|  |  |
| --- | --- |
| **FOR IACUC OFFICE USE ONLY** | |
| **PROTOCOL #:** |  |
| **APPROVAL DATE:** |  |
| **EXPIRATION DATE:** |  |

***Northeastern University***

Institutional Animal Care and Use Committee (NU-IACUC)

**Telephone:** 617-373-3958 **Email:** [iacuc-office@northeastern.edu](mailto:iacuc-office@northeastern.edu)

**Website:** <https://animalcare.research.northeastern.edu/>

**ANIMAL CARE AND USE PROTOCOL**

*(Form Date: 5/2025)*

|  |
| --- |
| **I. PRINCIPAL INVESTIGATOR CONTACT INFORMATION** |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PRINCIPAL INVESTIGATOR:** | | | |  | | | DEGREE(S): | |  |
| ACADEMIC POSITION/TITLE: | | | |  | | | | | |
| DEPT/DIV: |  | | | | | | | | |
| E-MAIL ADDRESS: | |  | | | | | | | |
| DIRECT PHONE #: | |  | | | | CELL PHONE # | |  | |
|  | | | | | | | | | |
| **LABORATORY MANAGER or PRIMARY CONTACT:** | | |  | | | | DEGREE(S): | |  |
| E-MAIL ADDRESS: | |  | | | | | | | |
| DIRECT PHONE #: | |  | | | | CELL PHONE # | |  | |
| **PROTOCOL TITLE:** | |  | | | | | | | |
|  | | | | | | | | | | |
| **ANIMAL EMERGENCY CONTACT NAME & PHONE #:** | | | | |  | | | | | |
| Submission Type: | | | | | New Protocol  Three-year Renewal | | | | | |
| Type of Project:  (Check all that apply) | | | | | Research  Teaching/Training  Field Studies  Breeding/Holding  Other (Specify): | | | | | |

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| **IA. PRINCIPAL INVESTIGATOR ASSURANCE OF COMPLIANCE** |

**As the individual responsible for this project, I confirm that:**

|  |  |
| --- | --- |
|  | The information contained in this protocol is true and accurate, and that, to the best of my knowledge, it conforms to Northeastern University’s IACUC, NIH, and USDA policies on the use of animals in research and teaching. |
|  | I have considered alternatives to the biological models used in this project and have found these other methods unacceptable on scientific or educational grounds. |
|  | I certify that I have determined that the research proposed herein is not unnecessarily duplicative of previously reported research. |
|  | I accept responsibility for ensuring that all personnel involved in this project will be trained regarding any potential biological, chemical, and radiological hazards, relevant safety practices, and emergency procedures (splashes, needle sticks, animal bites, etc.). If applicable, I confirm that all relevant institutional regulatory requirements (e.g., Chemical Safety Plan, IBC Registration, Radioactive Materials Permit, etc.) will be followed. |
|  | ***I will complete all IACUC personnel requirements, as described in*** [***the IACUC Requirements for Personnel Working with Animals***](https://animalcare.research.northeastern.edu/nu-iacuc/working-with-animals/) ***prior to working with animals OR within 2 months of the approval of my protocol, whichever comes first.*** |
|  | ***All personnel involved in this project will be added to the protocol using a*** [***Supplement P***](https://animalcare.research.northeastern.edu/wp-content/uploads/2025/03/Supplement-P-2-2025-Final.docx)***. All personnel named above have agreed to participate in this study and are aware of procedures that are approved.*** |
|  | All individuals involved will be instructed in the humane care, handling, and use of animals and I will review their qualifications and competency. |
|  | I will properly assure the training of all individuals performing euthanasia |
|  | No change will be made to procedures, care, or housing without prior written notification to and approval by the Institutional Animal Care and Use Committee (IACUC). |
|  | I understand that it is non-compliant to provide an IACUC approval date to a funding agency without documentation of a congruency comparison conducted by the IACUC Office. For more information, see the [Policy on Requiring a Congruency Comparison Prior to Release of IACUC Approval Dates](https://animalcare.research.northeastern.edu/wp-content/uploads/2023/03/Policy-on-Requiring-a-Congruency-Comparison-Prior-to-Release-of-IACUC-Approval-Dates-Final-2022.docx). |
|  | I accept responsibility for complying with Material Transfer Agreement requirements. For more information, please see Material Transfer guidance on the NU-RES website. |
|  | I understand that failure to comply with IACUC policies and procedures will jeopardize Northeastern University’s Animal Welfare Assurances on file with the NIH and may lead to revocation of my privileges to conduct animal research at this institution. |

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|  |  |  |
| Principal Investigator (*Type in name or* *provide* *electronic signature*) |  | Date |

*By typing your name, you are submitting an electronic signature that confirms your understanding and adherence to the above statements and IACUC policies. This is considered legal documentation and confirmation of your agreement to execute all activities as approved.*

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| **II. VERIFICATION OF REGULATORY APPROVALS** |

Please check all that correspond to this IACUC protocol. The Principal Investigator is responsible for ensuring that the appropriate permits and approvals remain up to date. For the hazardous agents listed below, the PI must complete and submit an **Animal Hazardous Materials Addendum (AHA)** along with the animal protocol**. This form is to be reviewed and approved by the IACUC and the IBC/EH&S. Include any safety plan with the AHA.**

|  |
| --- |
| Check if Not Applicable |

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Animal Hazardous Materials Addendum (AHA) has been completed and submitted with this protocol** | | |
|  | **Institutional Biosafety Committee (IBC)** [Scope of IBC review and responsibility](https://www.northeastern.edu/ehs/ehs-programs/biosafety/)  Registration Number(s): |  | **Approval from Radiation Safety**  list use of irradiator, lasers, x-rays, UV, radiation, etc.: |
| Biohazardous Agent(s): |
|  | **Environmental Health and Safety (EHS) Chemical Hazard** Attach Animal Hazardous Materials Addendum & applicable chemical safety plan. |  | **Wildlife Permit(s)**  Permit(s) issued for: |
| Chemical Hazard Name(s): |

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| **IIA. FUNDING** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Funding.** Please check all that apply pertaining to the funding source/support for this project.Funding sources may include internal (department, internal grants) or external (NIH, NSF, DoD, VA, etc.).  *All funding through federal agencies will require a congruency review between this protocol and the grant. In these cases, please ensure that you complete a Congruency Request Form and submit to the IACUC Office for review.* [Grant/Protocol Congruency Form (New 8-2024)](https://animalcare.research.northeastern.edu/wp-content/uploads/2024/08/IACUC-Grant-Protocol-Congruency-Form-2024.docx) | | | |
|  | **Status** | **Name of granting agency or other source (department, institution, etc.)** | **Title of award(s) and Award ID(s) – if applicable** |
|  | N/A |  |  |
|  | Pending funding by federal grant |  |  |
|  | Partially or fully funded by federal grant |  |  |
|  | Funding to be provided by Northeastern |  |  |
|  | Funding provided by other organization |  |  |
|  | Other |  |  |

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| **III. PROJECT OBJECTIVES AND JUSTIFICATION** |

**NOTE:** Federal regulations mandate this section be written using ***lay terms*. *Define*** all scientific terms and phrases so they are understandable at an ***8th grade reading level***. The target audience includes non-scientists that must be capable of understanding the language used to describe the objectives and importance of the proposed project.

Check the boxes to ensure compliance with this mandate.

Confirm this section is written in **lay terms** for the non-scientist

Define **all** abbreviations, scientific terms, and phrases. (Please go as far as defining a neuron as a nerve cell.)

Do **NOT** use the Objectives section from submitted or approved grant proposals.

|  |  |
| --- | --- |
| **A. Specific OBJECTIVES of this project.** State the hypothesis(es) to be tested and provide the explicit goals. | |
|  | |
| **B. Describe the potential CONTRIBUTIONS AND SIGNIFICANCE OF THIS PROJECT** to human and/or animal health and to the advancement of knowledge. | |
|  | |
| **C. Justify the** **USE OF ANIMALS.** Researchers must consider the replacement of live animal models (*in vitro*, computer models, etc.) to accomplish the objectives of the proposed study. Select the applicable justification(s) that explain why live animals are required. In none apply, choose “Other” and provide your own reasoning. | |
|  | The complexity of the processes or mechanisms being studied cannot be duplicated with in vitro models (e.g., cell culture), computer simulation, or with simpler species (e.g., invertebrates). |
|  | There is not enough information about the processes being studied to design in vitro/non-living models. |
|  | Animal tissues are required for the development of an in vitro system. |
|  | Methods have already been tested in vitro and must now be performed in live animals; or preclinical studies in living animals are necessary prior to human testing. |
|  | This is a behavioral, learning, or developmental study which must be performed in live animals. |
|  | Participants/students must interact with live animals to develop competence in animal handling and performing procedures (i.e., teaching and training protocols). |
|  | Other (please proved justification): |

|  |
| --- |
| **IV. SPECIES INFORMATION** |

|  |  |  |
| --- | --- | --- |
| **A. Please list the species to be used.** Boxes can be duplicated for additional species. | | |
| |  |  |  |  | | --- | --- | --- | --- | | Species name |  | Species name |  | | Species name |  | Species name |  | | | |
| **B. Justify the choice of species.** Explain why each particular animal model was selected. Describe the unique characteristics each species has that are necessary for your investigations. | | |
|  | | |
| **C. Transgenic animals.**  Will transgenic animals be used, created, or bred? If yes, confirm by checking the box below: | | Yes  No |
|  | **I confirm\*** neither parental transgenic rodent contains the following genetic modifications: (i) incorporation of more than one-half of the genome of an exogenous eukaryotic virus from a single family of viruses; nor (ii) incorporation of a transgene that is under the control of a gamma-retroviral long terminal repeat; and transgenic rodents that result from breeding are not expected to contain more than one-half of an exogenous viral genome from a single family of viruses. | |
| ***\*****Confirmation denotes the transgenic rodents are exempt from the NIH Guidelines and IBC approval is not required. If this cannot be confirmed, or the transgenic animals are not rodents*[*, IBC approval*](https://www.northeastern.edu/ehs/ehs-programs/biosafety/) *is required. Contact the* [*Biosafety Office*](mailto:biosafety@northeastern.edu) *if you have questions about this section.* | | |

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| **V. REGULATORY EXCEPTIONS** |

Per regulations, the items listed below must be approved by the IACUC. Please mark the correct box and provide the requested justification in the text box.

|  |
| --- |
| 1. Are **multiple major survival surgeries** performed on the same animal? Major survival surgery penetrates and exposes a body cavity, produces substantial impairment of physical or physiologic functions, or involves extensive tissue dissection or transection. Some surgical procedures characterized as minor may induce substantial post-procedural pain or impairment and should be similarly justified if performed more than once in a single animal.     No  Yes. Provide scientific justification for these multiple surgeries & the timeframes between them below. |
|  |
| 2. Are unanesthetized **animals restrained for 30 minutes or longer**? See [*IACUC Policy for Physical Restraint of Research Animals*](https://animalcare.research.northeastern.edu/wp-content/uploads/2022/05/Physical-Restraint-Final-2024.docx)*.*  No  Yes. Provide scientific justification below: |
|  |
| 3. Are **non-pharmaceutical grade (NPG) substances** usedin live animals? See [*IACUC Policy on the Pharmaceutical and Non-Pharmaceutical Grade Compounds in Animals*](https://animalcare.research.northeastern.edu/wp-content/uploads/2022/04/Policy-on-the-Use-of-Non-Pharmaceutical-Grade-NPG-Substances-and-Expired-Materials-Final-2022.docx) .  Check these references for availability of [animal pharmaceuticals](https://animaldrugsatfda.fda.gov/adafda/views/" \l "/search) or [human pharmaceuticals](http://www.accessdata.fda.gov/scripts/cder/daf/index.cfm).  No.  Yes. |
| 1. List all NPG substances below and ensure they are also in VIII.A.: |
|  |
| 4. Will **water or food be restricted** during any portion of the project(excluding overnight fast pre-operatively)? *See* [*IACUC Policy on Food/Water Restriction or Deprivation*](https://animalcare.research.northeastern.edu/wp-content/uploads/2023/01/Food-Water-Restriction-or-Deprivation-Final-2024.docx)for specific protocol requirements.  No  Yes. Provide scientific justification below and the time limits for the restriction or deprivation below. |
|  |
| 5. Do you require an experimental exception for **single housing** of social species(excluding during surgical recovery)? See [*IACUC Policy on Single Housing of Research Animals*.](https://animalcare.research.northeastern.edu/wp-content/uploads/2025/04/Single-Housing-Policy-Final-2024.docx)  No  Yes. Provide explicit details regarding need for exception for single housing below. |
|  |
| 6. Do you require an exception from standard **husbandry practices** or **environmental conditions** recommended in [*The Guide for the Care and Use of Laboratory Animals*](https://grants.nih.gov/grants/olaw/guide-for-the-care-and-use-of-laboratory-animals.pdf) or [Animal Welfare Regulations](https://www.aphis.usda.gov/animal_welfare/downloads/AC_BlueBook_AWA_508_comp_version.pdf)(e.g. prolonged cage or bedding change intervals, cage size, alteration of temperature, humidity, light level/cycle, use of wire bottom caging, removal of bedding substrate, exclusion from environmental enrichment, etc.)?  No  Yes. Provide explicit details regarding need for exception from standard husbandry practices or environmental conditions below. |
|  |
| 7. Describe and justify any other exceptions to [*The Guide for the Care and Use of Laboratory Animals*](https://grants.nih.gov/grants/olaw/guide-for-the-care-and-use-of-laboratory-animals.pdf), Animal Welfare Regulations, or IACUC Policies not addressed above. |
|  |

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| **VI. NON-STANDARD HOUSING AND CARE** |

Describe any specialized care and housing practices that do not constitute Regulatory Exceptions as described above.

|  |
| --- |
| Check if Not Applicable |
| 1. Describe any **alterations of standard caging** or **specialized husbandry practices** that are not regulatory exemptions (e.g., use of metabolic caging, pinnacle caging, nonstandard enrichment conditions, etc.)  Note: *Non-standard caging or equipment should be approved by DLAM prior to use.* |
|  |
| 2. **Non-standard drinking water**: For ANY additives placed in the drinking water, provide the following: 1) Name of additive, 2) Concentration/Dose/Volume, and 3) Frequency or Duration that treated water will be provided. |
|  |
| 3. **Non-standard diet/chow**: For ANY specialized diets used in place of the standard chow, provide the following: 1) Name of diet; 2) Dietary composition, including name & concentration of any drugs formulated into the diet, and 3) Frequency or Duration.  Confirm diet(s) are nutritionally balanced. Otherwise, provide justification below. |
|  |

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| **VII. EXPERIMENTAL DESIGN** |

Explain the experimental design in detail from start to finish. Note some details are also required in other sections (e.g., Section IX. Procedural Details and Section X. Surgery Description).

Check the boxes to ensure compliance.

Be organized and concise in your description of the experimental design.

Organize each experiment by number or letter and use the same system in Section XII “Animal Number

Justification”

Describe/identify all experimental procedures, substances, and time points.

Include information on number of groups, animals/group, and total animal numbers/experiment.

Include information on study duration and scientific endpoints.

|  |
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| **VIII. PROCEDURAL DETAILS** |

1. **EXPERIMENTAL SUBSTANCE ADMINISTRATIONS**  Check if Not Applicable

Copy/paste the table below as necessary. Protocols with multiple species must identify and include species-specific details, as necessary. Do not include anesthetics, analgesics, or water/diet provisions addressed in other sections.

**NOTE\***: Please include only 1 substance/table.

*Table can be duplicated for additional substances.*

|  |  |
| --- | --- |
| Name of substance |  |
| Dosage/Concentration |  |
| Volume |  |
| Route | SQ  IP  PO  IV  IM  RO (retroorbital)  Other: |

1. **ANESTHESIA/SEDATION NOT used for surgery or euthanasia.**  Check if Not Applicable

Click link for the [Recommended Doses of Anesthetics and Analgesics](https://animalcare.research.northeastern.edu/wp-content/uploads/2024/09/Anesthesia-and-Analgesia-Guidelines-2024-Final.doc) You may copy and paste the appropriate regimen based on procedure. Additional rows can be added to the table below as necessary.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name of procedure(s):** | |  | | | |
| **Anesthetic/Sedation Name** | | **Dose** | | **Route** | **Re-dose/Maintenance** |
|  | Isoflurane | 2-5% | | Inhaled | Continuous |
|  | |  | |  |  |
|  | |  | |  |  |
| Methods used to monitor anesthetic/sedation  (check all that apply): | | | Responsiveness to stimuli | | |
| Respiratory rate/effort | | |
| Other: | | |
| All animals are monitored continuously while under anesthesia.  Confirm supplemental heat and eye lubricant will be provided when the animal is under anesthesia for longer than 5 mins or justify otherwise. | | | | | |
| **If more than 1 anesthetic event, please complete the following:**  Number of anesthetic events per animal:  Duration and Frequency: | | | | | |

**ANALGESIA NOT used for surgery:**

Click link for [Analgesia formulary by species](https://animalcare.research.northeastern.edu/wp-content/uploads/2024/09/Anesthesia-and-Analgesia-Guidelines-2024-Final.doc) *You may copy and paste the appropriate regimen based on procedure. Additional rows can be added as necessary.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Check if Not Applicable | | | | | |
| **Name of procedure(s):** | |  | | | |
| **Species:** | | Mouse  Rat  Other: | | | |
| **Analgesic Name** | **Dose** | | **Route** | **Duration of Treatment** | |
|  |  | |  |  | and  or  +/- |
|  |  | |  |  | and  or  +/- |
|  |  | |  |  | and  or  +/- |

1. **IMPLANTS**  Check if Not Applicable

Protocols with multiple species must identify and include species-specific details, as necessary. Copy/paste the table below as necessary.

|  |  |
| --- | --- |
| 1) Type and material of implant |  |
| 2) Site(s) of implantation |  |
| 3) Size of implant |  |
| 4) Method of sterilization for implant |  |
| 5) Length of time of implantation |  |
| 6) Removal procedure (N/A, if post-mortem) |  |
| 7) For drugs, compounds, or other substances administered via pump or pellet, provide dosage (in mg/kg/day) and confirm how sterility of the substance will be ensured prior to loading. | |
|  | |

1. **SURVIVAL BLOOD COLLECTION**  Check if Not Applicable

See IACUC Policy on [*Blood Collection from Common Laboratory Animals*](https://animalcare.research.northeastern.edu/wp-content/uploads/2022/05/Blood-Collection-Final-2024.docx) for information on blood collection.

**Maximum Survival Blood Collection Volumes for Mice**

|  |  |  |  |
| --- | --- | --- | --- |
| Body Weight (g) | Circulating Blood Volume (CBV) (ml) | 10% CBV (ml)  every 2 weeks**∇** | 15% CBV (ml) over  4-week period**∇** |
| 20 | 1.26 – 1.44 | 0.13 – 0.14 | 0.19 – 0.22 |
| 25 | 1.58 – 1.80 | 0.16 – 0.18 | 0.24 – 0.27 |
| 30 | 1.89 – 2.16 | 0.19 – 0.22 | 0.28 – 0.32 |
| 35 | 2.21 – 2.52 | 0.22 – 0.25 | 0.33 – 0.38 |
| 40 | 2.52 – 2.88 | 0.25 – 0.29 | 0.38 – 0.43 |

**∇ Maximum total sample volume for that time period. (Based on 63-72 ml/kg TBV)**

**Maximum Survival Blood Collection Volumes for Rats**

|  |  |  |  |
| --- | --- | --- | --- |
| Body Weight (g) | Circulating Blood Volume (CBV) (ml) | 10% CBV (ml)  every 2 weeks**∇** | 15% CBV (ml) over  4-week period**∇** |
| 125 | 7.25 – 8.00 | 0.73 – 0.80 | 1.09 – 1.20 |
| 150 | 8.70 – 9.60 | 0.87 – 9.60 | 1.31 – 1.44 |
| 200 | 11.60 – 18.80 | 1.16 – 1.28 | 1.74 – 1.92 |
| 250 | 14.50 – 16.00 | 1.45 – 1.60 | 2.18 – 2.40 |
| 300 | 17.40 – 19.20 | 1.74 – 1.92 | 2.61 – 2.88 |
| 350 | 20.30 – 22.40 | 2.03 – 2.24 | 3.05 – 3.36 |
| 400 | 23.20 – 25.60 | 2.32 – 2.56 | 3.48 – 3.84 |

**∇ Maximum total sample volume for that time period. (based on 58-64 ml/kg TBV)**

If more than one experiment includes survival blood collections, please copy/paste the table below as needed.

|  |  |  |
| --- | --- | --- |
| **Specify Experiment(s):** |  | |
| 1) Blood draw method and anatomical area used | |  |
| 2) Maximum volume for each blood draw | |  |
| 3) Frequency of draws | |  |
| 4) Maximum number of draws/animal | |  |
| If requesting larger volumes than recommended, provide scientific justification below: | | |
|  | | |

1. **BEHAVIORAL TESTS**  Check if Not Applicable

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name of behavioral test** | **Time required for each testing and/or training session** | | **Frequency of testing/training sessions and interval between sessions** | | **Duration of testing/training sessions** |
|  |  | |  | |  |
|  |  | |  | |  |
|  |  | |  | |  |
|  |  | |  | |  |
| **METHODS USED** | | | | | |
| 1) Please describe the goals and performance expected for each test. | | | | | |
|  | | | | | |
| 2) Will an apparatus be used? | | No  Yes | | If yes, please describe below. | |
|  | | | | | |
| 3) Will aversive stimuli be used? | | No  Yes | | If yes, describe the stimulus and its intensity, duration, and frequency of administration below. | |
|  | | | | | |
| 4) Please describe limits to deprivation or aversive stimuli if desired response does not occur. | | | | | |
|  | | | | | |
| 5) Will rewards be used? | | No  Yes | | If yes, please describe below. | |
|  | | | | | |
| 6) Please describe other techniques to be used below, if applicable. | | | | | |
|  | | | | | |

**F. EXPERIMENTAL TUMOR GROWTH**  Check if Not Applicable

|  |  |  |  |
| --- | --- | --- | --- |
| 1) Animal Hazardous Materials Addendum Provided: | | | Yes  No |
| IBC approval must be obtained **prior to use of any tumors in animals.**  [Bio-Safety Office](http://www.northeastern.edu/ehs/ehs-programs/biosafety/). | | | |
| 2) Identity and source of the tumor |  | | |
| 3) Is the tumor of **rodent origin** or been passaged **in rodents**? | | | Yes  No |
| If **yes**, they must be tested for contamination with adventitious agents. For more info contact DLAM. | | | |
| 4) Is the tumor of **human origin**? | | | Yes  No |
| 5) Provide primary site(s) of anticipated tumor growth and any expected sites of metastasis, if applicable. | |  | |
| 6) Provide method of measuring tumor growth | |  | |
| 7) Provide maximum size and dimension of tumor | |  | |

**G. USE OF ANTIBODY PREPARATIONS OR OTHER BIOLOGICS**  Check if Not Applicable

|  |  |
| --- | --- |
| 1) Are antibody preparations used?  If yes, continue by checking the appropriate box(es) below: | Yes  No |
| Antibodies will be obtained commercially (off the shelf) *OR* | |
| Antibodies will be custom made. If custom made, continue below:  in vitro tissue culture techniques used *OR*  in vivo techniques used. If live animals are used, continue below:  in-house production (describe in Section VII) *OR*  vendor produced (see [Policy on Production of Custom Antibodies](https://animalcare.research.northeastern.edu/wp-content/uploads/2022/05/Policy-on-Production-of-Custom-Antibodies-Final-2022.docx) for list of approved vendors) | |
| 2) Are other biologics (e.g., blood, serum, cellular components) used? | Yes  No |
| \*If **yes,** they must be tested for contamination with adventitious agents. For more information, please contact: the DLAM office at 617-373-3958 or at [dlam@northeastern.edu](mailto:dlam@northeastern.edu). | |

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| **IX. SURGERY DESCRIPTION** |

See [*IACUC Policy for Rodent Surgery*](https://animalcare.research.northeastern.edu/wp-content/uploads/2022/04/Standard-Rodent-Surgery-Final-2025.docx), [*Tips Only Rodent Surgery*](https://animalcare.research.northeastern.edu/rodent-surgery-insturment-tips-only-final-2025-docx/), and [*Aseptic Surgery for USDA Covered Species*](https://animalcare.research.northeastern.edu/wp-content/uploads/2024/09/Aseptic-Surgery-for-USDA-Covered-Species-2024-Final.doc). Please note that there are additional requirements for non-rodent species. Exsanguinations/cardiac perfusions that require a skin incision to expose the vessel and perfusions need to be described as terminal surgeries. If more than one surgery is being added*, copy the table below and answer questions 1-7 for each individual surgery*.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Check if Not Applicable | | | | | | | | | | | | | | |
| 1. **Name of Surgery:** | | |  | | | | | | | | Confirm if  survival or  terminal | | | |
| 1. **Species** | | Mouse  Rat  Other: | | | | | | | | | | | | |
| 1. ***Rodent Surgery Only*: Tips Only Rodent Surgery will be followed** | | | | | | | | | | | | Yes  No | | |
| 1. **Check the relevant boxes for this surgery:** | | | | | | | | | | | | | | |
| The following are all required for survival surgery. Provide scientific justification to omit or change. Terminal surgeries only require continuous monitoring under anesthesia (the last box).  Disinfection of the surgical area/table.  Surgeon is properly prepared for each surgery. At a minimum, sterile gloves, mask, gown, and safety glasses. Disposable or clean lab coats may only be used for non-USDA species.  Surgical instruments are sterilized prior to use and in between animals.  Animal is appropriately prepped for surgery by the following steps:  1. Provision of eye lubricant  2. Removal of the fur/hair  3. Disinfectant/ethanol wipe of the skin (3x for each scrub).  Supplemental heat is provided while the animal is under anesthesia.  All animals are monitored continuously while under anesthesia. | | | | | | | | | | | | | | |
| 1. **Anesthetic details:** Click link forcommonly used anesthetics:[Anesthesia/Analgesia Formulary](https://animalcare.research.northeastern.edu/wp-content/uploads/2024/09/Anesthesia-and-Analgesia-Guidelines-2024-Final.doc)   *You may copy and paste the appropriate regimen based on surgery type. Additional rows can be added as necessary.* | | | | | | | | | | | | | | |
| **Anesthetic/Sedation Name** | | | | **Dose** | | | | **Route** | **Re-dose/ Maintenance** | | | | | |
|  | Isoflurane | | | 2-5% | | | | Inhaled | Continuous | | | | | and  or  +/- |
|  | | | |  | | | |  |  | | | | | and  or  +/- |
|  | | | |  | | | |  |  | | | | | and  or  +/- |
| **Methods used to monitor anesthetic depth** (check all that apply): | | | | | Tail/Toe Pinch | | | | | | | | | |
| Respiratory rate/effort. | | | | | | | | | |
| Other: | | | | | | | | | |
| Methods used for intraoperative monitoring (USDA species only) | | | | | | | | | |  | | | | |
| All animals are monitored continuously while under anesthesia.  Thermoregulation is provided while the animal is under anesthesia. | | | | | | | | | | | | | | |
| 1. **How are the surgical instruments sterilized for each animal (for survival surgery)?** | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | |
| 1. **Describe the surgery in detail including skin incisions, manipulations, closures, and suture information.**   *Do not repeat details confirmed in Part 2, 3 and 4 above.*  Confirm initial dose of analgesia will be given prior to making the incision OR provide justification below.  Confirm sutures/wound clips will be removed 7-14 days post-operatively OR provide justification below*.* | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | |
| 1. **Analgesic regimen:** Click link forcommonly used analgesics: [Anesthesia/Analgesia Formulary](https://animalcare.research.northeastern.edu/wp-content/uploads/2024/09/Anesthesia-and-Analgesia-Guidelines-2024-Final.doc)   *Multiple analgesics may be added to provide flexibility. When multiple analgesics are selected, indicate and/or below. Additional rows may be added if necessary* | | | | | | | | | | | | | | |
| **Analgesic Name** | | | | | | **Dose** | **Route** | | **Duration of Treatment** | | | | | |
|  | | | | | |  |  | |  | | | | and  or  +/- | |
|  | | | | | |  |  | |  | | | | and  or  +/- | |
|  | | | | | |  |  | |  | | | | and  or  +/- | |
| Confirm that a DLAM Surgical Card will be placed on the animal’s cage and that it is completely filled out. | | | | | | | | | | | | | | |

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| **X. ANIMAL CARE AND MONITORING** |

In animal health emergencies, animals may be treated or euthanized by the veterinary staff to relieve suffering. When possible, veterinary staff will make reasonable efforts to contact investigative staff prior to diagnostic testing, therapy, or euthanasia. However, you **MUST** notify veterinary staff of any therapeutic restrictions for your research in advance in case they are unable to make contact during a health emergency.

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| **A. Adverse Effects:** Describe expected experimental effects, distress, pain, significant discomfort, or morbidity that may occur because of the experiments, procedures, genetic phenotypes, or from surgery (including infection, inflammation, erosion, or accidental removal of implants). Indicate how adverse effects will be alleviated (e.g., with analgesia, nursing care, nutritional support, etc.) or provide justification for Category E procedures below | | | | | | | |
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| **B. Justification for Category E procedures:** Please provide **scientific justification** if pain and/or distress is an unavoidable part of the research/procedures and why it cannot be alleviated. | | | | | | | |
|  | | | | | | | |
| **C. Health Monitoring:** Indicate the frequency and length of the time that **ALL** animals will be observed to evaluate pain/distress. This includes observation of animals on and off studies, as well as post-operative care/monitoring. When necessary, explain how monitoring will change if health status changes. Protocol personnel are responsible for this monitoring. Routine health checks by veterinary staff does NOT fulfill this requirement. | | | | | | | |
| **Procedure or Experiment name(s)** | | | **Frequency of observations/monitoring** | | | | |
|  | | |  | | | | |
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| **D. Humane Endpoints**: List the criteria used to determine when euthanasia will be performed for humane reasons, even if prior to the experimental endpoint.  ***Check all boxes that apply:*** | | | | | | | |
|  | Body weight loss of >15% | | | | |  | Tumor ulceration/necrosis |
|  | Body Condition Score (BCS) of <2 | | | | |  | Tumor size of > 1cm3 or 1.5 cm in diameter |
|  | Inability to eat or drink | | | | |  | Inability to right self |
|  | Any of the following clinical Signs: | | |  | | | |
| Other: | |  | | | | | |
| **E. Documentation for Medical Records:** Check the criteria documented for Health Monitoring (described in Part C) and Humane Endpoint determination (Part D). Records must be made available to IACUC or veterinary staff upon request. Medical records are required to be maintained for all USDA covered species (either dedicated record or part of cage card). | | | | | | | |
|  | Frequency of Body Weight measurement and Body Condition Soring: | | | |  | | |
|  | Tumor measurements | | | | | | |
|  | Blood, urine, or other laboratory tests | | | | | | |
|  | Other: indicate other scoring systems or measurable criteria used (e.g., EAE, seizure scale, etc.): | | | | | | |
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| **XI. ANIMAL NUMBER JUSTIFICATION** |

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| **1. JUSTIFY THE NUMBER OF ANIMALS REQUESTED.**  In a **Table** present each experiment by number or letter in the same format they are organized in Section VIII. Identify how many animals are needed for each group and experiment. Include group sizes, the number of groups/experiments, the number of conditions, timepoints, repetitions, etc. Also, provide statistical justification for your animal numbers and identify the statistical test used. The number of animals must be the minimum number required to meet the goals of the study. | |
|  | |
| B. What was the method(s) used to determine how many live animals are needed for this protocol? Check all that apply. | |
|  | Power analyses indicated that the proposed sample size, number of groups and/or number of experiments is the lowest required for statistically valid tests of the hypothesis (i.e. 80% power with 0.05 type I error) |
|  | Based on previous and/or published data, the numbers of animals requested are the minimum needed to achieve sufficient statistical power. |
|  | This is a pilot/feasibility study that uses the minimum number of animals required to provide meaningful, but not statistically significant data (i.e. model development) |
|  | The numbers of animals or group sizes have been established by federal agency requirements.  \*Name of agency for this request of animal numbers: |
|  | Breeding or Holding protocol: Numbers represent the estimates of offspring that will be produced and/or animals that will otherwise need to be held while not on study |
|  | Teaching/Training Protocols: Numbers are based on expected student enrollment: reflects animal/student ratio required for effective teaching |
|  | Field Study Protocols: Numbers are based on as many animals as can potentially be located |
|  | None of the above methods could be used to determine numbers, and the numbers requested represent the best estimates in the PI’s professional judgement.  \*Please explain why none of the above methods could be used and state how the final numbers were determined: |

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| **2. TOTAL NUMBER OF ANIMALS USED FOR BREEDING.** Provide the total number of animals bred under this protocol. Please provide a clear distinction between which of the animals bred will be used in the experiments above and which are used for maintenance or culled only. | | | | | |
| Mouse |  | Rat |  | Other |  |
| Total number includes adult breeders plus offspring generated. All animals born must be accounted for, even if not used in experiments*.* A table or chart that organizes the number expected from breeding is suggested. Estimate litter size, litters per female, and number of offspring that may be culled based on Mendelian genetics or other methods. If average litter size is unknown, estimate 10 pups per pregnancy for rodents. *.* | | | | | |
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| **3. TOTAL NUMBER OF ANIMALS.** Calculate the total number of animals required during the 3-year approval period by species. All animals used in experiments, used for maintenance breeding, or culled *must* be accounted for.Indicate how many animals are utilized in each [Pain/Distress Category-P/D](https://animalcare.research.northeastern.edu/wp-content/uploads/2022/05/IACUC-Pain-and-Distress-Category-Descriptions-Final-2024.docx):  **CAT C:** Animals that underwent study-related procedures that involved *no more than slight or momentary* pain, distress, and no use of pain-relieving drugs.  **CAT D:** Animals that underwent study-related procedures that involved more than momentary pain or distress which was *alleviated* with anesthetics, analgesics, or tranquilizers.  **CAT E:** Animals that experienced more than slight or momentary pain or distress that could *not be relieved* for study-related reasons. | | | |
| **Species name** |  |  |  |
| **Category C** |  |  |  |
| **Category D** |  |  |  |
| **Category E** |  |  |  |
| **Total number requested** |  |  |  |

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| **XII. SEARCH FOR ALTERNATIVES**   Check if Not Applicable |

Federal regulations require investigators consider alternatives for procedures that may cause more than momentary pain or distress. You must provide a written narrative description of the methods and sources that were used to determine that alternatives were not available. This only applies to **Category D** and **Category E** procedures. Category C procedures do not require an alternative search.

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| Procedures are Category B or C therefore no literature searches are needed. | |
| **A. SOURCE FOR ALTERNATIVE SEARCHES** | |
| The database(s) searched |  |
| The date that the search was conducted |  |
| The years covered by the search |  |
| **B. METHODS & NARRATIVE DESCRIPTION FOR EACH SEARCH:**  Suggested search strategy: “procedure” + “species” + “alternative” [e.g.: skin incision + mouse + alternative]  Provide a written narrative of the methods and sources used for each alternative search. The Committee must be able to assess if the search was appropriate and sufficiently thorough. Please Note: You are no longer required to provide the number of references retrieved or the alternative search for “anesthesia.” | |
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| **XIII. DISPOSITION OF ANIMALS FOLLOWING STUDY** |

Provide details of euthanasia for each species. **Even if the experimental plan does not include euthanasia, protocols must include an emergency plan in case euthanasia becomes necessary.**No animal may be adopted, reused, or given away without advance permission from DLAM. See [IACUC Policy on Euthanasia and Secondary Method of Euthanasia in Animals](https://animalcare.research.northeastern.edu/wp-content/uploads/2022/04/Euthanasia-and-Secondary-Methods-Final-2024.doc).

* Copy and paste the chart below for each different species, if necessary.
* If an inhalant is used for euthanasia, a secondary method of euthanasia is required.
* Methods of euthanasia must be consistent with the [AVMA Guidelines](https://www.avma.org/sites/default/files/2020-01/2020-Euthanasia-Final-1-17-20.pdf) or otherwise scientific justification must be provided below.
* Physical methods without anesthesia or sedation must be justified below (i.e., conscious cervical dislocation or decapitation). See *IACUC Policy for Maintenance of Blades for Use in Conscious Decapitation*.

|  |  |
| --- | --- |
| **Species name** |  |
| **Primary euthanasia method** |  |
| **Confirm secondary method is used when required** | Cervical dislocation,  Decapitation,  Thoracotomy,  Exsanguination,  Major organ removal will be performed following the primary method |
| **Other euthanasia methods:** |  |

|  |  |
| --- | --- |
| **A physical method of sacrifice will be used without prior anesthesia or sedation** (i.e., conscious cervical dislocation or decapitation). Please provide justification below. | |
|  | |
|  | **Euthanasia is not expected or required. Emergency only.** |

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| **XIV. LOCATION OF ANIMALS** |

The use and/or housing of animals outside the centralized animal facility must be approved by the IACUC prior to initiation. Once approved, animals can only be outside of the centralized facility for less than 12 hours (for USDA species) or less than 24 hours (for other species), unless the location is approved as a satellite facility.

|  |  |
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| **1. Are live animals ever used outside of the centralized facilities?** | Yes  No  Other location |

If you answered **yes** above, please complete Question 1. If you answered **other location**, please complete Question 2.

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| **1A. Type of procedure or housing** | **Building and**  **Room Number** | **Is room currently approved by the IACUC?** | **Longest time frame animals Will Be present** |
| Euthanasia/tissue harvest |  | Yes  No |  |
| Survival surgery |  | Yes  No |  |
| Non-survival surgery |  | Yes  No |  |
| Satellite housing\*\* |  | Yes  No |  |
| Other: |  | Yes  No |  |

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| **1B. Provide justification for removing animals from central facilities.** |
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| **2. Provide description(s) and justification for field studies and use of other locations.** |
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\*\* Investigators housing their animals in satellite housing must provide the IACUC and DLAM a detailed SOP on the housing and care of the animals housed in their facility.

Updated: 05/2025