

Guidance on Anesthesia in Research and Instruction Animals

Route of Drug Administration

- x Injectable agents

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- x Rodents and rabbits, however, generally do not regurgitate or vomit, and do not need to be fasted, or have water restriction preoperatively, unless there is scientific justification.

Physiological Support

- x While anesthetized, from induction to recovery, animals must be provided appropriate supportive care.
 - o The sophistication of the support will vary with species, and the type and duration of the procedure, but typically will minimally include use of ophthalmic (ocular) lubricant on the eyes, thermal support to maintain normal body temperature, and, in larger animal species, administration of IV fluids.
- x Supplemental heat and temperature monitoring
 - o Supplemental/external heat sources must be provided for all but the most rapid anesthetic events (i.e., ≤ 5 minutes). Supplemental heat should be provided throughout anesthesia, from induction, and through recovery from anesthesia.
 - o Supplemental heat sources to counter hypothermia include slide warmers, chemical or microwaveable heat packs, warm water recirculating pads, heat lamps and forced air heaters such as Bair Huggers.
 - f All of these have the potential to cause thermal burns.
 - x All thermal sources (exception: warm water recirculating pads) must have a barrier thick enough to diffuse the heat, such as a small towel, placed between the animal and the pad.
 - x Electric heating pads are discouraged because of their increased risk for thermal burns compared to the other sources. If used, electric heating pads must be stored flat, to avoid damage from creasing/folding/rolling of the wires.
 - o Another means of supportive care is the administration of sterile fluids subcutaneously. Warmed (not hot) saline or lactated Ringer's solution (38.5-40°C) can be given at 2ml/100g during or immediately after surgery.
 - o Whenever possible, body temperatures should be monitored. Temperature monitoring during anesthesia is important as decreases in body temperature (hypothermia) are

x Toe pinch

- o Toe pinch is used to assess perception of pain in an anesthetized animal. If the toe or distal paw has pressure applied using a digital pinching action, withdrawal of the limb or overt movement of the animal signals response to stimulus and pain.
- o This test should be used during anesthesia induction to determine when an animal has achieved an adequate level of anesthesia to begin a painful procedure.
- o This test is also used intermittently during anesthesia to assess continued depth of anesthesia and lack of response to painful stimuli. If after having lost the toe pinch response, the animal begins to regain it, or shows other signs of movement, this is an indication that additional anesthetic doses may need to be administered.

x Heart rate

- o Heart rate is a primary factor for effective monitoring of large animal species, but is difficult to assess accurately in most rodent species due to their rapid heart rates.
- o If electrocardiography or pulse oximetry is being used, measurement of heart rate may be possible, and trends can be observed over the anesthetic interval.
- o Increases in heart rate may indicate pain perception and the need for additional anesthesia.
- o Conversely, if heart rate decreases, this may be an indication that the animal is reaching a deeper plane of anesthesia and additional anesthetic is not needed or that too much has been administered.

x Respiratory rate and character

- o Respiratory rate and character are primary factors for monitoring large animal species. Respiratory character may be monitored in rodents, but respiratory rate may be difficult to accurately measure in many rodent species.
- o Trends in respiratory rate and character can be judged over time to help assess anesthetic depth.
 - f Increases in respiratory rate and shallow breaths may indicate that an animal is

