

NU – IACUC

POLICY

Northeastern University Institutional Animal Care and Use Committee

Recommended Doses of Anesthetics and Analgesics of Laboratory Animals

Statement:

The proper use of anesthetics and analgesics while performing potentially painful procedures using live vertebrate animals is essential in maintaining proper animal welfare and ensuring that animals are not in more than momentary pain or discomfort. The NU-IACUC strongly believes if something is painful to a person, it is also painful to an animal. This policy outlines the proper dosage, route and estimated time of effect for approved anesthetics and analgesics used with research animals at Northeastern University.

Anesthesia

Anesthesia: *A state characterized by loss of sensation, the result of pharmacological depression of nerve function.*

Anesthetic: *A drug that causes temporary loss of sensation.*

Paralytic Agents: *Paralytic drugs are not considered anesthetics by the NU-IACUC. Therefore, use of these agents must be used accompanied with an additional anesthetic.*

Anesthetic Monitoring: All animals will be closely monitored while under anesthesia. Animals that are anesthetized should never be left unattended. Anesthetized animals will be monitored for vital signs, i.e. breathing rate, and for proper depth of anesthesia. Below is a list of common methods to evaluate and monitor that proper anesthesia is in effect:

- Toe Pinch- Pinch the foot or the webbing between the toes. If the animal pulls back, proper anesthesia has not been reached.
- Skin Pinch
- Jaw tightness: The tightness or tone of the jaw is a good indicator of proper anesthetic depth.
- Heart Rate: An increase in heart rate usually indicates a decrease in anesthetic depth.
- Respiration Rate: shallow, fast respiration usually indicates a decline in anesthetic depth.

Mice

Anesthetic:	Dosage	Route	Onset of Effect	Duration of Surgical Anesthesia
Avertin (instructions)	0.2ml/ 10g BW of a 1.25% Solution	IP	10 minutes	15-45 minutes
Ketamine/Xylazine	80-100 mg/kg + 10 mg/kg	IP	5 minutes	20-30 minutes
Pentobarbital	50 mg/kg	IP	10 minutes	20-40 minutes
Isoflurane*	To effect	Inhalation	5-10 seconds	10-15 seconds

* Can only be used in a vented fume hood or with a vented vaporizer

Rat

Anesthetic:	Dosage	Route	Onset of Effect	Duration of Surgical Anesthesia
Ketamine/Xylazine	40 mg/kg + 5 mg/kg	IP	5 minutes	80 minutes
Ketamine/Xylazine	60 mg/kg + 7.5 mg/kg	IP	5 minutes	115 minutes
Pentobarbital	30-40 mg/kg	IP	5 minutes	90 minutes
Isoflurane*	To effect	Inhalation	5-10 seconds	10-15 seconds

* Can only be used in a vented fume hood or with a vented vaporizer

Hamster

Anesthetic:	Dosage	Route	Onset of Effect	Duration of Surgical Anesthesia
Ketamine/Xylazine	200 mg/kg + 10 mg/kg	IP	5 minutes	80 minutes
Pentobarbital	9 mg/100 g BW with a boost of 1.2 mg/100 g BW	IP	5 minutes	90 minutes

Isoflurane*	To effect	Inhalation	5-10 seconds	10-15 seconds
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* Can only be used in a vented fume hood or with a vented vaporizer

Rabbit

Anesthetic:	Dosage	Route	Onset of Effect	Duration of Surgical Anesthesia
Ketamine/Xylazine	35 mg/kg + 5 mg/kg	IM	15 minutes	25-40 minutes
Ketamine/Xylazine	10 mg/kg + 3 mg/kg	IV	10 minutes	20-30 minutes
Ketamine Xylazine Acepromazine	35 mg/kg 5 mg/kg 0.75 mg/kg	IM	10 minutes	100 minutes
Pentobarbital	Induce with 10 mg/kg IV and dose with increments of 2-10 mg until satisfactory level of anesthesia is reached.	IV	10 minutes	90 minutes
Isoflurane or Halothane*	To effect	Inhalation	5-10 seconds	Requires anesthetic vaporizer

Analgesics

Analgesia – *A condition in which noxious stimuli are perceived but are not interpreted as pain; usually accompanied by sedation without loss of consciousness.*

Once the appropriate analgesic has been chosen and administered, frequent assessment of the animal is necessary to ensure not only that the choice is appropriate, but also that the dosage is adequate.

Mouse

Anesthetic:	Dosage	Route	Duration of Analgesia
Butorphanol	1.0-5.0 mg/kg	SQ	q 4 hrs.
Buprenorphine	0.05-0.1 mg/kg	SQ	q 6-12 hrs.
Acetaminophen	300 mg/kg	In drinking water	Ongoing
<u>Bupivacaine</u>	< 3.0 mg/kg	SQ	6-12 hrs

Rat

Anesthetic:	Dosage	Route	Duration of Analgesia
Butorphanol	0.5-2.0 mg/kg	SQ	q 4 hrs.
Buprenorphine	0.1-0.5 mg/kg	SQ	q 6-12 hrs.
Acetaminophen	300 mg/kg	In drinking water	Ongoing
Bupivacaine	< 3.0 mg/kg	SQ	6-12 hrs

Hamster

Anesthetic:	Dosage	Route	Duration of Analgesia
Buprenorphine	0.5 mg/kg	SQ	q 8-12 hrs.

Rabbit

Anesthetic:	Dosage	Route	Duration of Analgesia
Butorphanol	0.1-0.5 mg/kg	IV, SQ	q 4 hrs
Buprenorphine	0.02-0.05 mg/kg	SQ	q 12 hrs
Aspirin	100 mg/kg	PO q 4 hrs	3-4 hrs
Acetaminophen	100-300 mg/kg q4hr	PO	Ongoing
Bupivacaine	<3.0	mg/kg	Infiltrate around incision site