDs**

- **carprofen**
- **flunixin**
- **ketoprofen**
- **meloxicam**

### **indications**

- **muscle damage**
- **mild pain**
- **osteoarthritis**
- **post op pain**
- **colic**

### **pharmacokinetics**

- **extreme variation between species!!!**
  - **aspirin half life**
    - **cat 22 hours**
    - **cattle 25 minutes**

## **beware**

- cats
  - aspirin & paracetamol
- cattle
  - phenylbutazone
- dogs
  - naproxen

## **analgesics**

- opioids
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- psychotropics
- odds & sods

## **$\alpha 2$ effects**

- analgesia
- sedation
- bradycardia
- spasm then relaxation of smooth muscle
- skeletal muscle relaxation
- vomiting
- hypothermia

## **drugs**

- xylazine
- detomidine
- medetomidine
  - dexmedetomidine
- romifidine
- clonidine

### **α2 side effects**

- bradycardia
- spasm then relaxation of smooth muscle
  - blood vessels
  - gut
  - uterus
- skeletal muscle relaxation
- vomiting
- hypothermia

### **α2 side effects**

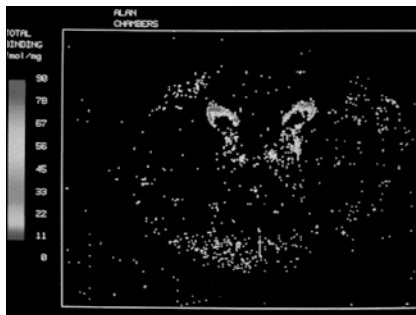
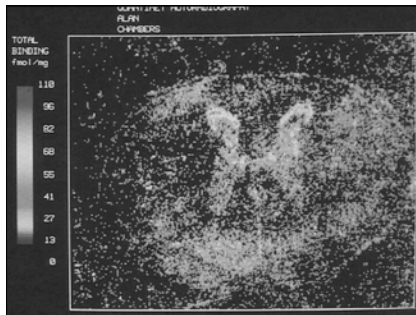
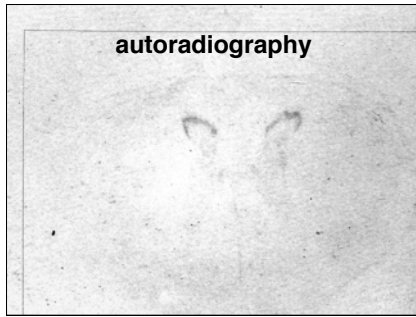
- ruminants
  - grunting respiration
  - hypoxia
  - rarely death

### **mechanism**

- G protein coupled receptors
- same effectors as opioids?
- increase K<sup>+</sup> conduction
- hyperpolarise neurones
- also bind to imidazoline Rs

### **sites of action**

- spinal cord
- locus coeruleus
- cortex?
- medulla
- thoracic cord
- sympathetic varicosities



### indications

- minor operations
- deep sedation
- anaesthetic premed
- (induce vomiting)

### **minor ops**

- mainly large animals
- ± local anaesthetic
- better analgesia at front end??
- ruminants sensitive to xylazine
- hypersensitivity in some deer to xylazine
  - respiratory problems
  - death in extreme cases

### **sedation / premed**

- depth
- duration
- cardiovascular side effects
- interaction with anaesthetics

### **vomiting**

- 30% of dogs
- 40% of cats
  - higher doses – up to 100%

### **routes**

- iv
- im
- epidural / intrathecal

## **analgesics**

- opioids
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## **psychotropics**

- ketamine
- tricyclic antidepressants
  - NMDA antagonists
  - prevent / stop hyperalgesia
- (amantadine)

## **psychotropics**

- anticonvulsants
  - carbamazepine
  - phenytoin
- inhalation anaesthetics
  - nitrous oxide
  - (trichloroethylene)
  - (methoxyflurane)

## **others**

- capsaicin
- NOS inhibitors?
- cannabinoids?



## balanced analgesia

- opioids
- local analgesics
- NSAIDs
- $\alpha 2$  adrenergic agonists
- psychotropics
- odds & sods

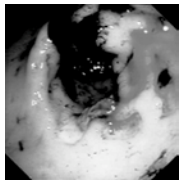
## What would you do?

- 7 year old mare
- went lame after heavy work
- now reluctant to use right fore



## What would you do?

- 9 year old Lab with arthritis
- off food
- "looking miserable"
- initially improved on ketoprofen



## other analgesics

- NSAIDs and  $\alpha 2$  agonists most commonly used
- NSAID side effects
  - gastric ulceration
  - kidney failure
- $\alpha 2$  side effects
  - cardiovascular depression
  - vomiting
- combinations, usually with opioids, produce best analgesia with fewest side effects
- remember local anaesthesia!