



IACUC Guidance:	TAMU-G-011	Title:	Guidelines on the Use of Neuromuscular Blockers
	Location	Effective Date	Review By
	College Station/Dallas/Galveston/Kingsville	05/01/2024	04/30/2027
	Houston	06/01/2024	04/30/2027

1. PURPOSE

- 1.1. To ensure that animals undergoing procedures involving neuromuscular blockers (NMB) receive proper anesthesia to preserve their welfare. Neuromuscular blocking agents present a risk to animal welfare by eliminating typical signs and reflexes used to assess anesthetic depth.

2. RESPONSIBILITY

- 2.1. The **AV**, together with the **IACUC**, is responsible for evaluating any proposed use of NMB to ensure the well-being of the animal.
- 2.2. The **AV** is responsible for direct veterinary administration, oversight and care of animals receiving NMB.
- 2.3. The **PI** is responsible for:
 - 2.3.1. Adequately describing the use of NMB in the AUP
 - 2.3.2. The application of appropriate anesthesia, monitoring, and analgesia for all animals undergoing surgical or sedation procedures.
 - 2.3.3. Ensuring all personnel working with animals receiving NMB are properly trained in their use and possible adverse reactions

3. DEFINITIONS AND/OR ACRONYMS

- 3.1. **Analgesic:** Drug used to relieve pain
- 3.2. **AUP:** Animal Use Protocol. Document submitted by the PI indicating the housing and procedures involving animals.
- 3.3. **AV:** Attending Veterinarian. Individual designated by Texas A&M University to fulfil the regulatory role of AV. May also describe veterinary staff who report directly to, and have delegated authority from, the AV.
- 3.4. **AWO:** Animal Welfare Office. Supports the IACUC administratively.
- 3.5. **FCR:** Full committee review. Review and formal vote performed by a convened quorum of the members of the IACUC as described in TAMU-S-002.
- 3.6. **IACUC:** Institutional Animal Care and Use Committee. Institutional body responsible for ensuring adherence to federal regulation and institutional policy relating to the care and use of animals in teaching, testing and research. Appointed by the Institutional Official.
- 3.7. **PI:** Principal Investigator. The individual who has ultimate administrative and programmatic responsibility for the design, execution, and management of a project utilizing vertebrate animals.
- 3.8. **Paralytic:** Medication that causes extreme muscle relaxation resulting in the inability to move. Also known as a neuromuscular blocker (**NMB**).

4. GUIDELINES OR PROCEDURE

- 4.1. Anesthetic Monitoring – see TAMU-G-002 for more information
 - 4.1.1. To maintain homeostasis, an assessment of the animal’s physiologic condition and plane of anesthesia must occur and be documented at least every 15 minutes throughout the procedure.
 - 4.1.2. Parameters that are often monitored during anesthesia are absent in an animal receiving NMB.
 - 4.1.3. Inadequate depth of anesthesia could result in a conscious state and the experience of acute stress.
- 4.2. If NMB are used:
 - 4.2.1. Clear justification for their use is required in the protocol.
 - 4.2.2. A consultation with the AV, or designee, is required prior to initial use and any time the NMB procedure is modified.

- 4.2.3. General anesthesia is required
 - 4.2.3.1. Animals must be at an adequate depth of anesthesia and non-responsive to surgical stimuli prior to administration of the NMB.
- 4.2.4. Appropriate supportive care, such as respiratory/ventilatory support is required during anesthesia.
- 4.2.5. Appropriate anesthetic monitoring criteria must be identified and instituted to ensure adequate depth of anesthesia
 - 4.2.5.1. Heart rate and blood pressure must be monitored at a minimum
 - 4.2.5.2. A peripheral nerve stimulator in conjunction with train-of-four monitoring is highly recommended to monitor paralysis of peripheral nerves.
- 4.2.6. Appropriate recovery procedures are needed:
 - 4.2.6.1. Animals are reversed from the NMB when reversal agents are available before being allowed to recover from the anesthetic event.
 - 4.2.6.2. Recovery must be monitored ensure the animal has recovered control of respiration and locomotion (e.g. normal breathing pattern, sustained head lift or ability to stand and ambulate) before returning to the housing location.
 - 4.2.6.3. Animals which display unexpected clinical signs of neurological impairment must be euthanized.
- 4.2.7. Surgical and anesthesia records must contain the appropriate information and be maintained consistent with Texas A&M University Standard Administrative Procedures (SAPS) 15.99.03.M1.03. and 29.01.03.M0.01.
 - 4.2.7.1. Any animal that is sedated or anesthetized for longer than 15 minutes must have an anesthesia record.
 - 4.2.7.2. Records are required for every animal that has undergone surgery.
 - 4.2.7.3. Recordkeeping requirements are listed in TAMU-G-002, TAMU-G-013, TAMU-G-018, TAMU-G-022, TAMU-G-035, and TAMU-G-049 (as applicable to the species and surgery performed).

5. EXCEPTIONS

- 5.1. The PI may request an exception to the above standards by describing the departure in the AUP.

6. REFERENCES, MATERIALS, AND/OR ADDITIONAL INFORMATION

- 6.1. References
 - 6.1.1. Preparation and maintenance of higher mammals during neuroscience experiments. Report of a National Institute of Health workshop. 1991 Van Sluyters RC, Oberdorfer MD, eds. NIH Publication No. 91-3207.
 - 6.1.2. Drummond JC, 1996. Use of neuromuscular blocking drugs in scientific investigations involving animal subjects. *Anesthesiology*, 85(4):607-699.
 - 6.1.3. National Research Council. 2011. [Guide for the Care and Use of Laboratory Animals](#). National Academies Press, Washington, D.C. 220p.
 - 6.1.4. [USDA Animal Welfare Inspection Guide](#)
- 6.2. Resources
 - 6.2.1. For more information concerning the selection and use of NMBs, please contact:
 - 6.2.1.1. CMP at 979-845-7433
 - 6.2.1.2. ARU: at (214) 828-8149
 - 6.2.1.3. PAR: at (713) 677-7471
 - 6.2.1.4. PRF: at (361) 221-0770
 - 6.2.2. Texas A&M University SAPs:
 - 6.2.2.1. [15.99.03.M1.03](#) The Responsible Stewardship of Research Data
 - 6.2.2.2. [29.01.03.M0.01](#) Security of Electronic Information Resources
 - 6.2.3. [AWO](#): (requires TAMU NetID authentication)
 - 6.2.3.1. Sample documents including surgical and anesthetic records



- 6.2.3.2. TAMU-G-002 IACUC Guidelines on the Use of Anesthesia and Analgesia
- 6.2.3.3. TAMU-G-013 Guidelines for Surgical Procedures in Rodents
- 6.2.3.4. TAMU-G-018 Guidelines for Survival Surgical Procedures in Non-Rodent Mammals
- 6.2.3.5. TAMU-G-022 Guidelines for Survival Surgical Procedures in Rodents
- 6.2.3.6. TAMU-G-035 Guidelines for Performing Surgery in Fish
- 6.2.3.7. TAMU-G-049 Guidelines for Performing Surgery in Amphibians and Reptiles

6.3. Acknowledgments

- 6.3.1. This document has been partially prepared using materials obtained from the Universities of Michigan and California, San Francisco.

7. HISTORY

Effective Date	Version #	Description
03/19/2020	000	College Station/Galveston: New format and updated content; replaced unnumbered SOP (Guideline for the Use of Neuromuscular Blocking Drugs)
04/30/2020	001	Houston/Kingsville: New document. Reviewed and approved via email.
05/19/2020	002	Dallas: New document.
08/02/2021	003	College Station/Galveston: Renewal document; updated definitions and references; expansion of recovery monitoring description. Reviewed and approved via email.
09/01/2021	004	Houston/Kingsville: Renewal document; updated definitions and references; expansion of recovery monitoring description. Reviewed and approved via email.
09/21/2021	005	Dallas: Renewal document; updated definitions and references; expansion of recovery monitoring description
03/24/2022	006	College Station/Dallas/Galveston: Merging of Dallas animal care and use program with College Station/Galveston
10/20/2022	007	College Station/Dallas/Galveston/Kingsville: Merging of Kingsville animal care and use program with College Station/Dallas/Galveston.
05/01/2024	008	College Station/Dallas/Galveston/Kingsville: Renewal; updated definition and resources sections, expansion of guidance references for recordkeeping, addition of exceptions section. Reviewed and approved via TEAMS.
06/01/2024	009	Houston: Renewal; updated definition and resources sections, expansion of guidance references for recordkeeping, addition of exceptions section.