Guidelines and Policy for Cervical Dislocation of Rodents – Euthanasia Recommended Best Practices

The following guidelines have been written to assist faculty, staff, and students of Marquette University in performing rodent cervical dislocation euthanasia in a humane manner and complying with pertinent regulatory requirements. Under some circumstances deviations from the below procedures may be indicated but such variances must be approved from the Marquette IACUC in advance.

**Note:** If you indicate that you will be utilizing cervical dislocation as a method of euthanasia on question #34 on the IACUC Protocol Review Form, you will need to list the names of those performing the euthanasia (including a description of qualification and/or training of person performing the cervical dislocation). This guideline will assist in answering this question. Also, the protocol must contain adequate scientific justification if cervical dislocation must be performed on conscious animals due to the study requirements.

Cervical dislocation euthanasia **must** be performed by trained individuals using appropriate equipment. The use of cervical dislocation in rodents is only appropriate for mice and small rats (<200g), and the MU IACUC requires anesthesia prior to cervical dislocation. Cervical dislocation in unanesthetized rodents is permitted only if there is an approved scientific justification. Cervical dislocation may also be used as a secondary means to assure death after euthanasia with CO₂, isoflurane, or injectable overdose.

**Note on Training:** Principal Investigators must ensure that all individuals responsible for administering cervical dislocation euthanasia are appropriately qualified and monitored, and that they adhere to the IACUC-approved protocols and Marquette Animal Care and Use Policies. The primary responsibility for establishing, monitoring, and recording cervical dislocation training lies with the PI. Additional training in these techniques are available from the Marquette University Animal Resource Center. Any personnel who will be performing cervical dislocation techniques can arrange a training session by contacting the Animal Resource Center Office. It may be good practice to add into a protocol proposal a few extra animals for training/practice purposes.

**Note on neonates:** Due to the anatomy of rat and mouse neonates, cervical dislocation is difficult to perform adequately, especially when euthanizing mice and rats in their younger stage before hair grows in at 7-10 days. For routine euthanasia for these animals (such as assuring death after CO₂ exposure) decapitation must be used rather than cervical dislocation (see IACUC Guidelines on Decapitation).
IACUC Guidelines on Cervical Dislocation:

The IACUC is specifically charged with reviewing the methods of euthanasia for each research protocol to assure compliance with the recommendations set by the American Veterinary Medical Association Guidelines for the Euthanasia of Animals (AVMA) (2013 Edition). The AVMA recommends that such methods (cervical dislocation) be used only when pharmacological methods are not appropriate for the research study.

Cervical dislocation is rapid, requires neither special equipment nor transport of the animal and yields tissues uncontaminated by chemical euthanasia agents. Circumstances where cervical dislocation may be justified for use in non-sedated rodents includes research studies which require the harvest of drug-free brain tissue, or when an animal in distress requires immediate euthanasia deemed so by the consulting veterinarian.

Acceptable use of Cervical Dislocation:

The use of cervical dislocation to euthanize mice and rats with body weights less than 200g by trained personnel is appropriate (after IACUC approval) if either of the following is true:

- Animals are sedated or anesthetized using drugs or carbon dioxide prior to cervical dislocation
- The PI has considered other methods, and has determined that cervical dislocation without the use of other agents is the most appropriate method based on previous experience using this technique and/or the specific aims of the research study. If the IACUC approves the study, the PI must ensure that personnel performing cervical dislocation have been properly trained and consistently apply it humanely and effectively. This will require training documentation as well as maintaining training records that are subject to IACUC review.

Methods and Training

Inexperienced staff should be trained by experienced persons and should practice on euthanized animals or anesthetized animal to be euthanized until they are proficient in performing the method properly and humanely. The steps for cervical dislocation are as follows:

1. Restrain the animal in a normal standing position on a firm, flat surface and grasp the base of the tail with one hand making sure you have a firm grip. Performing cervical dislocation on a surface that the animal can grip (wire bar lid or cage top) may make it easier to gain access to the base of the skull because the rodents often stretch themselves forward when held by the tail.

2. Place a sturdy stick-type pen, a rod-shaped piece of metal, a closed scissors/hemostats or the thumb and first finger of the other hand against the
back of the neck at the base of the skull. Never use a pencil as they may have the potential to break easily.

3. To produce the dislocation, quickly push forward and down with the hand of the object restraining the head while pulling backward with the hand holding the base of the tail.

4. The effectiveness of dislocation can be verified by feeling for a separation of cervical tissues. When the spinal cord is severed, a 2-4mm space will be palpable between the occipital condyles and the first cervical vertebra. Occasionally, however, the dislocation occurs between thoracic vertebrae.

5. Finally, check closely to confirm respiratory arrest, and when possible verify, by palpation, that there is no heartbeat.

**Training responsibilities:**
This can also be used to describe training methods in protocol proposals.

1. The trainee will demonstrate the cervical dislocation to one or more lab staff, PI, consulting veterinarian or her designee.

2. The trainee will each practice the procedure on anesthetized or dead rodents until proficient. The trainer will be present for each of these practice cervical dislocations.

3. The trainee will then perform a live cervical dislocation under the supervision of the trainer. This step can be repeated at the discretion of the trainer until the trainee demonstrates proficiency.

4. Proficiency will be determined by the trainer, and will be based upon one or more demonstrations that the trainee conducts the cervical dislocation quickly and smoothly, without any overt signs of distress in the animal.

5. Upon completion of training/demonstration of proficiency, the trainer will document the proficiency in a lab training binder, and will provide in writing to the IACUC (via Appendix G) that the trainee has completed the required training for physical method euthanasia.

This process will need to be repeated for each new staff member not listed on the original IACUC approved protocol that is doing any form of physical euthanasia (in this case cervical dislocation).

**References:**
The University of California – San Francisco – IACUC Standard Euthanasia Guidelines for Rodents
The University of California – San Diego – IACUC Policy and Guidelines for Euthanasia
The University of South Carolina – Office of Research, Policy 26
The University of Texas at Austin – Office of Research Support, Guideline # 004
Penn State University – Office of the Vice President – IACUC Guideline 15
The AVMA Panel on Euthanasia - 2013