Laboratory Animal Formulary

IM = intramuscular  PO = by mouth
IP = intraperitoneal  SC = subcutaneous
IV = intravenous

MICE

ANALGESICS

Pain:  **Buprenorphine**: 0.05-0.1 mg/kg SC two to three times daily (1 ml of 0.3 mg/ml in 4 ml NaCl = 0.06 mg/ml)
**Buprenorphine SR**: 1-5 mg/kg (2.5 mg/kg common) SR (sustained release) formula SC ONLY every 3 days
**Medetomidine CRI** (constant rate infusion): 0.05mg/kg SC, followed by 0.1 mg/kg/hr (used for imaging)

Pain due to inflammation:

**Carprofen**: 5 mg/kg SC, IV, IM, IP once daily (1 ml of 50 mg/ml in 9 ml NaCl = 0.5 mg/ml, alternatively, 0.05 ml (50 µl) of carprofen with 5 ml sterile water)
**Ibuprofen**: Use name-brand Advil©. Add 200 mg capsule to 200 mL water and shake vigorously. Light sensitive, no acidified water, change every 5 days
**Meloxicam**: 2 mg/kg orally or SC once daily

ANESTHETICS

**Atipamezole**: To reverse xylazine or medetomidine 0.1-1 mg/kg IM, IP, IV, SC  
**Bupivacaine**: 2 mg/kg, onset 5 minutes, duration 2-4 hours (1-3 drops).  
**Ketamine**: 50-100 mg/kg IM, IP; 50 mg/kg IV; 200 mg/kg with 5 mg/kg diazepam IM, IP; 100 mg/kg with 5-15 mg/kg xylazine IM, IP

Refer to the following NIH guidelines for additional information on ketamine mixtures:  

**Lidocaine**: Percutaneously: 1-3 mg/kg *(do not exceed 4mg/kg)*, onset 1 minute, duration 30-60 minutes  
**Pentobarbital**: 40-60 mg/kg anesthetic, 100 mg/kg euthanasia IV, IP

ANTIBIOTICS

**Amoxicillin**: 0.25 mg/ml in water. Add 1 ml re-suspended 50 mg/ml (Amoxil) solution to 199 ml water. Do not acidify water.
**Doxycycline**: 2.5-5 mg/kg PO twice daily. *Do not use in young or pregnant animals*
**Enrofloxacin**: 85 mg/kg (0.5 mg/ml in drinking water (62.5 mg enrofloxacin with 125 ml water)), change every 3-5 days, or when cloudy, can be mixed with juice.
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**Trimethoprim/sulfamethoxazole**: 5 ml of 240 g/5 ml suspension in 500 ml of water (use sterile or distilled instead of acidified or chlorinated water) light sensitive, change every 5 days; 15-30 mg/kg PO, IM twice daily

**ANTICHOLINERGICS/ANTIMUSCARINICS**

Atropine: 0.04-0.1 mg/kg  
Glycopyrrolate: 0.01-0.02 mg/kg IV

**ANTICONVULSANTS**

Diazepam: 3-5 mg/kg IM  
Midazolam: 1-2 mg/kg IM; 5 mg/kg IV, IM, IP

**ANTIDOTES**

Yohimbine: 0.2 mg/kg IP as needed (to reverse xylazine or medetomidine)

**ANTIHISTAMINES**

Diphenhydramine: 50 mg/kg IP; 5 mg/kg SC

**ANTIINFLAMMATORY/IMMUNOSUPPRESSANTS**

Dexamethasone: 0.05-0.2 mg/kg IM (anti-inflammatory)  
Prednisone: 0.5-2.2 mg/kg IM, SC

**ANTIPARASITICS**

Fenbendazole: 50 mg/kg PO once; 150 ppm in feed for six consecutive weeks  
Ivermectin: 200-250 mcg/kg SC or PO every 7 days for 3 weeks

**DYSTOCIA**

Dystocia Cocktail: 0.1 ml PGF2α (5 mg/ml concentration) + 0.1 ml 10% calcium gluconate + 0.05 ml 5% isotonic dextrose + 0.75 ml lactated ringer’s solution = 1.0 ml SC

**FLUID THERAPY**

Saline: 0.02 ml-0.05 ml per gram body weight of sterile saline or lactated ringer’s solution once or twice daily

**NEUROMUSCULAR BLOCKER**

Pancuronium: 0.03 mg/kg IV

**OPIOID ANTAGONIST**

Naloxone: 0.05-0.1 mg/kg IM, IP, IV
SEDATIVE/ANALGESIC

Dexmedetomidine: 0.25-1.0 mg/kg IP (0.5 mg/kg most common)
Xylazine: 5-10 mg/kg

TRANQUILIZERS

Acepromazine: 0.25-0.5 mg/kg IM
RATS

ANALGESICS

Pain: Buprenorphine: 0.01-0.05 mg/kg SC two to three times daily; 0.1-0.25 mg/kg PO two to three times daily (1 ml of 0.3 mg/ml in 4 ml NaCl = 0.06 mg/ml); Buprenorphine SR: 1-5 mg/kg (1.2 mg/kg common – higher may cause dysphoria or pica) SR (sustained release) formula SC ONLY every 3 days

Pain due to inflammation:

Carprofen: 5 mg/kg SC, IV, IM, IP once daily (1 ml of 50 mg/ml in 9 ml NaCl = 0.5 mg/ml, alternatively, 0.05 ml (50 µl) of carprofen with 5 ml sterile water)
Ibuprofen: Use name-brand Advil©. Add 200 mg capsule to 200 mL water and shake vigorously. Light sensitive, no acidified water, change every 5 days.
Meloxicam: 2 mg/kg PO, SC once daily

ANESTHETICS

Atipamezole: To reverse xylazine or medetomidine 0.1-1 mg/kg IM, IP, IV, SC
Bupivacaine: 2 mg/kg, onset 5 minutes, duration 2-4 hours
Ketamine: 50-100 mg/kg IM, IP; 50 mg/kg IV; 40-60 mg/kg with 5-10 mg/kg diazepam IM, IP; 40-75 mg/kg with 5-15 mg/kg xylazine IM, IP

Refer to the following NIH guidelines for additional information on ketamine mixtures: https://ncifrederick.cancer.gov/lasp/acuc/bethesda/Media/Documents/KetamineCombinations.pdf

Lidocaine: Percutaneously: 1-3 mg/kg (do not exceed 4mg/kg), onset 1 minute, duration 30-60 minutes
Pentobarbital: 40-60 mg/kg anesthetic, 100mg/kg euthanasia IV, IP
Propofol: 10 mg/kg IV

ANTIBIOTICS

Amoxicillin: 0.25 mg/ml in water. Add 1 ml re-suspended 50 mg/mL (Amoxil) solution to 199 ml water. Do not acidify water.
Doxycycline: 2.5-5 mg/kg PO twice a day. Do not use in young or pregnant animals
Enrofloxacin: 85 mg/kg (0.5 mg/ml in drinking water (62.5 mg enrofloxacin with 125 ml water)), change every 3-5 days, or when cloudy, can be mixed with juice.
Trimethoprim/sulfamethoxazole: 5 ml of 240 g/5ml suspension in 500 ml of water (use sterile or distilled instead of acidified or chlorinated water) light sensitive, change every 5 days; 15-30 mg/kg PO, IM twice daily

ANTICHOLINERGICS/ANTIMUSCARINICS

Atropine: 0.04-0.1 mg/kg
Glycopyrrolate: 0.01-0.02 mg/kg IV

ANTICONVULSANTS

Diazepam: 3-5 mg/kg IM
Midazolam: 1-2 mg/kg IM; 5 mg/kg IV, IM, IP
ANTIDOTES

Yohimbine: 0.2 mg/kg IP as needed (to reverse xylazine or medetomidine)

ANTIHISTAMINES

Diphenhydramine: 10 mg/kg SC

ANTIINFLAMMATORY/IMMUNOSUPPRESSANTS

Dexamethasone: 0.05-0.2 mg/kg IM (anti-inflammatory)
Prednisone: 0.5-2.2 mg/kg IM, SC

ANTIPARASITICS

Fenbendazole: 50 mg/kg PO once; 100 ppm in feed for 14 days; 150 ppm in feed for 5 seven day periods separated by 7 days off
Ivermectin: 200-250 mcg/kg SC or PO every 7 days for 3 weeks

FLUID THERAPY

Saline: 0.02 ml-0.05 ml per gram body weight of sterile saline or lactated ringer’s solution once or twice daily

OPIOID ANTAGONIST

Naloxone: 0.01-0.1 mg/kg IM, IP, IV

SEDATIVE/ANALGESIC

Dexmedetomidine: 0.15 mg/kg IP; 5 mcg/kg IP, IV followed by 100 mcg/kg/hr SC constant rate infusion (sedation appropriate for imaging, not surgery)
Xylazine: 5-10 mg/kg

TRANQUILIZERS

Acepromazine: 0.25-0.5 mg/kg IM
GUINEA PIGS

ANALGESICS

Pain: **Buprenorphine:** 0.05 mg/kg SC, IV two or three times daily

Pain due to inflammation:

**Meloxicam:** 0.1-0.3 mg/kg PO once or twice daily

ANESTHETICS

**Atipamezole:** To reverse xylazine or medetomidine 0.1-1 mg/kg IM, IP, IV, SC

**Bupivacaine:** 2 mg/kg, onset 5 minutes, duration 2-4 hours

**Ketamine:** 10-30 mg/kg IM; 10-20 mg/kg with 1-2 mg/kg diazepam IM; 85 mg/kg with 12-13 mg/kg xylazine IM

Refer to the following NIH guidelines for additional information on ketamine mixtures:

**Lidocaine:** Percutaneously: 1-3 mg/kg (**do not exceed 4 mg/kg**), onset 1 minute, duration 30-60 minutes

**Pentobarbital:** 15-40 mg/kg IP; 30 mg/kg IV

**Telazol:** 40-60 mg/kg IM for immobilization

ANTIBIOTICS

**Doxycycline:** 2.5-5 mg/kg PO twice daily. **Do not use in young or pregnant animals**

**Enrofloxacin:** 2.5-10 mg/kg (5 mg/kg most common) IM, PO, SC twice daily; 100 mg/L of water

**Trimethoprim/sulfamethoxazole (TMS):** 5 ml of 240 g/5 ml suspension in 500 ml of water (use sterile or distilled instead of acidified or chlorinated water) **light sensitive;** 15-30 mg/kg PO, IM twice daily

ANTICHOLINERGICS/ANTIMUSCARINICS

**Atropine:** 0.04-0.1 mg/kg

**Glycopyrrolate:** 0.01-0.02 mg/kg IV

ANTICONVULSANTS

**Diazepam:** 0.5-3 mg/kg IM

**Midazolam:** 1-2 mg/kg IM; 5 mg/kg IV, IM, IP

ANTIDOTES

**Yohimbine:** 0.2 mg/kg IP as needed (to reverse xylazine or medetomidine)

ANTIHISTAMINES

**Diphenhydramine:** 7.5 mg/kg PO; 12.5 mg/kg IP
ANTIINFLAMMATORY/IMMUNOSUPPRESSANTS

Dexamethasone: 0.05-0.2 mg/kg IM (anti-inflammatory)
Prednisone: 0.5-2.2 mg/kg IM, SC

ANTIPARASITICS

Fenbendazole: 20-50 mg/kg PO once a day for 5 days
Ivermectin: 200-250 mcg/kg SC or PO every 7 days for 3 weeks; for Trixacarus caviae 500 mcg/kg SC repeat at 14 and 28 days
Metronidazole: 10-40 mg/kg PO once daily

BENZODIAZEPINE ANTAGONIST

Flumazenil: 0.01 mg/kg IV, may have to repeat (T\(1/2\) = 1 hr)

CARDIAC STIMULANT

Epinephrine: 0.003 mg/kg IV

DIURETIC

Furosemide: 5-10 mg/kg twice a day

GASTRIC ACID/ULCERS

Cimetidine: 5-10 mg/kg PO, IM, SC two, three or four times daily

NEUROMUSCULAR BLOCKER

Pancuronium: 0.06 mg/kg IV

OPIOID ANTAGONIST

Naloxone: 0.01-0.1 mg/kg IM, IP, IV

PROKINETIC

Cisapride: 0.1-0.5 mg/kg PO twice daily

RESPIRATORY STIMULANT

Doxapram: 2-5 mg/kg IV, IP, SC

SEDATIVE/ANALGESIC

Xylazine: 5 mg/kg IM

SHOCK

Epinephrine: 0.003 mg/kg IV
TRANQUILIZERS

Acepromazine: 0.25-0.5 mg/kg IM

VITAMINS

Vitamin C: 30 mg/kg IM, PO, once daily; 200 mg/L of water
HAMSTERS

ANALGESICS

Pain: Buprenorphine: 0.05-0.5 mg/kg SC twice a day

Pain due to inflammation:

Meloxicam: 0.2 mg/kg PO, SC once a day

ANESTHETICS

Atipamezole: To reverse xylazine or medetomidine 0.1-1 mg/kg IM, IP, IV, SC
Bupivacaine: 2 mg/kg, onset 5 minutes, duration 2-4 hours
Ketamine: 100 mg/kg IM; 50 mg/kg with 5 mg/kg diazepam IM; Not recommended for use with xylazine

Refer to the following NIH guidelines for additional information on ketamine mixtures:

Lidocaine: Percutaneously: 1-3 mg/kg (do not exceed 4 mg/kg), onset 1 minute, duration 30-60 minutes
Pentobarbital: 70-80 mg/kg IP
Telazol: 50-80 mg/kg IP for immobilization/anesthesia

ANTIBIOTICS

Doxycycline: 2.5-5 mg/kg PO twice a day. Do not use in young or pregnant animals
Enrofloxacin: 2.5-10 mg/kg (5 mg/kg most common) IM, PO, SC twice a day; 100mg/L of water
Trimethaprim/sulfamethoxazole: 15-30 mg/kg PO twice a day; 30 mg/kg IM twice a day

ANTICHOLINERGICS/ANTIMUSCARINICS

Atropine: 0.04-0.1 mg/kg
Glycopyrrolate: 0.01-0.02 mg/kg IV

ANTICONVULSANTS

Diazepam: 3-5 mg/kg IM
Midazolam: 1-2 mg/kg IM; 5 mg/kg IV, IM, IP

ANTIINFLAMMATORY/IMMUNOSUPPRESSANTS

Dexamethasone: 0.05-0.2 mg/kg IM (anti-inflammatory)
Prednisone: 0.5-2.2 mg/kg IM, SC

ANTIPARASITICS

Fenbendazole: 20-50 mg/kg PO once a day for 5 days
Ivermectin: 200-500 mcg/kg SC, PO every 14 days for 3 weeks
Metronidazole: 0.2 mg/kg PO three times a day
**BENZODIAZEPINE ANTAGONIST**

*Flumazenil*: 0.01 mg/kg IV, may have to repeat (T'/2 = 1 hr)

**DIURETIC**

*Furosemide*: 5-10 mg/kg twice a day

**GASTRIC ACID/ULCERS**

*Cimetidine*: 5-10 mg/kg PO, IM, SC two, three or four times a day

**OPIOID ANTAGONIST**

*Naloxone*: 0.01-0.1 mg/kg IM, IP, IV

**PROKINETIC**

*Cisapride*: 0.1-0.5 mg/kg PO twice a day

**RESPIRATORY STIMULANT**

*Doxapram*: 5-10 mg/kg IV, IP

**TRANQUILIZERS**

*Acepromazine*: 0.25-0.5 mg/kg IM
GERBILS

ANALGESICS

Pain:  Buprenorphine: 0.1-0.2 mg/kg SC twice a day

Pain due to inflammation:

Meloxicam: 0.2 mg/kg PO, SC once a day

ANESTHETICS

Atipamezole: To reverse xylazine or medetomidine 0.1-1 mg/kg IM, IP, IV, SC
Bupivacaine: 2 mg/kg, onset 5 minutes, duration 2-4 hours
Ketamine: 100 mg/kg IM; 50 mg/kg with 5 mg/kg diazepam IM

Refer to the following NIH guidelines for additional information on ketamine mixtures:

Lidocaine: Percutaneously: 1-3 mg/kg (do not exceed 4 mg/kg), onset 1 minute, duration 30-60 minutes
Pentobarbital: 70-80 mg/kg IP
Telazol: 10-30 mg/kg IP for immobilization/anesthesia

ANTIBIOTICS

Doxycycline: 2.5-5 mg/kg PO twice a day. Do not use in young or pregnant animals
Enrofloxacin: 2.5-5 mg/kg IM, PO, SC twice a day
Trimethoprim/sulfamethoxazole: 15-30 mg/kg PO twice a day; 30 mg/kg IM twice a day

ANTICHOLINERGICS/ANTIMUSCARINICS

Atropine: 0.04-0.1 mg/kg
Glycopyrrolate: 0.01-0.02 mg/kg IV

ANTICONVULSANTS

Diazepam: 3-5 mg/kg IM
Midazolam: 1-2 mg/kg IM; 5mg/kg IV, IM, IP

ANTIINFLAMMATORY/IMMUNOSUPPRESSANTS

Dexamethasone: 0.05-0.2 mg/kg IM (anti-inflammatory)
Prednisone: 0.5-2.2 mg/kg IM, SC

ANTIPARASITICS

Fenbendazole: 20-50 mg/kg PO once a day for 5 days
Ivermectin: 200 mcg/kg SC, PO every 7 days for 3 weeks
Metronidazole: 0.2 mg/kg PO three times a day
BENZODIAZEPINE ANTAGONIST

Flumazenil: 0.01 mg/kg IV, may have to repeat (T_{1/2} = 1 hr)

DIURETIC

Furosemide: 5-10 mg/kg twice a day

GASTRIC ACID/ULCERS

Cimetidine: 5-10 mg/kg PO, IM, SC two, three or four times a day

OPIOID ANTAGONIST

Naloxone: 0.01-0.1 mg/kg IM, IP, IV

PROKINETIC

Cisapride: 0.1-0.5 mg/kg PO twice a day

RESPIRATORY STIMULANT

Doxapram: 5-10 mg/kg IV, IP
BIRDS

ANALGESICS

Pain: Buprenorphine: 0.01-0.05 mg/kg IM

Pain due to inflammation:

Carprofen: 1-4 mg/kg IM, IV, PO once a day
Meloxicam: 0.2 mg/kg PO, SC once a day

ANESTHETICS

Atipamezole: To reverse xylazine or medetomidine 0.5 mg/kg IM
Bupivacaine: 2 mg/kg, onset 5 minutes, duration 2-4 hours
Lidocaine: Percutaneously: 1-3 mg/kg (do not exceed 4 mg/kg), onset 1 minute, duration 30-60 minutes

ANTIBIOTICS

Cefazolin: 11-22 mg/kg IM twice a day
Ceftriaxone: 25 mg/kg SC twice a day (use 1.0 ml of 100 mg/ml ceftriaxone mixed with 9 ml saline)
Doxycycline: 75-100 mg/kg IM every 5-7 days for the first 4 weeks then every 5 days for 45 day treatment course; 40-50 mg/kg PO once a day
Enrofloxacin: 2.5-5 mg/kg IM twice a day
Trimethaprim/sulfamethoxazole: 50-100 mg/kg PO twice a day

ANTICHOLINERGICS/ANTIMUSCARINICS

Atropine: 0.04-0.1 mg/kg IM, SC

ANTICONVULSANTS

Diazepam: 0.5-2 mg/kg IV, IM

ANTIDOTES

Yohimbine: 0.1 mg/kg IV

ANTIHINGAMINES

Diphenhydramine: 2-4 mg/kg PO, IM, IV twice a day

ANTIINFLAMMATORY/IMMUNOSUPPRESSANTS

Dexamethasone: 2 mg/ml injectable: 2-4 mg/kg IM, IV once, twice or three times a day
Prednisone: 0.2 mg/30g body weight or dissolve a 5 mg tablet in 2.5 ml of water, administer 2 drops PO twice a day
ANTIPARASITICS

Ivermectin: 200-400 mcg/kg PO, topically
Metronidazole: 50 mg/kg PO once a day for 5 days
Pyrantel pamoate: 4.5 mg/kg PO once, repeat in 14 days

BENZODIAZEPINE ANTAGONIST

Flumazenil: 0.01 mg/kg IV (may have to repeat as T1/2 is 1 hour)

DIURETIC

Mannitol: 0.5-1.5 g/kg IV over 20 minutes, repeat every 4-6 hours

PROKINETIC

Cisapride: 0.5-1.5 mg/kg PO three times a day

RESPIRATORY STIMULANT

Doxapram: 5-20 mg/kg IM, IV, IT, IO

SEDATIVE/ANALGESIC

Xylazine: 1-4 mg/kg IM

TETANY

Calcium Gluconate: for hypoglycemic tetany 50-100 mg/kg IV slow, dilute IM; for egg-bound 0.01-0.02 ml/gram IM of 1% solution

References
5. Veterinary Information Network
Institutional Animal Care and Use Committee

ZEBRAFISH (Ref: the University of North Carolina at Chapel Hill)

ANALGESICS
- **Butorphanol**: 0.1-0.4 mg/kg IM every 24 hrs; efficacy of dose varies with species
- **Carprofen**: 2.0-4.0 mg/kg IM every 72-96 hrs
- **Flunixin meglumine**: 0.25-0.5 mg/kg IM every 72-96 hrs
- **Ketoprofen**: 2.0 mg/kg IM every 24-48 hrs
- **Meloxicam**: 0.1-0.2 mg/kg every 24-48 hrs
- **Tramadol**: 5.0-10 mg/kg PO every 48-72 hrs

ANESTHETICS
- **Tricaine methanesulfonate** (MS-222): 25-250 mg/L in water bath or on gills to effect. Buffer to neutral pH with sodium bicarbonate or other buffer.

EUTHANASIA
- **Benzocaine hydrochloride**: > 250 mg/L in water for immersion. Per AVMA guidelines, pure benzocaine is not water soluble and should be avoided for anesthesia or euthanasia because it requires the use of acetone or ethanol solvents which may be irritating to tissues.
- **Tricaine methanesulfonate** (MS-222): > 250-500 mg/L in water or on gills. > 10 minutes immersion after opercular movement cessation. Buffer to neutral pH with sodium bicarbonate or other buffer.