

## Opioids Overview and General Clinical Effects

**Analgesia:** MOR are potent analgesics

**Behavioral effects:** Sedation, euphoria, dysphoria \*Species and dose dependent

Sedation: dogs, rabbits, mild in ruminants

Euphoric: cats and horses

Dysphoria: possible in any species \*Seem to be less if the animal is in pain when the opioid is administered

**Anesthetic sparing effects**

**Emesis:** Tend to promote emesis at the chemoreceptor trigger zone (CRTZ) but inhibit emesis at the vomiting center

**Cardiovascular effects:** Minimal as long as HR is maintained, can produce vagally mediated reduction in HR but this is treatable with an anticholinergic. Cats and horses may have an increased HR

**Histamine release:** may decrease systemic vascular resistance \*meperidine should not be given IV, morphine can be given slow IV

**Respiratory system:** respiratory depression, high doses of mu agonists can produce apnea, panting is common in dogs due to its effect on thermoregulation (they feel warmer than they actually are)

**Thermoregulation:** Hypothermia in dogs, hyperthermia in cats

**Pupil size:** Miosis (constriction) in dogs and rabbits, mydriasis (dilation) in cats and rodents

**Urinary:** MOP agonists can produce urinary retention by increasing urethral sphincter tone, relaxation of bladder smooth muscle and increased ADH secretion

**GIT effects:** Delayed gastric emptying, relaxation of lower esophageal sphincter, altered motility

| Opioid Drugs   | Receptor    | Clinical Effects   | Duration   | Administration   | Additional Info  |
|--|-------------|--|--|--|--|
| Morphine<br>Hydromorphone<br>Oxymorphone<br>Fentanyl | Mu agonists | Analgesia<br>Euphoria, dysphoria,<br>sedation<br>Respiratory depression<br>Change in pupil size<br>Reduced GI motility<br>Urine retention<br>Change in HR<br>Hypothermia | 4 hours<br><br>*Fentanyl has a<br>30-60 min duration | Morphine must be<br>given slowly IV, can<br>cause histamine<br>release | Vomiting is common in<br>dogs<br><br>Hydromorphone may<br>produce less sedation in<br>dogs and hyperthermia<br>in cats |

|                                    |   |   |   |   |   |
|------------------------------------|---|---|---|---|---|
|                                    |   |   |   |   | Oxymorphone is less likely to produce dysphoria in cats |
| Agonist/Antagonist<br>-Butorphanol | Kappa agonist<br>Mu receptor antagonist   | Analgesia mediated via kappa receptors but has a ceiling effect due to MOR antagonism | Rapid onset after IV administration and has a duration of 30-60 min<br>Up to 90 min after IM administration | IV and IM   | Commonly used in large animals                          |
| Partial Agonist<br>-Buprenorphine  | Mu receptor agonist                       | Produces all the effects of MOR agonists but to a lesser degree                       | 6 hours   | IV – 15 min until action<br>IM – 20-30 min until action |   |
|                                    | Kappa                                     | Analgesia<br>Dysphoria, sedation<br>Diuresis<br>Change in pupil size                  |   |   |   |
|                                    | Delta                                     | Analgesia<br>Respiratory depression<br>Urine retention<br>Dependence *human concern   |   |   |   |
|                                    | Opioid-receptor-like receptor (ORL-1 NOP) |   |   |   |   |
| Antagonists<br>Naloxone            | Used to reverse MOR agonists              | Not an effective reversal for buprenorphine due to its high receptor affinity         | 30 min so re-administration may be necessary  | IV- 1-2 min until action                                |   |