

DRUG FORMULARY FOR RESEARCH ANIMALS AT UVM

* requires DEA registration

MOUSE

ANALGESICS				
NSAIDs - for minor surgery/procedure (e.g., skin/scalp incision, small craniotomy, vascular cut-down); give 1 st dose intra-op				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Meloxicam	5-10	SC, PO	q 12-24h	
Carprofen	5-10	SC, PO	q 12-24h	
	15-20	SC, PO	q 24h	
Ketoprofen	10-20	SC	q 24h	
Flunixin	2-5	SC	q 12h	

OPIOIDS - for major surgery (e.g., thoracotomy, laparotomy, osteotomy/fracture, large craniotomy); give 1 st dose intra-op				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Buprenorphine*	0.05-0.1	SC, IP	q 4-6h	may cause respiratory depression
Slow-release Buprenorphine*	3.25	SC	q 72h	Ethiq-XR®
	0.5-1.0	SC	q 48h	Bup-SR-LAB® (ZooPharm)
Morphine*	2-5	SC	q 2-4h	
Naloxone	0.01-0.10	IP	once	reverses opioids

GENERAL ANESTHETICS				
INHALED – preferred method for survival surgery, especially ≥30 min; but provides no post-op analgesia				
Drug	Dose (%)	Route	Frequency	Notes
Isoflurane or Sevoflurane	4-5 (induction), 1-3 (maintenance)	inhaled	continuous	requires precision vaporizer; adjust % to effect; special vaporizer for sevoflurane

INJECTABLE				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Ketamine*/Xylazine	90-120 Ket/5-10 Xyl (in one syringe)	IP	lasts 20-30 min	for short (<30 min) procedures; re-dose with ½ ketamine dose only
Ketamine*/Xylazine/ Acepromazine	80-100 Ket/5-10 Xyl/ 2-3 Ace. (in one syringe)	IP	lasts 30-40 min	for short (<30 min) procedures; re-dose with ½ ketamine dose only
Ketamine*/Dexmedetomidine	50-75 Ket/0.25-0.5 Dex (in one syringe)	IP	lasts 20-30 min	for short (<30 min) procedures; re-dose with ½ ketamine dose only
Atipamezole (reversal agent)	1.0-2.5	SC, IP	once	reverses dexmedetomidine
Yohimbine (reversal agent)	1.0-2.0	SC, IP	once	reverses xylazine
Sodium pentobarbital* (not euthanasia solution)	40-60	IP	lasts 30-40 min	low margin of safety; consider supplementing with NSAID
Tribromoethanol	200-300	IP	lasts 15-20 min	for terminal procedure/euthanasia; use fresh solution (<1wk old)
Urethane	1100-1800	IP	lasts 8-10 h	for non-survival procedure only; minimal CV/resp depression
Alpha-chloralose	100-120	IP	lasts up to 8 h	for non-survival procedure only; hypnosis, poor anesthesia, poor analgesia
Chloral hydrate*	370-400	IP	lasts ~1 h	for non-survival procedure only; hypnosis, poor anesthesia, poor analgesia

HYPOTHERMIA – for neonates only				
Drug	Dose	Route	Frequency	Notes
Hypothermia	ice-water slurry	topical	once per surgery; lasts 10-15 min	only for pups ≤6 days old; avoid direct contact with ice; rewarm gradually

LOCAL ANESTHETICS

Drug	Dose (mg/kg)	Route	Frequency	Notes
Lidocaine	2-4 (≤ 0.1cc of 0.5%)	intra-incisional	once, before incision; lasts <1h	fast onset (2 min); max total dose 7mg/kg
Bupivacaine	1-2 (≤ 0.1cc of 0.25%)	intra-incisional	once, before incision; lasts 4-8h	slow onset (15 min); max total dose 6mg/kg
Lidocaine/Prilocaine	5-10	topical	q 24h	(EMLA® cream)

ANTIBIOTICS

Treatment is typically directed by veterinary staff, unless specifically approved in protocol

Drug	Dose (mg/kg)	Route	Frequency	Notes
Ampicillin	20-100	PO, SC, IM	q 12h	0.5 mg/mL drinking water x 14d
Doxycycline	5-10	PO	q 12h	
Enrofloxacin	10-50	PO, IM	q 12h	0.05-2.0 mg/mL drinking water x 14d
Erythromycin	20	PO	q 12h	
Gentamicin	2-4	SC, IM	q 8-24h	
Metronidazole	20-60	PO	q 8-12h	2.5 mg/mL drinking water x 5d
Trimethoprim/sulfa	80-160	PO, IM	q 12h	1-3.5 mL of 480 mg/mL to 250 mL H2O

OPHTHALMIC DRUGS

Drug	Dose	Route	Frequency	Notes
Gentamicin ophthalmic	1-2 drops	topical (ophth)	q 12h	ophthalmic antibiotic
Proparacaine HCl	1 drop	topical (ophth)	q 12h	ophthalmic anesthetic

PARALYTIC DRUGS

Produce immobility but not unconsciousness. Must be justified in protocol and level of anesthesia well monitored.

Drug	Dose (mg/kg)	Route	Frequency	Notes
Succinylcholine	0.05-0.1	IV	infusion	must be anesthetized
Vecuronium	0.1-0.5	IV	infusion	must be anesthetized

EUTHANASIA AGENTS

Chemical euthanasia agent must be followed by secondary physical method of euthanasia.

Drug	Dose	Route	Notes
Carbon Dioxide (CO ₂)	30-70% vol/min	inhalation	produces death by hypoxia
Anesthetic overdose Isoflurane, sevoflurane Tribromoethanol Pentobarbital* Urethane	2-5X anesthetic dose 5% 500 mg/kg 150 mg/kg 3000 mg/kg	inhalation IP IP IP	Beuthanasia®, Euthasol®, Fatal-Plus®

RAT

ANALGESICS

NSAIDs - for minor surgery/procedure (e.g., skin/scalp incision, small craniotomy, vascular cut-down); give 1st dose intra-op

Drug	Dose (mg/kg)	Route	Frequency	Notes
Meloxicam	1-2	SC, PO	q 24h	
Carprofen	5	SC, PO	q 24h	
Ketoprofen	2-5	SC	q 12-24h	
Flunixin	2-5	SC	q 12h	

OPIOIDS - for major surgery (e.g., thoracotomy, laparotomy, osteotomy/fracture, large craniotomy); give 1st dose intra-op

Drug	Dose (mg/kg)	Route	Frequency	Notes
Buprenorphine*	0.01-0.05	SC, IP	q 8-12h	may cause pica
Slow-release Buprenorphine*	0.65-1.0 1.2-2.0	SC SC	q 72h q 48h	Ethiq-XR® Bup-SR-LAB® (ZooPharm)

GENERAL ANESTHETICS

INHALED – preferred method for survival surgery, especially ≥30 min; but provides no post-op analgesia

Drug	Dose (%)	Route	Frequency	Notes
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Isoflurane or Sevoflurane	4-5 (induction), 1-3 (maintenance)	inhaled	continuous	requires precision vaporizer; adjust % to effect; special vaporizer for sevoflurane
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INJECTABLE				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Ketamine*/Xylazine	40-80 Ket/5-10 Xyl (in one syringe)	IP	lasts 20-30 min	for short (<30 min) procedures; re-dose with ½ ketamine dose only
Ketamine*/Xylazine/ Acepromazine	40-80 Ket/5-10 Xyl/ 1-2 A (in one syringe)	IP	lasts 30-40 min	for short (<30 min) procedures; re-dose with ½ ketamine dose only
Ketamine*/Dexmede- tomidine	50-75 Ket/0.2-0.5 Dex (in one syringe)	IP	lasts 20-30 min	for short (<30 min) procedures; re-dose with ½ ketamine dose only
Atipamezole (reversal agent)	0.1-1.0	SC, IP	once	reverses dexmedetomidine
Yohimbine (reversal agent)	1.0-2.0	SC, IP	once	reverses xylazine
Sodium pentobarbital* (not euthanasia solution)	30-50	IP	lasts 30-40 min	low margin of safety; consider supplementing with NSAID
Tribromoethanol	250-400	IP	lasts 15-20 min	for terminal procedure/euthanasia; use fresh solution (<1wk old)
Urethane	800-900	IP	lasts 8-10 h	for non-survival procedure only
Alpha-chloralose	35-65	IP	lasts 8-10 h	for non-survival procedure only; hypnotic agent, poor analgesia
Chloral hydrate*	300-450	IP	lasts 1h+	for non-survival procedure only; hypnotic agent, poor analgesia

HYPOTHERMIA – for neonates only				
Drug	Dose	Route	Frequency	Notes
Hypothermia	ice-water slurry	topical	once per surgery; lasts 10-15 min	only for pups ≤6 days old; avoid direct contact with ice; rewarm gradually

LOCAL ANESTHETICS				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Lidocaine	1-4 (≤ 0.1cc of 0.5%)	intra-incisional	once; lasts <1h	fast onset; max total dose 7mg/kg
Bupivacaine	1-8 {≤ 0.1cc of 0.25%}	intra-incisional	once; lasts 4-8h	slow onset; max total dose 8mg/kg
Lidocaine/Prilocaine	5-10	topical	q 24h	(EMLA® cream)

ANTIBIOTICS				
Treatment is typically directed by veterinary staff, unless specifically approved in protocol				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Ampicillin	20-100	PO, SC, IM	q 12h	0.5 mg/mL drinking water x 14d
Doxycycline	5-10	PO	q 12h	
Enrofloxacin	5-10	PO, IM	q 12h	0.05-2.0 mg/mL drinking water x 14d
Erythromycin	20	PO	q 12h	
Gentamicin	2-5	SC, IM	q 8-24h	
Metronidazole	10-40	PO	q 12-24h	2.5 mg/mL drinking water x 5d
Trimethoprim/sulfa	20-30	PO, IM	q 12h	1-3.5 mL of 480 mg/mL to 250 mL H2O

OPHTHALMIC DRUGS				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Gentamicin ophthalmic	1-2 drops	topical (ophth)	q 12h	ophthalmic antibiotic
Proparacaine HCl	1 drop	topical (ophth)	q 12h	ophthalmic anesthetic

PARALYTIC DRUGS				
Produce immobility but not unconsciousness. Must be justified in protocol and level of anesthesia well monitored.				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Succinylcholine	0.05-0.1	IV	infusion	must be anesthetized
Vecuronium	0.1-0.5	IV	infusion	must be anesthetized

EUTHANASIA AGENTS				
Chemical euthanasia agent must be followed by secondary physical method of euthanasia.				
Drug	Dose	Route	Notes	

Carbon Dioxide (CO ₂)	30-70% vol/min	inhalation	produces death by hypoxia
Anesthetic overdose Isoflurane Tribromoethanol Pentobarbital* Urethane	5-10X anesthetic dose 5% 800 mg/kg 100 mg/kg 2000 mg/kg	inhalation IP IP IP	Beuthanasia®, Euthasol®, Fatal-Plus®

GUINEA PIG

ANALGESICS				
NSAIDs - for minor surgery/procedure (e.g., skin/scalp incision, small craniotomy, vascular cut-down); give 1 st dose intra-op				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Meloxicam	1-2	SC, PO	q 24h	Limit to 3 days
Carprofen	1-2	SC, PO	q 24h	
Ketoprofen	1-2	SC	q 24h	
Flunixin	2-5	IM	q 12-24h	

OPIOIDS - for major surgery (e.g., thoracotomy, laparotomy, osteotomy/fracture, large craniotomy); give 1 st dose intra-op				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Buprenorphine*	0.05-0.1	SC, IM	q 8-12h	

GENERAL ANESTHETICS				
INHALED – preferred method for survival surgery, especially ≥30 min; but provides no post-op analgesia				
Drug	Dose (%)	Route	Frequency	Notes
Isoflurane	4-5 (induction), 1-3 (maintenance)	inhaled	continuous	requires precision vaporizer; adjust % to effect;

INJECTABLE				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Ketamine*/Xylazine	20-40 Ket/3-5 Xyl (in one syringe)	IM		
Ketamine*/Diazepam*	60-100 Ket/5-8 Dia (in one syringe)	IM		
Chloral hydrate*	400	IP	once; lasts 1h+	for non-survival procedure only; hypnotic agent, poor analgesia
Urethane	1500	IP, IV	once; lasts 8-10h	for non-survival procedure only

LOCAL ANESTHETICS				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Lidocaine	1-4 (≤ 0.1cc of 0.5%)	intra-incisional	once; lasts <1h	fast onset; max total dose 7mg/kg
Bupivacaine	1 max (≤ 0.1cc of 0.25%)	intra-incisional	once; lasts 3-4h	slow onset; max total dose 1mg/kg
Lidocaine/Prilocaine	5-10	topical	q 24h	(EMLA® cream)

ANTIBIOTICS				
Treatment is typically directed by veterinary staff, unless specifically approved in protocol				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Doxycycline	2-5	PO	q 12h	
Enrofloxacin	5-10	PO, IM	q 12h	0.05-0.2 mg/mL drinking water x 14d
Gentamicin	2-4	SC, IM	q 8-24h	

OPHTHALMIC DRUGS				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Gentamicin ophthalmic	1-2 drops	topical (ophth)	q 12h	ophthalmic antibiotic
Proparacaine HCl	1 drop	topical (ophth)	q 12h	ophthalmic anesthetic

PARALYTIC DRUGS				
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Produce immobility but not unconsciousness. Must be justified in protocol and level of anesthesia well monitored.				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Succinylcholine	0.05-0.1	IV	infusion	must be anesthetized
Vecuronium	0.1-0.5	IV	infusion	must be anesthetized

EUTHANASIA AGENTS

Chemical euthanasia agent must be followed by secondary physical method of euthanasia.

Drug	Dose	Route	Notes
Carbon Dioxide (CO ₂)	30-70% vol/min	inhalation	produces death by hypoxia
Anesthetic overdose	5-10X anesthetic dose		
Isoflurane	5%	inhalation	Beuthanasia®, Euthasol®, Fatal-Plus®
Pentobarbital*	150	IP	
Urethane	3000	IP	

PIG

ANALGESICS

NSAIDs - for minor surgery/procedure (e.g., skin/scalp incision, small craniotomy, vascular cut-down); give 1st dose intra-op

Drug	Dose (mg/kg)	Route	Frequency	Notes
Meloxicam	0.4	PO, IM	q 24h	
Carprofen	2-3	PO	q 12-24h	
Ketoprofen	1-3	IM	q 12-24h	
Flunixin	1-4	IM	q 24h	

OPIOIDS - for major surgery (e.g., thoracotomy, laparotomy, osteotomy/fracture, large craniotomy); give 1st dose intra-op

Drug	Dose (mg/kg)	Route	Frequency	Notes
Buprenorphine*	0.01-0.05	IM	q 8-12h	
Slow-release Buprenorphine*	0.12-0.24	IM	q 3-5d	Bupe-SR
Fentanyl*	0.02-0.05	IV	q 6h	

GENERAL ANESTHETICS

INHALED – preferred method for survival surgery, especially ≥30 min; but provides no post-op analgesia

Drug	Dose (%)	Route	Frequency	Notes
Isoflurane or Sevoflurane	4-5 (induction), 1-3 (maintenance)	inhaled	continuous	requires precision vaporizer; adjust % to effect; special vaporizer for sevoflurane

INJECTABLE

Drug	Dose (mg/kg)	Route	Frequency	Notes
Ketamine*/Xylazine	20 Ket/1-2 Xyl (in one syringe)	IM	lasts 20-30 min	
Ketamine*/Acepromazine	22-33 Ket/1.1 Ace	IM		sedation, pre-anesthesia
Ketamine*/Dexmedetomidine	1 Ket/0.1 Dex (in one syringe)	IM	lasts 20-30 min	sedation, pre-anesthesia
Ketamine*/Midazolam*	33 K/0.5 M	IM	lasts 45-60 min	sedation, pre-anesthesia
Atipamezole	1	IM, IV	once	reverses dexmedetomidine
Yohimbine	1.0-2.0	IV	once	reverses xylazine
Fentanyl*	0.003-0.005 per hr	IV	infusion	often given w/ propofol/midazolam

LOCAL ANESTHETICS

Drug	Dose (mg/kg)	Route	Frequency	Notes
Lidocaine	1-4 (≤ 0.1cc of 0.5%)	intra-incisional	once; lasts <1h	fast onset; max total dose 7mg/kg
Bupivacaine	1 max (≤ 0.1cc of 0.25%)	intra-incisional	once; lasts 3-4h	slow onset; max total dose 1mg/kg
Lidocaine/Prilocaine	5-10	topical	q 24h	(EMLA® cream)

ANTIBIOTICS

Treatment is typically directed by veterinary staff, unless specifically approved in protocol

Drug	Dose (mg/kg)	Route	Frequency	Notes
Amoxicillin	7-10	PO	q 12h	
Ampicillin	2-5	IM	q 12h	
Ceftiofur	3-5	IM	q 24h	
Enrofloxacin	2.5-5	IM, PO	q 12-24h	
Erythromycin	2-5	IM, IV	q 12h	
Gentamicin	2	PO	q 24h	
Trimethoprim/sulfa	5	IM	q 24h	

OPHTHALMIC DRUGS

Drug	Dose (mg/kg)	Route	Frequency	Notes
Gentamicin ophthalmic	1-2 drops	topical (ophth)	q 12h	ophthalmic antibiotic
Proparacaine HCl	1 drop	topical (ophth)	q 12h	ophthalmic anesthetic

PARALYTIC DRUGS

Produce immobility but not unconsciousness. Must be justified in protocol and level of anesthesia well monitored.

Drug	Dose (mg/kg)	Route	Frequency	Notes
Succinylcholine	0.05-0.1	IV	infusion	must be anesthetized
Vecuronium	0.12-0.18	IV	infusion	must be anesthetized

EUTHANASIA AGENTS

Chemical euthanasia agent must be followed by secondary physical method of euthanasia.

Drug	Dose (mg/kg)	Route	Notes
Sodium pentobarbital*	150	IV	Beuthanasia®, Euthasol®, Fatal-Plus®
KCl	75-150	intra-cardiac, IV	must be under deep anesthesia

SHEEP

ANALGESICS

NSAIDs - for minor surgery/procedure (e.g., skin/scalp incision, small craniotomy, vascular cut-down); give 1st dose intra-op

Drug	Dose (mg/kg)	Route	Frequency	Notes
Meloxicam	1-2	PO, IM	q 24h	
Carprofen	2-4	IM, IV	q 24h	
Ketoprofen	1-4	IM, IV	q 24h	
Flunixin	1.1-2.2	IM, IV	q 24h	

OPIOIDS - for major surgery (e.g., thoracotomy, laparotomy, osteotomy/fracture, large craniotomy); give 1st dose intra-op

Drug	Dose (mg/kg)	Route	Frequency	Notes
Buprenorphine*	0.005-0.01	IV	q 4-8h	
Slow-release Buprenorphine*	0.12-0.24	IM	q 3-5d	Bupe-SR
Fentanyl*	0.02-0.05	IV	q 6h	

GENERAL ANESTHETICS

INHALED – preferred method for survival surgery, especially ≥30 min; but provides no post-op analgesia

Drug	Dose (%)	Route	Frequency	Notes
Isoflurane or Sevoflurane	4-5 (induction), 1-3 (maintenance)	inhaled	continuous	requires precision vaporizer; adjust % to effect; special vaporizer for sevoflurane

INJECTABLE

Drug	Dose (mg/kg)	Route	Frequency	Notes
Ketamine*/Xylazine	5 Ket/0.03-0.05 Xyl 10-15 Ket/0.1 Xyl (in one syringe)	IV IM	lasts 15-20 min	don't use in late pregnancy
Ketamine*/Acepromazine	22-33 Ket/1.1 Ace	IM		sedation, pre-anesthesia
Ketamine*/Dexmedetomidine	1 Ket/0.015 Dex (in one syringe)	IM	lasts 20-30 min	anesthesia

Ketamine*/Diazepam*	3-7.5 Ket/0.5-1 Dia	IV	lasts 45-60 min	sedation, pre-anesthesia
Atipamezole	0.1-0.2	IM, IV	once	reverses dexmedetomidine
Yohimbine	0.12-0.2	IM, slow IV	once	reverses xylazine

LOCAL ANESTHETICS				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Lidocaine	1-4 (<3 ml/kg of 2%)	intra-incisional	once; lasts <1h	fast onset;
Bupivacaine	1-2 (<0.8 ml/kg of 0.25%)	intra-incisional	once; lasts 4-8h	slow onset;

ANTIBIOTICS				
Treatment is typically directed by veterinary staff, unless specifically approved in protocol				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Amoxicillin	7-10	PO	q 12h	
Cephalexin	10	SC	q 24h	
Enrofloxacin	2.5-5	IM, PO	q 12-24h	

OPHTHALMIC DRUGS				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Gentamicin ophthalmic	1-2 drops	topical (ophth)	q 12h	ophthalmic antibiotic
Proparacaine HCl	1 drop	topical (ophth)	q 12h	ophthalmic anesthetic

PARALYTIC DRUGS				
Produce immobility but not unconsciousness. Must be justified in protocol and level of anesthesia well monitored.				
Drug	Dose (mg/kg)	Route	Frequency	Notes
Succinylcholine	0.01-0.02	IV	infusion	must be anesthetized
Vecuronium	0.01-0.05	IV	infusion	must be anesthetized

EUTHANASIA AGENTS				
Follow with secondary method. Death must be confirmed.				
Drug	Dose (mg/kg)	Route	Notes	
Sodium pentobarbital*	150	IV	Beuthanasia®, Euthasol®, Fatal-Plus®	
KCl	75-150	intra-cardiac, IV	must be under deep anesthesia	

FISH

GENERAL ANESTHETICS				
Drug	Dose (mg/L)	Route	Frequency	Notes
Benzocaine	25-100	immersion	once	Dissolve powder in ethanol; Buffer with NaCO ₃
Tricaine Methane Sulfonate (MS-222)	75-125	immersion	lasts 5-20 min	Buffer with NaCO ₃ to pH7

EUTHANASIA AGENTS				
IMMERSION – often 1-step method; leave fish in solution ≥30 min after last opercular movement				
Drug	Dose	Route	Notes	
Tricaine Methane Sulfonate (MS-222)	250-500 mg/L	immersion	Buffer with NaCO ₃ to pH7	
Benzocaine	≥250 mg/L	immersion	Buffer with NaCO ₃	
CO ₂	CO ₂ -saturated water	immersion	only from gas cylinder	
ethanol	10-30 mL 95% EtOH / L	immersion	produces anesthesia, then death	
Eugenol/isoeugenol/clove oil	≥20 mg/L	immersion	poor water solubility; potential carcinogens	
Isoflurane/sevoflurane	5-20 mL/L	immersion	poor water solubility; human hazard	
Quinaldine sulfate	≥100 mg/L	immersion	Buffer with NaCO ₃	
2-phenoxyethanol	0.3-0.4 mg/L	immersion		

lidocaine	400 mg/L	immersion	Effective in adult zebrafish
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INJECTION – usually part of 2-step method			
Drug	Dose (mg/kg)	Route	Notes
Sodium pentobarbital*	60-100	IV, intracardiac, intracoelomic	Death in 30 min
Ketamine*	66-88	IM	usually followed with pentobarbital
Ketamine*/Medetomidine	1-2 Ket / 0.05-0.1 Med	IM	usually followed with pentobarbital
propofol	1.5-2.5	IV	usually followed with pentobarbital

PHYSICAL – usually 2-step method; requires training and verification of proficiency	
Method	Notes
Decapitation, then pithing	Decapitation alone unacceptable
Cervical transection, then pithing	Use sharp knife or instrument
Cranial concussion, then pithing or exsanguination	Blunt force trauma to head
Maceration	Macerator designed for size of fish
Rapid chilling (2-4°C)	Acceptable for zebrafish and other small (<3.8cm) tropical fish; conditionally acceptable for other tropical fish; not appropriate for cold-water fish or any large-bodied fish. No direct contact of fish with ice. Slow chilling or freezing of unanesthetized fish is unacceptable.