Animal Source

PSU Animal Resource Program

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Anesthetic Monitoring of Rodents

Monitoring of anesthetized animals requires assessment of cardiovascular and respiratory function, as well as depth of anesthesia. Because of their small size, rodent monitoring poses a particular challenge.

Anesthetic depth is typically assessed via response to toe pinch. The foot is extended and the toe is pinched either manually or gently with a hemostat. Any response by the animal, such as withdrawing the limb, indicates insufficient anesthetic depth has been achieved. Either additional time is needed to allow previously injected anesthesia to act or additional anesthetic is required.

Respiratory function in anesthetized rodents is typically monitored by observing chest wall motion during breathing. Although respiration rates are too fast to count, the presence and quality of respiration may be assessed. Increasing respiratory rate and/or effort may indicate insufficient anesthetic depth or airway obstruction.

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Mouse Biomethodology Seminar
June 9, 2006
1-4 pm
Call 865-1495 to register to attend

Using Microisolation Technique When Working With Rodents

The purpose of microisolation caging for rodents is to prevent fomite or aerosol transmission of infectious agents between cages or from contaminated equipment or handlers. When working with microisolation cages it is important to remember that everything outside the cage is considered contaminated and everything inside the cage is considered uncontaminated or “clean”.

Specialized handling techniques are used to maintain the clean status of the cage when working with the animals housed in them. Ideally, microisolator cages should only be opened within a biosafety cabinet or changing hood. In some instances this is not feasible, but appropriate disinfection procedures should be followed for cage handling, nonetheless. Clean exam gloves and a long-sleeved lab coat or gown must be worn whenever the cage is opened. In addition, your gloved hands must be sprayed with disinfectant prior to and inbetween opening each cage. Appropriate disinfectant solutions are supplied by ARP for investigator use.

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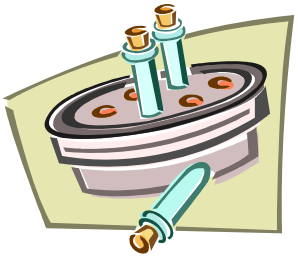
Inside this issue:

New Services Available: Hematology and Blood Chemistry Testing

The Animal Resource Program (ARP) is pleased to announce that diagnostic hematology and blood chemistry testing is available from ARP for a nominal fee as a service to the research, extension, and teaching communities at Penn State. These services are offered for many species, including rodents, non-human primates, rabbits, sheep, cattle, horses, swine, and deer. Depending on the test, as little as 5 µl of serum is required. Available tests include:

Complete Blood Count (CBC): 20 µl of serum required



White cell counts and 5 part differentials (percent and absolute)
Red cell count
Hemoglobin
Hematocrit
MCV, MCH, MCHC
Platelet count and mean platelet volume
PCV and percent total solids.

Blood Chemistry: Each test may be run singly, or in combination as your needs dictate, and require 5- 50µl of serum.

Albumin
Alkaline Phosphatase
ALT (SGPT)
Amylase
AST (SGOT)
Bicarbonate
BUN
Calcium
Chloride
CK
Creatinine
GGT
Glucose
LDH
Magnesium
Phosphate
Potassium
Total Bilirubin
Total Protein
Triglycerides
Cholesterol

Additional chemistries which may be run with advance notification include:

T4
Uric acid
Iron

Blood Gases:

By special arrangement, blood gases and electrolyte panels can be run.

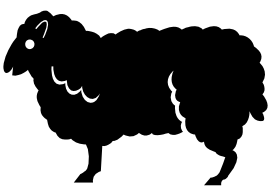
Submission forms can be picked up at the ARP office or mailed to you through campus mail. Samples and submission forms may be dropped off during regular business hours. Results will be returned via email by the next business day. Call 865-1495 for additional information.

Agriculture and Wildlife Facilities: Top ten things to know for AAALAC and IACUC site visits

1. All teaching, research, and demonstration activities using Penn State animals or being taught by Penn State individuals need prior IACUC approval. For example:

   > The Pennsylvania State Game Commission, in conjunction with PSU faculty and staff, would like to offer a class on handling White-tailed deer at the PSU Deer Research Facility. Despite the fact that the Game Commission is sponsoring and initiating the program, Penn State animals and personnel are involved and PSU IACUC approval is required for this class to be held.

2. Biosecurity protocols must be followed with no exceptions. Individual PSU agricultural facilities have specific guidelines regarding visitor entry to the facilities. Employees must be aware of their facility's biosecurity requirements and be prepared to question visitors prior to permitting entry. Do not assume visitors know or understand PSU biosecurity requirements.
   a. Visitors to the PERC must not have been around birds or poultry, including backyard farm operations and pets within the last 24 hours.
   b. Visitors to the swine farm must not have been around swine within the last 48 hours.
   c. Visitors to all PSU agricultural facilities should not have traveled outside of the United States within the last 2 weeks.
3. All animals (livestock, fish, amphibians, etc.), must be observed at least once daily.
4. Human food must not be stored with drugs, vaccines or foodstuffs intended for use in animals. Refrigerators for human food storage should be clearly marked as such. Facility personnel should not eat, drink, or smoke while handling or working around animals. Frozen colostrum, plasma, milk and milk replacer for feeding animals cannot be stored with human food.
5. Veterinary medical records must be kept for all animals examined by a veterinarian, and treatment records must be kept for all animals receiving treatment. Meat and milk withdrawal times must be recorded.
   a. Treatments should be recorded at the time they are administered and include the name or initials of the person administering the treatment.
   b. Treatments should follow veterinary recommendations or approved treatment protocols and records should be easy to follow.
   c. At the end of a treatment regime, it is important to record the outcome of the case, e.g. the animal recovered, no further treatment is needed; no improvement, change treatment; no improvement, cull animal or euthanize.
6. Emergency contact numbers must be posted where they can be clearly seen.
7. Animals being used for research must have IACUC protocol numbers and PI contact information posted where they can be clearly seen.
8. Procedure areas must be kept clean and orderly. Manure, dust, dirt, blood, etc. should be cleaned off equipment after each day of use.
9. Facility managers must be familiar with herd/flock health management plans, and printed copies should be kept at each facility.
10. Expired drugs must be disposed of according to approved methods or the attending veterinarian contacted to remove them.



Laboratory Animal Users: Important animal care issues for AAALAC and IACUC site visits.

Monitoring Animals:

Animals should be observed daily for signs of illness, injury or abnormal behavior. More frequent observations may be needed if animals are ill or distressed. Correct weekend, holiday, and emergency contact information must be clearly posted.

Housing and Husbandry:

Animals should be group housed whenever possible but cages must not be overcrowded. Environmental enrichment is important for all animals, especially those singly housed. All animals must be on an approved IACUC protocol. Maintain records of animal care, routine and experimental procedures, medical treatments and weaning.

Surgery:

Personnel should be adequately prepared and trained to perform the surgical procedures as described in the IACUC protocol. Aseptic technique, including proper surgical attire and sterilization of instruments, must be followed. Animals must be monitored during surgery to ensure appropriate anesthetic depth is maintained.

Written records outlining surgical procedures and post-operative care are required. Provide analgesia post-operatively and observe animals until they are able to right themselves. Monitor the animal and surgical site daily until fully healed and wound clips are removed.

Euthanasia

AVMA Guidelines must be followed unless scientifically justified and approved by the IACUC. Personnel must be adequately trained to perform euthanasia. Confirmation of death and proper disposal is required.

IACUC Approval

IACUC approval is required for all animal research, teaching, testing, demonstration, and observation activities. All personnel who handle animals must be listed on the IACUC protocol. All personnel working under an approved IACUC protocol should be familiar with the content of that protocol.

Special Procedures

Animals undergoing special treatments such as experimental diets, medicated water, or infectious disease research should be clearly marked and the procedures to follow posted in the animal room. Biosafety protocols should also be available in the animal room.

Controlled Drugs

Controlled drugs must be stored under double lock at all times. Accurate records of use and disposal must be maintained. Expired drugs should be properly disposed of.

Weaning

Wean mice at 21-24 days of age. Do not allow cages to become overcrowded before removing weanlings.

Personal Protective Equipment

Disposable shoe covers are required for entry into all animal rooms (except rooms housing fish or amphibians). Shoe covers should be removed upon exiting the room. If animals or animal samples are to be handled dedicated outerwear (laboratory coat or disposable gown) and disposable gloves must be worn. This attire should be donned upon entry into the animal room and removed before leaving the facility or entering another animal room. Disposable shoe covers, gowns, gloves, caps and facemasks are available for use in each animal facility. Personnel should wash their hands after handling animals or animal samples.

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Anesthetic Monitoring, continued from page 1.

Cardiovascular monitoring of anesthetized rodents is difficult because of their high heart rates and lack of a palpable peripheral pulse. Electrocardiography and pulse oximetry equipment may be used on rats and other large rodents, but commercially available models are generally not sensitive enough to work well for mice. Cardiovascular monitoring in rodents may also be accomplished by palpation of a heart beat through the chest wall and observation of mucous membrane color.

Mucous membrane color is a subjective measure of both cardiovascular and respiratory function. Normal tongue and mouth color is pink. A bluish coloration (cyanosis) indicates that poorly oxygenated blood is present in tissue capillary beds. This may be due to either low blood pressure (cardiovascular dysfunction) or insufficient oxygenation of blood (respiratory dysfunction).

Many anesthetic complications are the result of incorrect dosing of injectable anesthetic drugs or hypothermia. Obtain accurate body weights on animals and double check calculations when preparing injectable anesthetic solutions before you administer the anesthetic. Rodent body temperatures drop quickly during anesthesia and may result in hypothermia. Hypothermia will exaggerate the effect of anesthesia and often leads to an effective anesthetic overdose and death.

Rodent body temperature may be maintained by placing anesthetized animals on a warm surface such as a warm-water circulating heating pad or under a heat lamp. Care must be taken not to overheat the animal. The ambient temperature at the level of the animal should not exceed 100°F.

Microisolation Technique, continued from page 1.

The changing hood or biosafety cabinet blowers must be turned on and the work surfaces and walls wiped down with disinfectant prior to use. The solid stainless steel floor inside the cabinet is the work surface. Do not work on the air intake grates. When opening the cage the filter top should be removed and placed upside down next to the cage. Mice may be handled with either disinfectant sprayed gloved hands or disinfectant dipped forceps.

After you are finished working in the hood or cabinet, remove all materials and wipe down the inside surfaces with disinfectant. To prevent corrosion wipe the cabinet a second time with water soaked paper towels.

Life Sciences Animal Facility Opening

The new laboratory animal facility located in the Life Sciences Building is in the process of opening and animals will be moving in soon. If you are interested in using the facility please contact Jeff Dodds or Donna Carey to discuss the entrance requirements.

Animal Resource Program

101 Centralized Biological Laboratory
Pennsylvania State University
University Park, PA 16802

(814) 865-1495
Fax: (814) 865-3685

AAALAC consultants will be visiting the University Park animal facilities June 26-June 29, 2006.

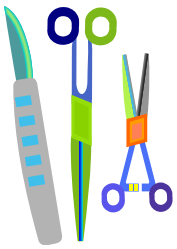
The Animal Resource Program (ARP) is committed to providing PSU research personnel with high quality animal care services and facilities, to facilitate and improve animal research, and to ensure the health, well-being and humane treatment of all animals at PSU. ARP provides veterinary and diagnostic services, personnel training and expertise in laboratory animal, agricultural and wildlife technology and medicine. ARP veterinarians have specialized training and are available to assist with animal model development, experimental design, budget projections and grant preparation. Participation in collaborative research projects is welcomed.

Lab animal users animal care issues, continued from page 4

Procedure Room Use

Procedure rooms are available in each animal facility for investigator use. Gas anesthesia equipment is available in many of these rooms along with sharps containers and other material needed for waste disposal. Investigators are responsible for maintaining the room in clean and uncluttered condition and appropriate waste disposal.

More information on these and other topics may be found at http://www.research.psu.edu/arp/. Feel free to contact the Animal Resource Program for help and guidance. Please call 865-1495 or e-mail Mary Kennett at mjk26@psu.edu or Jeff Dodds at jwd12@psu.edu.



Surgery in Research Course Offered Fall 2006

Surgery in Research (Vet Sci 497A) will again be offered as a 2 credit, full semester course this fall. The class will meet once a week on Thursdays from 2:30 to 4:25 pm and include a combination of lecture and laboratory work. Topics covered in the course will include surgical planning and preparation, anesthesia and analgesia, post-operative care, large animal surgery and others. Laboratory sessions will include rat, mouse, fish and amphibian surgeries.