

Analgesics

Other Drugs

by the end of this lecture you should be able to

- formulate a balanced analgesia plan for any animal

What would you do?

- fractured metacarpal
- needs a splint
- analgesia?



analgesics

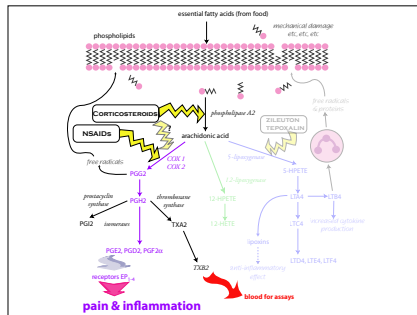
- opioids
- local analgesics
- NSAIDs
- $\alpha 2$ adrenergic agonists
- odds & sods

NSAID effects

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

NSAID mechanism

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

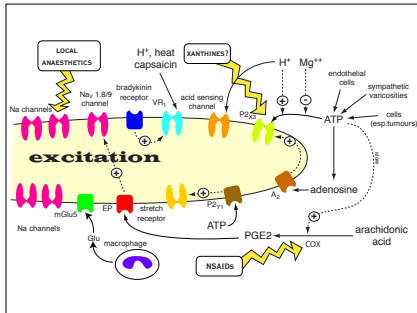


cyclo-oxygenase

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

prostaglandins

- peripheral
 - PGs sensitise nociceptors
- central
 - PGs used as neuromodulators?



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

What would you do?

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



analgesics

- opioids
- local analgesics
- NSAIDs
- $\alpha 2$ adrenergic agonists
- 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

$\alpha 2$ side effects

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

$\alpha 2$ side effects

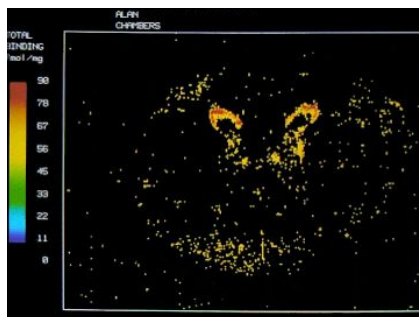
- ruminants
 - grunting respiration
 - hypoxia
 - rarely death

mechanism

- G protein coupled receptors
- same effectors as opioids?
- increase K^+ 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
- severe sensitivity 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
- local analgesics
- NSAIDs
- α 2 adrenergic agonists
- odds & sods

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
- α 2 adrenergic agonists
- psychotropics
- others

What would you do?

- fractured metacarpal
- needs a splint
- analgesia?



other analgesics

- NSAIDs and α 2 agonists most commonly used
- NSAID side effects
 - gastric ulceration
 - kidney failure
- α 2 side effects
 - cardiovascular depression
 - vomiting
- combinations, usually with opioids, produce best analgesia with fewest side effects
