



# ANIMAL TRACKS



A newsletter for the Duke research community

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<http://www.duhs.duke.edu>

## AAALAC MYTHS VS. FACTS

**Myth #1:** AAALAC International is a regulatory agency.  
**Fact #1:** AAALAC International is a private, non-profit, non-government organization that provides independent assessment of animal care programs.

**Myth #2:** AAALAC International conducts inspections of laboratory animal care and use programs.  
**Fact #2:** AAALAC International evaluates laboratory animal care and use programs through a voluntary, peer-review process.

**Myth #3:** AAALAC International establishes policies and regulations.  
**Fact #3:** AAALAC International evaluates animal care and use programs based on recommendations in the *Guide for the Care and Use of Laboratory Animals (Guide)*, NRC 1996 and other widely accepted guidelines.

**Myth #4:** An institution's evaluation and report is available to the general public.  
**Fact #4:** AAALAC International's accreditation process is confidential. The evaluation and its results are known solely by the institution and AAALAC International, even if deficiencies are found.

**Myth #5:** AAALAC Site Visitors are full time inspectors.  
**Fact #5:** The members of AAALAC's Site Visit Team are individuals who manage and operate animal care programs. This is good and bad. Good: The Site Team will understand and appreciate our efforts of program improvement. Bad: Since they manage programs, they will know where to look for problem areas. The best approach? Find problems ... Solve problems.

## 10 Common AAALAC Concerns Fore-Warning is Fore-Armed!

AAALAC will be on campus in a few days. As you finalize your laboratory preparation for this important activity, please assure you can answer 'YES' to each of these questions:

1. Do we have copies of all of our approved protocols where our research staff can review them?
2. Are all of the research staff familiar with the protocol procedures they are working on?
3. Are we using only analgesics / anesthetics that are in our approved protocol?
4. Do we have an IACUC exemption for keeping animals in our laboratory 12 hours? (only applies to those labs maintaining animals outside of a vivarium)
5. Are we following the HUMANE ENDPOINTS listed in our protocol?
6. Does our research staff know how to contact a Duke veterinarian after hours if needed?
7. Are all of the surfaces in our animal housing areas sanitizable?
8. Do all of our staff understand (and can they explain) Duke's veterinary care reporting system?
9. Have our research staff completed the required animal training? Safety training?
10. Are all of our cages of animals labeled with CURRENT PROTOCOL cage cards having the required PI information?

\*\*If you or your laboratory do not understand or have a clear answer for any of these items, please contact either the OAWA (668-6720) or DLAR (681-6792) today! The animal program would like to help your lab be a shining star during the 2006 AAALAC accreditation site visit!

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## DOSAGE CALCULATION IN ANESTHESIA AND ANALGESIA

Calculating the correct dose of injectable anesthetic or sedative drug is the MOST critical part of any anesthetic procedure. Even a slight miscalculation can result in the animal feeling pain during a procedure, or worse, in the death of the animal. Check and double check each calculation before administering a drug to your patient! NEVER ASSUME you know the correct dose. Many drugs are available in more than one concentration, so ALWAYS read the label on the drug vial in your hand to be certain of the drug concentration in the preparation you are using.

The dosage the research team selects depends first on the desired effect, whether it is sedation, analgesia, or anesthesia, then on the route of administration.

Using an injectable anesthetic, the most rapid effect is produced by the intravenous route; however, the effect is short-lived in comparison with the effects produced by other routes. The intraperitoneal and intramuscular routes are approximately equal in rapidity of absorption and duration of effect. The oral route can be used for sedation or analgesia.

For most drugs, a dosage range is given, and the high dosage in a range may be three or four times as much as the low dosage in the range. The dose for an individual animal must, therefore, be a matter of professional judgment on the part of the researcher and the veterinarian.

The dosage selection depends on the animal's age, percent of body fat, breed or strain, and health status. It is most desirable to give anesthetics "to effect," but this cannot be done when the intraperitoneal or intramuscular routes are used. In those cases it may be helpful to consult the veterinary staff or rely on previous experience or with that animal species or type. Dosages for analgesics are even more difficult to determine. Observation of the animal's behavior provides clues to whether or not it is experiencing pain and whether the drugs being given are alleviating that pain. To make such a judgment, it is prudent to assume that conditions that cause pain to humans are equally painful to animals.

Once the correct dosage is determined, it must be prepared properly. The dosages for all species are given in milligrams per kilogram of body weight (mg/kg). For animals the size of rabbits or larger, this dosage range is usually satisfactory. Since the weight range for mice, small rats, and other small rodents is substantially lower than it is for rabbits, the dosage must be converted from mg/kg to mg/g to be safe and accurate for these species. Since grams are three orders of magnitude smaller than kilograms (1000 g = 1 kg), the conversion is made by dividing the amount of drug given in mg/kg by 1000 to arrive at the equivalent dosage in mg/g. For example, if 40 – 80 mg/kg IP of pentobarbital is required to anesthetize a mouse, 40 and 80 are each divided by 1000 to find the equivalent dosage range per gram of body weight. Thus, the correct dosage for a mouse would be 0.04 – 0.08 mg/g.

To measure the desired dosage accurately for small animals, it may be necessary to dilute commercially available drug preparations. Pentobarbital solution, for example, is available commercially at a concentration of 65 mg/ml. If a dosage of 60 mg/kg were selected for mice, dividing that dosage by 1000 yields an equivalent dosage of 0.06 mg/g given:

$$(60 \text{ mg/kg}) \times (1 \text{ kg}/1000 \text{ g}) = 0.06 \text{ mg/g}$$

Thus, a 30g mouse would require 1.8 mg of pentobarbital (multiply the animal weight by the dose of the drug):

$$(30 \text{ g}) \times (0.06 \text{ mg/g}) = 1.8 \text{ mg}$$

To find the required amount of the solution on hand, simply multiply the mg of drug required by the concentration of the drug you are working with:

$$(1.8 \text{ mg}) \times (1\text{ml}/65\text{mg}) = 0.028 \text{ ml of } 65 \text{ mg/ml solution}$$

By diluting one part of the original pentobarbital solution with 9 parts of water, the concentration becomes 6.5 mg/ml. From this dilution the final dosage would be 0.28 ml of solution rather than 0.028 ml of undiluted solution.

$$(1.8 \text{ mg}) \times (1\text{ml}/6.5 \text{ mg}) = 0.28\text{ml of } 6.5 \text{ mg/ml solution}$$

With a tuberculin syringe 0.28 ml can be measured accurately.

It should be noted that some diluted solutions have a very short shelf life, so new solutions must be made at frequent intervals.

For rats, hamsters, and guinea pigs an accurate dosage in milligrams per 100 grams of body weight can be formulated. The mg/kg dosages are divided by 10 to determine the equivalent dosage in mg/100 g.

## RESEARCH RESOURCES

A new book, *Engaging Science: Thoughts, Deeds, Analysis and Action*, published by the Wellcome Trust, features essays from leading researchers, practitioners, and commentators that discuss public attitudes towards science, the role of media in public engagement, the scientists' perspective, implications for education, linking the public to policy making and the role of campaigning groups. For more information, or to download individual chapters, visit [http://www.wellcome.ac.uk/doc\\_WTX032706.html](http://www.wellcome.ac.uk/doc_WTX032706.html).

### Information Resources on Marine Mammals



The Animal Welfare Act (AWA) regulates warm-blooded animals used for research, public exhibition, transportation in commerce, or sold in pet trade. Thus, all marine mammals used for public exhibition or research are regulated under the AWA. This includes cetaceans (i.e. whales, dolphins) and pinnipeds (i.e. seals, sea lions, walrus, sea otters, polar bears, manatees). Most marine mammals in captivity are in marine mammal parks or zoos. However, a few are also used in scientific research. Dolphins and whales in the wild are also regulated by the National Marine Fisheries Service. Sea otters, walrus, manatees and polar bears in the wild are regulated by the U.S. Fish and Wildlife Service. The Information Resources on Marine Mammals provides additional information on marine mammals in captivity, assisting care staff with provision of proper care, husbandry and nutrition.

Information on this and other animal care topics are available at the National Agricultural Library (NAL). Visit the Document Delivery Services Branch website at <http://www.nal.usda.gov/ddsb>.

For more information on marine mammals, visit:

<http://www.nal.usda.gov/awic/pubs/MarineMammals/MarineMammals.htm>

## Q and A

**QUESTION:** What are common signs of pain or distress in animals?

**ANSWER:** Common signs of pain or distress in animals include:

- Guarding attempting to protect, move away, or bite
- Vocalization
- Crying out when palpated or forced to use affected area
- Mutilation, licking, biting, scratching, shaking, or rubbing
- Restlessness
- Pacing, lying down and getting up, or shifting weight
- Sweating (in species that sweat)
- Recumbency for an unusual length of time
- Depression
- Reluctance to move or difficulty in rising
- Abnormal appearance (ruffled fur, unkempt)
- Head down, tucked abdomen, hunched, facial distortion, or pallor

**QUESTION:** How does the IACUC review protocols involving some degree of potential pain or distress?

**ANSWER:** The IACUC's primary role in protocol review is to assure that any amount of animal distress or pain is necessary and scientifically justified.

The IACUC be assured that there is a mechanism in place for prompt reporting of sick animals to the veterinary staff. It is the responsibility of the investigator to show they have considered all the options for minimizing pain and distress that do not compromise the scientific validity of the experiment. Research personnel should be trained in recognition of normal animal behavior so that they can effectively recognize pain or distress. The IACUC would prefer that there be objective assessments (choosing appropriate parameters and quantifying observations) of distress measurement.

Numerous models for scoring pain and distress have been published and involve assigning a numeric score to observations with the aid of descriptors. It is often useful to start with a general set of observations for assessing pain and distress such as change in body weight, physical appearance/posture or changes in unprovoked and provoked behavior. The assessment system should then be modified on a case-by-case basis using specific changes that may be anticipated in a particular study.

For more information on pain or distress assessment, contact OAWA (668-6720) or DLAR (681-6792).

## From Your Colleagues at DLAR

### Policy on the Transfer of Post Surgical USDA Regulated Species from Principal Investigator to DLAR Veterinary Staff

**Purpose:** To define the procedural expectations, which principal investigators (PI) must follow, when returning USDA regulated species to home cages in DLAR managed facilities.

**Responsibility:** Any individual performing survival surgery on a USDA regulated animal per an approved DIACUC protocol is responsible for ensuring the proper transfer back to its home cage. Unless DLAR is contacted in advance and agrees to provide all immediate post-operative care, the principal investigator is responsible for monitoring and documenting recovery of an animal until it is able to achieve and maintain sternal recumbency on its own.

**Procedure:** When an animal is sufficiently recovered from anesthesia and meets the following criteria it may be returned to its home cage: no additional emergency analgesics are needed (e.g. fentanyl, oxymorphone, or morphine), animal maintains normal body temperature without secondary heat source for a minimum of one hour, animal can achieve and maintain sternal recumbency, animal is alert and responsive to touch and/or sound, animal maintains expected post-operative parameters per approved protocol, animal does not vocalize abnormally, no surgical complications are present such as bleeding, incisional dehiscence, vomiting, respiratory distress, neurological signs, etc.

The PI must notify DLAR veterinary staff in one of the following methods when the animal is being transferred to DLAR: During normal work hours, contact a DLAR veterinary technician or veterinarian to notify them of the animal being returned. DLAR personnel may observe or assess animal before accepting the animal. The DLAR representative contacted will note and initial in the animal's record that they have been properly notified of the transfer.

During the evening or weekend hours, page the veterinary technician or veterinarian on call to notify them of the animal being returned. The DLAR individual may approve the transfer by phone or may ask the PI to wait until the DLAR veterinary staff member can observe and assess the animal before acceptance. (It is expected that surgery of USDA regulated species will not occur after hours or on weekends without prior approval by DLAR

Veterinary staff).

In the instances where DLAR anesthesia support has been contracted for the entire surgical procedure, the PI is still expected to monitor and document the recovery until the animal is able to achieve and maintain sternal recumbency (unless prior arrangements have been made with DLAR), however the **notification** of transfer of the animal can be made to the DLAR staff member providing anesthesia support at the end of the surgical procedure.

### Upcoming Events

October 3-6	AAALAC Triennial Site Visit
October 9	New protocol deadline
October 9	SC deadline
October 12	SC meeting
October 19	SC meeting
October 26	IACUC meeting
October 30	New protocol deadline
October 30	SC deadline

SC= Significant change

### MATCH THE TERMS AND DEFINITIONS:

- |                    |   |
|--------------------|---|
| 1. Analgesia       | A. An aversive state in which an animal is unable to adapt completely to stressors and the resulting stress and shows maladaptive behavior.                               |
| 2. Anesthesia      | B. An unpleasant sensory or emotional experience associated with actual or potential tissue damage.   |
| 3. Distress        | C. A complete loss of sensitivity to pain.  |
| 4. Pain            | D. A total loss of sensation in a part of or in the entire body.  |
| 5. Sedation        | E. A state of mental calming, decreased response to environmental stimuli, and muscle relaxation. No sleep, analgesia or anesthesia is present, even at increased dosage. |
| 6. Tranquilization | F. A state characterized by decreased awareness of surroundings, relaxation, and sleepiness. Analgesia is not present.  |

Answers: 1. C, 2. D, 3. A, 4. B, 5. F, 6. E