

# Laboratory Animal Formulary

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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:

<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, 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)

### ANTI-HISTAMINES

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

### ANTI-INFLAMMATORY/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 PGF<sub>2</sub> $\alpha$  (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

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**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

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**ANTIDOTES**

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

**ANTI-HISTAMINES**

**Diphenhydramine:** 10 mg/kg SC

**ANTI-INFLAMMATORY/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:

<https://ncifrederick.cancer.gov/lasp/acuc/bethesda/Media/Documents/KetamineCombinations.pdf>

**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; 30mg/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

### ANTICONSULSANTS

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

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

### ANTIDOTES

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

### ANTI-HISTAMINES

**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

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**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:** 100mg/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:

<https://ncifrederick.cancer.gov/lasp/acuc/bethesda/Media/Documents/KetamineCombinations.pdf>

**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

**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

### **ANTICONSULSANTS**

**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 ( $T^{1/2}$  = 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

**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:

<https://ncifrederick.cancer.gov/lasp/acuc/bethesda/Media/Documents/KetamineCombinations.pdf>

**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

**Trimethoprim/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

### **ANTI-HISTAMINES**

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

### **ANTI-INFLAMMATORY/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 T<sup>1/2</sup> 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

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**References**

1. BSAVA Small Animal Formulary, 6<sup>th</sup> Ed. 2008.
2. Plumb's Veterinary Drug Handbook, 6<sup>th</sup> Ed. 2008.
3. Quesenberry, KE, Carpenter, JW. Ferrets, Rabbits and Rodents, Clinical Medicine and Surgery, 2<sup>nd</sup> Ed.
4. Formulary for Laboratory Animals, 3<sup>rd</sup> Ed. 2005.
5. Veterinary Information Network
6. Merck Veterinary Manual, 10<sup>th</sup> Ed. 2010.

## **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.