APPLICATION FOR THE USE OF EXPERIMENTAL ANIMALS AT THE

A\*STAR Research Entities (ARES)

|  |
| --- |
| For IACUC Secretariat Use Only |
| IACUC # |  | Submission date | Click to enter a date | Approval date | Click to enter a date |
| IACUC Chair  |  | Approval duration | Start Date to End Date |

## Please complete ALL SECTIONS clearly in soft-copy, stating N/A if appropriate, and use the boxed spaces and check boxes provided. Please consult with IACUC Secretariat if you need help in completing any part of this form. Email this application with all supporting documents as soft copy to the IACUC Secretariat. Signature of Principal Investigator would only be required in the final revised copy. Incomplete forms will be returned to you AND WILL cauSE delays in processing OF APPLICATION.

## Please note –

The Animal & Veterinary Service (AVS) Rules and the National Advisory Committee for Laboratory Animal Research (NACLAR) require the following information to be completed and submitted for review by the Institutional Animal Care and Use Committee (IACUC).

The IACUC office will appoint a reviewer to review your application, to ensure that the care and use of laboratory animals at the BRC are scientifically, technically and humanely appropriate. During the review process, the reviewer may contact you from time to time for clarifications. It is important that you can respond to the clarification in timely manner, in order to get your application presented to the committee and stands a good chance of approval without delay.

The application should be based on each individual project rather than laboratory-based. IACUC strongly discourage multiple disparate projects in a single application.

The IACUC will endeavour to consider and approve applications within 4-6 weeks. However, due to the high volume of applications received, this may not always be possible for the more complex protocols. Therefore, clarity of submission and inclusion of all supporting documents will greatly assist the IACUC in its consideration of your application.

**FORMAL OFFICIAL Approval from the IACUC OFFICE is required beforE commencing animal experiments.**

Please contact the respective Unit Manager when you are ready to start work:

BRC Department 3 – Tel: 6464 2326

IACUC Office Tel: 6464 2381

IACUC Email: iacuc@brc.a-star.edu.sg

IACUC Application Form Checklist

The following checklist MUST be completed and email this application with any supporting test results and certificates as soft copy to the IACUC Secretariat. ONLY COMPLETED FORM WITH ALL THE SUPPORTING DOCUMENTS WILL BE ACCEPTED BY IACUC OFFICE FOR REVIEW.

**Please attach a copy of all records marked with a ‘Yes’**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Yes** | **N/A** | **Remarks** |

|  |
| --- |
| 1. APPLICATION FORM |
| All sections filled up |[ ] [ ]   |
| 2. RCULAC CERTIFICATES |
| RCULAC Certificates of all Personnel |[ ] [ ]   |
| **3. RISK ASSESSMENT** |
| Approved copy of Risk Assessment |[ ] [ ]   |
| **4. SAFETY** |
| GMAC Proposal Form (signed) for Recombinant DNA/transgenic animal used* Category A
* Category B
* Category C
 |[ ] [ ]   |
| Radioactive Substances* Safety Data Sheet (SDS)
* Copy of applicable Licence
 |[ ] [ ]   |
| Chemical Substances/ Pharmaceutical Substances* Safety Data Sheet (SDS)
* Appendix V Record Sheet NPG/NCE Form (if required)
 |[ ] [ ]   |
| Novel Compounds* Safety Data Sheet (SDS)
* Appendix V Record Sheet NPG/NCE Form
 |[ ] [ ]   |
| Human-Derived Materials* IRB approval letter/ exemption
* Mycoplasma Test Results
 |[ ] [ ]   |
| Other Biological Derived Materials (Non-Human)* MAP/PCR Test Results
 |[ ] [ ]   |

**SECTION A: ADMINISTRATION**

|  |  |  |
| --- | --- | --- |
| **1.** | **Title of Project:** |  |

**2. Type of Project**

**2A.** [ ]  New Application [ ]  Renewal Application

Please indicate the old IACUC number

**2B.** [ ]  Research Project [ ]  Service/Training Project

**3. Duration of Project:** Choose the Number of Years

**4. Funding:** Please indicate the source of the funding for this project:

[ ]  BMRC [ ]  NMRC [ ]  NRF [ ]  MOH

[ ]  SingHealth [ ]  MOE [ ]  NUS [ ]  NUH

[ ]  Others – please specify

**5. Principal Investigator (PI)**

**5A. PI Details**

|  |  |
| --- | --- |
| Name |  |
| Research Institution (RI) / Company | Choose the RI/ CompanyOthers – please specify |
| Department |  |
| Address |  |
| Work telephone number |  |
| Mobile phone number |  |
| E-mail address |  |
| RCULAC Cert. No (Theory) &Date/ Year obtained |  |

**5B. PI will be handling and HAVE CONTACT WITH ANIMALS**

|  |  |
| --- | --- |
| [ ]  **YES**  | [ ]  **NO**  |

If “**YES”**, please complete the following table:

|  |  |  |
| --- | --- | --- |
| RCULAC Cert. No. (Hands-on) | Vaccination History1 | Experience working with lab animals |
| Cert. No.: Text FieldDate/Year obtained: Text Field | Tetanus☐ Yes ☐ NoHepatitis B☐ Yes ☐ No | WhereWhenWhat speciesWhat procedures |

**6. Information of ALL staff who will have contact with animals:**

***\*Please copy and paste the table row if additional personnel are required.***

|  |  |  |  |
| --- | --- | --- | --- |
| Personnel Details | RCULAC Cert No. | Vaccination History1 | Experience working with lab animals2 |
| Name: Text FieldRI/Company: Text FieldContact no.: Text FieldE-mail: Text FieldRole/Responsibility:Text Field | Cert. No. (Theory): Text FieldDate/Year obtained: Text FieldCert. No. (Hands-on): Text FieldDate/Year obtained: Text Field | Tetanus[ ]  Yes [ ]  NoHepatitis B[ ]  Yes [ ]  No | WhereWhenWhat speciesWhat procedures |
| Name: Text FieldRI/Company: Text FieldContact no.: Text FieldE-mail: Text FieldRole/Responsibility:Text Field | Cert. No. (Theory): Text FieldDate/Year obtained: Text FieldCert. No. (Hands-on): Text FieldDate/Year obtained: Text Field | Tetanus[ ]  Yes [ ]  NoHepatitis B[ ]  Yes [ ]  No | WhereWhenWhat speciesWhat procedures |

1 If **“NO”** is checked, please indicate in the box below when (approx. date) staff intends to be vaccinated, or contact the BRC Safety Office if staff decides to opt out of the vaccination program.

|  |
| --- |
|  |

2 If staff included does not have any experience, please indicate the person who would be providing the training in the box below. Please note that the trainer should have experience working with lab animals and must be included in this protocol.

|  |
| --- |
|  |

**7. Emergency Contact Person**

|  |  |
| --- | --- |
| Name |  |
| Contact number (Mobile phone) |  |
| E-mail address |  |

**While every attempt will be made to contact the above if an animal is found moribund, in excess pain or distress, in the professional opinion of a BRC veterinarian, animals may be treated or subsequently euthanized for humane reasons to alleviate further suffering. BRC disclaims any responsibility for any adverse consequences of the research project.**

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**SECTION B: EXPERIMENTAL PROCEDURES**

**8. Rationale**

Summarize in **everyday lay terms** the purpose, rationale, and scientific goals of the proposed research using animals. Briefly describe how this proposal will have relevance to human or animal health, advancement of knowledge or other benefit to society. Scientific abstracts will **not** be accepted.

*For renewal of applications, please include a brief description of the findings over the past 3 years and provide justification for the renewal****.***

**Please limit response to 200 words:**

|  |
| --- |
| What is the need for this project?What is the plan for this project?How will success be measured in this project? |

**9. Animal Species**Please select the species that will be used for this study:

|  |  |
| --- | --- |
| Mouse |[ ]  Others: Please specify |[ ]
| Rat |[ ]  Click or tap here to enter text. |  |

If **multiple species** would be used to conduct the same experiment, please provide justification below:

|  |
| --- |
| Please justify |

**10. Experimental Procedures**

Please provide a **LIST** of all experimental procedures to be performed on the animals. This list should be written clearly, be easily understood by all IACUC members (including the Lay Person) and contain concise sequential information of all experimental procedures to be performed on animals. Please select the pain or distress classification (C, D or E) for each procedure as described in Appendix I.

***\*Please copy and paste the table row if additional row is required.***

**10A. Procedures**

|  |  |  |
| --- | --- | --- |
|  | List of Procedures | Pain Classifications |
| 1. | e.g. *Breeding of transgenic mice* | Please select |
| 2. | e.g. *Ear notching/ tail excision for genotyping* | Please select |
| 3. | e.g. *Euthanasia* | Please select |

**NOTE: After the application has been approved, any change and additional procedures MUST be submitted to the IACUC as an amendment and obtain written approval PRIOR to implementation.**

**10B. IACUC Guidelines and Standard Procedures**

Please check and adhere to the IACUC guidelines and standard procedures that are applicable for the procedures in this application.

|  |  |
| --- | --- |
| Guideline for Cancer Research in Mice and Rats (Appendix IV) |[ ]  Standard Procedures for Blood Collection (Appendix IX) |[ ]
| Guideline for Cytotoxic and ABSL2 Waste Handling (Appendix VI) |[ ]  Standard Procedures for Administration of Substances (Appendix X) |[ ]
| Standard Procedures for Genotyping Mice and Rats (Appendix VII) |[ ]  Standard Procedures on Surgical Procedures (Appendix XI) |[ ]
| Standard Procedures for Anaesthetic and Analgesic Use (Appendix VIII) |[ ]  Standard Procedures for Euthanasia of Mice and Rats (Appendix XII)  |[ ]

**NOTE: The copy of individual Guidelines and Standard Procedures are available and downloadable from** [**IACUC website**](https://www.a-star.edu.sg/brc/A-STAR-IACUC/Forms-Guidance-Guidelines)**.**

**10C. Method of Identification**

Please check the applicable method of identification:

|  |  |
| --- | --- |
| Ear Tags |[ ]  Microchip Implant |[ ]
| Ear Punches |[ ]  Non-toxic, Permanent Markers |[ ]
| Hair Dye |[ ]  Others: Please specify |[ ]
| Tattooing |[ ]   |  |

**If toe clipping is required, please provide scientific justification:**

|  |
| --- |
| Please justify |

**10D. Tissue Sampling**

Please list all tissues / organs / body fluids to be collected from animals **prior to** euthanasia (e.g. blood / bile / liver biopsy, tail clips, ear tissues, etc.)

|  |  |
| --- | --- |
| [ ]  **YES**  | [ ]  **NO**  |

If “**YES”**, list all the tissues that you plan to sample:

|  |  |  |
| --- | --- | --- |
| 1.  | 2.  | 3.  |
| 4.  | 5.  | 6.  |

#

**11.** **Non-surgical Procedures**

|  |
| --- |
| Provide a detailed, clear description of each non-surgical procedure in sequence as listed in paragraph 10A. Please avoid using jargon, abbreviations etc. Do not include explanations and procedures irrelevant to animal use. You are strongly encouraged to use a diagram or chart to explain complex experimental designs.**If standard procedures are to be strictly followed, please tick the relevant procedures in paragraph 10B. No detailed description is needed unless there is a deviation from the standard procedures.** E.g. 2) Tail biopsy for genotyping  Standard procedure will be followed.(Surgical procedures should be described in paragraph 12 below) |

**NOTE: After an application has been approved, any change and additional procedures MUST be submitted to the IACUC as an amendment and obtain written approval PRIOR to implementation.**

If any of the procedures described above deviate(s) to the National Advisory Committee for Laboratory Animal Research (NACLAR) guidelines or the Guide for the Care and Use of Laboratory
Animals, please provide scientific justification:

*If this is required, the IACUC will advise during the review process.*

|  |
| --- |
|  |

**12. Surgical Procedures**

Does the project involve surgery?

|  |  |
| --- | --- |
| [ ]  **YES**  | [ ]  **NO**  |

Provide details for each surgical procedure listed in Paragraph 10A.

**12A. Name of surgeon(s) and their relevant experience:**

|  |  |
| --- | --- |
| Name of surgeon | Experience in carrying out surgical procedures on lab animals (where, what, when, what species) |
| 1.  |  |
| 2.  |  |

For those with no previous/insufficient surgical experience, please list staff who will undergo training, and who will be responsible for training:

|  |  |
| --- | --- |
| Name of trainee | Name and Experience (where, what procedures, when, what species) of person responsible for training and assuring that staff has obtained adequate skills  |
| 1.  |  |
| 2.  |  |

**12B. Details of Surgical Procedure**

|  |  |
| --- | --- |
| Nature of surgical procedure  | [ ]  Survival [ ]  Non-survival  |
| Species |  |
| Room where surgery will be carried outNote: **All survival surgery must be carried out under aseptic conditions (see Appendix XI for guidance)** | Name of Building: e.g ImmunosLevel and Room #: e.g Level 7, SPRNote: All rooms must be AVS-licensed and IACUC-approved – see paragraph 16 for list. |

\*See Appendix XI for guidance

|  |
| --- |
| Describe in detail, the surgical procedure including both pre- and post-operative care, monitoring, time-frames for the procedures, anaesthesia regimen and pain monitoring.Please include the use of BRC’s rodent / animal Surgery and Post-surgery report forms –  |

**12C. Multiple Surgical Procedures**

Will multiple surgical procedures be carried out on the animal(s)?

|  |  |
| --- | --- |
| [ ]  **YES** | [ ]  **NO** |

If “**YES”**, please provide scientific justification for multiple survival surgical procedures to be performed on the same animal:

|  |
| --- |
|  |

**12D. Frequency & Duration**

State frequency and duration at which animals will be observed after surgery.

|  |
| --- |
|  |

**12E.** **Table of Drugs**

Provide details of drugs to be used for the surgery. Please consult the BRC veterinarians for advice on drugs available:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Drug Used** | **Agent name and concentration (mg/ml)** | **BRC standard drug dose** | **Dose** **(vol / BW)** | **Route of administration, frequency and duration** |
| Anaesthetic |  | [ ]  Yes [ ]  No |  |  |
| Reversal drug |  | [ ]  Yes [ ]  No  |  |  |
| Antibiotic |  | [ ]  Yes [ ]  No |  |  |
| Analgesic |  | [ ]  Yes [ ]  No |  |  |
| Paralytics |  | [ ]  Yes [ ]  No |  |  |
| Other |  | [ ]  Yes [ ]  No |  |  |

**NOTE: After an application has been approved, any modifications to the surgical procedures described MUST be submitted to the IACUC as an Amendment and obtain written approval PRIOR to implementation.**

**13. Experimental Endpoints**

Describe when (use time line, etc.) the endpoint for each group of animals will be. All animals (as described in Paragraph 14) must be covered by an end-point. (Not to be confused with humane endpoints in Paragraph 18)

|  |
| --- |
|  |

**14. Animal numbers & Pain / Distress Classification levels**

With reference to the list of experimental procedures described in Paragraph 10A, for each of the pain classifications C, D or E, indicate the number of animals you intend to use.

*For service/ training protocols, only an estimation of the animal numbers is required. Due to the nature of the work, service protocols would not be penalized when the usage exceeds the proposed number.*

*Note: Only an increase of up to 30% of the approved numbers are allowed if required during the study period.*

|  |  |  |  |
| --- | --- | --- | --- |
| Animal Details | Pain Classification | Total number of animals **used** (including those bred but were euthanized because not required) each year | 3-year total number of animals |
| Year 1 | Year 2 | Year 3 |
| Strain/LineSourceAge/WeightSex | Please select |  |  |  |  |
| Strain/LineSourceAge/WeightSex | Please select |  |  |  |  |

**14A. Indicate the features of the animal strain that you plan to use that make this the ideal choice for the proposal (anatomical, physiological or genetic features):**

|  |
| --- |
|  |

**14B. If you wish to use one sex only, please justify:**

|  |
| --- |
|  |

**14C. Justification for animal numbers**

You are encouraged to provide this information in a table or diagrammatic illustration as an attachment. Please refer to examples in Appendix II.

|  |
| --- |
| Points to note:i) Breeding Please provide the breakdown of the number of breeders, number of offspring and also number of animals bred but euthanized due to incorrect genotype. ii) Group StudyDescribe and justify (e.g. provision of power of analysis) the number of groups and group size inclusive of experimental and control animals in accordance to the procedures to be performed on each group. To also specify if there is any repeats and variables/ contingency. iii)Tissue HarvestingDefine the number of animals required per experiment, how many experiments to be performed per month/year and any variables/ contingency. |

**14D. \*Please provide scientific justification if animals are to be subjected to Pain/ Distress Classification E.**

|  |
| --- |
|  |

**15. Housing**

Where do you intend to house (i.e. keep for 24 hours or more) the animals?

|  |
| --- |
|  BRC Department 2 cluster (SPF rodents) |[ ]
|  BRC Department 2 cluster (ABSL2 Room) |[ ]
| BRC Department 3 cluster (SPF rodents) |[ ]
| BRC Department 3 cluster (ABSL2 cluster) |[ ]

**15A. Single Housing (Select the appropriate reason if required)**

|  |  |
| --- | --- |
| Breeding (Male studs will be housed singly with enrichment) |[ ]  Social incompatibilityPlease provide supporting documents.  |[ ]
| Time mating (Females will be housed singly once pregnant. Enrichment will be provided.) |[ ]  Experimental purposes:Please provide justification |[ ]

**15B. If non-standard housing would be used, please indicate type and provide justification:**

*Please refer to Appendix III for the types of standard housing for the different species.*

|  |
| --- |
|  |

**16. Request to bring animals out from the housing facility (see above) for experimental procedures. This is not encouraged.**

If requesting to bring animals out of BRC for experimental purposes, please justify why the animal experimental procedure cannot be carried out at the BRC animal housing Departments:

|  |
| --- |
|  |

For external collaborators, please complete the Animal Transfer Form and Acknowledgement Form whenever you are requesting animals for this purpose. Please e-mail the IACUC Secretariat to request a copy of the form.

**The satellite laboratories/ rooms for animal procedures/ experiments under ARES must be IACUC approved and AVS licenced. Below is the list of such laboratories/ procedure rooms. Please check the applicable location where animals will be brought to:**

|  |  |
| --- | --- |
| IMCB Euthanasia & Animal Procedure Room (#05-33, Proteos) |[ ]  IMCB Animal Procedure & Euthanasia Room (#01-02, Helios) |[ ]
| IMCB Necropsy Room (#06-01/02, Proteos) |[ ]  IMCB Imaging Area 1(#01-02, Helios) |[ ]
| AMP Multi-photon Microscopy & Procedure Room (#06-46, Proteos) |[ ]  IMCB Imaging Area 2 (#01-02, Helios) |[ ]
| SIgN L3 Animal Procedures Room 1 (#03-00, Immunos) |[ ]  IMCB Animal Surgery Room(#01-02, Helios) |[ ]
| SIgN L4 Animal Procedures Room 1 (#04-00, Immunos) |[ ]  IMCB Neuroscience Procedure Room (#01-02, Helios) |[ ]
| SIgN Multi-Photon Confocal Microscope Animal Procedure Room (#03-06, 2-Photon Room, Immunos) |[ ]  IMCB Neuroscience Imaging Room (#01-02, Helios) |[ ]
| A\*SRL Euthanasia Room Level 6 (#06-23, Immunos) |[ ]  IMCB Isotopic Molecular Imaging Labs (IMIL) (#07-11, Helios) |[ ]
| GIS Infectious Diseases Animal Procedure Room (#06-13/14/15, Genome) |[ ]   Other AVS Licensed facility:Please specify |[ ]

**17. Death as an Endpoint**

Will death be used as an experimental endpoint? Such circumstances are rare, and if applied for, will receive additional scrutiny by the IACUC. **You are strongly encouraged to consider other alternative endpoints (to be included under paragraph 18, Humane Endpoints).**

|  |  |
| --- | --- |
| [ ]  **YES** | [ ]  **NO** |

#

If “**YES”,** please provide relevant and current scientific justification, including why an alternative to death cannot be used as an end-point:

|  |
| --- |
|  |

**18. Humane Endpoints**

To avoid prolonged pain and/or distress to the animals, they are to be euthanized for humane reasons prior to death and removed from the study

For studies involving cancer, see IACUC Guideline for Cancer Research in Mice and Rats (Appendix IV). Describe the criteria that will be used to decide when euthanasia will be performed.

|  |
| --- |
| (e.g. when the animal becomes moribund; tumour size exceeds a certain diameter, percentage body weight loss etc.) |

**19. Euthanasia**

Describe the method of euthanasia that will be employed for all animals as denoted in Paragraph 14. Death must be confirmed by personnel trained to recognise cessation of vital signs in the species being euthanized. A secondary method of euthanasia (e.g. thoracotomy or exsanguination) can be also used to ensure death. See below and IACUC Guideline for Euthanasia of Mice and Rats (Appendix XII).

* 1. For rat and mouse fetuses up to 15 days’ gestation - euthanasia of the mother or removal of the fetuses should ensure rapid death of the fetus due to loss of blood supply and non-viability of fetuses at this stage of development.
	2. For rat and mouse fetuses over 15 days’ gestation and neonates up to 10 days’ of age – decapitation with a sharp pair of scissors or cervical dislocation is recommended.
	3. For rat and mouse neonates 10 days’ of age and older (e.g. weaners, adults) – use CO2

Euthanasia Table for Rat / Mouse

|  |  |  |  |
| --- | --- | --- | --- |
| Rat / mouse age | Fetus to 15D gestation | Fetus > 15D to Neonate 10D | Animals > 10D  |
| Agent (e.g. CO2, chemical) |  |  |  |
| Dosage |  |  |  |
| Route of administration |  |  |  |
| \* Physical method (e.g. decapitate, cervical dislocation, other) |  |  |  |

\*Animals euthanized by physical methods must be anaesthetised or sedated prior to euthanasia, unless scientific justification is provided in the box below and adequate experience in the technique can be demonstrated to the veterinarian and approved by the IACUC.

Euthanasia Table for **Other Species**

|  |  |  |
| --- | --- | --- |
| Name of species |  |  |
| Agent (e.g. CO2, chemical) |  |  |
| Dosage |  |  |
| Route of administration |  |  |
| Other method – please describe |  |  |

Provide scientific justification if your experimental protocol requires euthanasia of un-sedated or un-anaesthetised animals:

|  |
| --- |
|  |

**20. Animal Welfare**

It is the responsibility of the PI to inform the IACUC of any risks to animal well-being.

**20A.** Please describe if you will need to take any additional steps to minimise any pain or distress suffered by the animals used in this study proposal:

|  |  |
| --- | --- |
| [ ]  **YES** | [ ]  **NO**  |

If **“YES”**, please justify and state the additional steps to be taken:

|  |
| --- |
|  |

**20B.** In the case of mutant, transgenic or gene KO/KI animals, please indicate whether the genetic modification is likely to impact the well-being and/or cause an immunocompromised state of the modified animal (if known):

|  |  |
| --- | --- |
| [ ]  **YES** | [ ]  **NO**  |

If **“YES”**, please provide information on how you plan to address this handicap to the animals:

|  |
| --- |
|  |

**If NO, but the modification subsequently affects the well-being of the animals, it is the responsibility of the PI to immediately inform the IACUC of any such handicaps and describe how they will be addressed in an Amendment to this research proposal.**

**20C.** Cages for all species would be provided with enrichment.

If any additional enrichment is required, please indicate below:

|  |
| --- |
|  |

If enrichment would not be given, please provide scientific justification to support.

|  |
| --- |
|  |

**21. Fate of any animals remaining after completion of the study**

Will all animals be euthanised at the end of the study?

|  |  |
| --- | --- |
| [ ]  **YES** | [ ]  **NO** |

If “**NO”**, explain why the animals not be euthanised and describe what will happen to them:

|  |
| --- |
|  |

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**SECTION C: JUSTIFICATIONS**

**22. Avoidance of Duplication of Previous Research**

Describe the database and literature searches that have been carried out to ascertain that the proposed work is not an unnecessary duplication of previous research; include a list of the key words / terms and databases that were used for the searches (not applicable for protocols involving novel drugs / product testing as a service):

*Due to the nature of the work, service/ training protocols may be exempted from this section.*

|  |  |
| --- | --- |
| Date of most recent search to avoid duplication: |  |
| Years covered by search: |  |
| Key words used: |  |
| Search strategy used / database searched: |  |
| Result of search, e.g. number of hits:  |  |
| Conclusion / justification to proceed: |  |

Based on the information obtained from database and literature searches, does the proposed work duplicate any previous research?

|  |  |
| --- | --- |
| [ ]  **YES**  | [ ]  **NO**  |

If “**YES”,** provide justification for proceeding with the proposed studies:

|  |
| --- |
|  |

**23. The 3 R’s**

Provide written assurances that the following 3R’s were given due consideration when planning the project:

**Replacement –** Alternative to using live animals, or the use of invertebrate species. Indicate clearly which non-animal alternatives were considered for the study:

|  |
| --- |
|  |

**Reduction –** Reduction in the number of animals used (e.g. using appropriate statistical methods in the design and analysis of the study), without compromising scientific validity of the project. State clearly the reasons for the numbers of animals you wish to use:

|  |
| --- |
|  |

**Refinement** – Do you intend to use alternative or improved techniques or procedures to minimize potential pain, distress and discomfort of the animals?

|  |
| --- |
|  |

**Use one of the following web-sites to assist / justify your searches:**

1. USDA Animal Welfare Information Centre, Alternatives and Searches: <https://www.nal.usda.gov/services/literature-searching-animal-use-alternatives>
2. ALTBIB, the Bibliography on Alternatives to the Use of Live Vertebrates in Biomedical Research and Testing:

<https://ntp.niehs.nih.gov/whatwestudy/niceatm/altbib>

1. Norecopa, The 3R Guide database:

<https://norecopa.no/databases-guidelines/3r-guide-database/>

1. National Centre for the Replacement Refinement & Reduction of Animals in Research: <https://nc3rs.org.uk/who-we-are/3rs#anchor_1>

**Please retain your search data on file for the duration of the project, so that AVS may inspect if they wish to.**

**Database searched - provide details of any database searches** **relating to the 3R’s**:

|  |  |
| --- | --- |
| Date of the most recent search for 3R’s : |  |
| Years covered by search: |  |
| Key words used (should relate to the project and the 3R’s): |  |
| Search strategy used / Database searched: |  |
| Conclusion - justification to proceed as described: |  |

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**SECTION D: SAFETY**

**24. Potentially Hazardous Materials**

Ifthis proposal entails the use of any of the following materials in animals, indicate the nature of the material used and include the necessary authorization documents.

**At the start of each experiment involving the use of potentially hazardous material in BRC, the PI and his /her staff must label the cages appropriately and inform the room technician and** **BRC safety office****.**

**24A. Genetically Modified Organisms (GMOs)**

|  |  |  |
| --- | --- | --- |
| 1. Recombinant DNA/ transgenic animal used?
 | [ ]  Yes | [ ]  No  |
| *If yes, please support with Genetic Modification Advisory Committee (GMAC) document inclusive of exemption approval, if applicable.* |
| 1. Proposed category of GMAC work:
 | [ ]  Cat. A  | [ ]  Cat. B | [ ]  Cat. C |
| *Please refer to* [*The Singapore Biosafety Guidelines for Research on Genetically Modified Organisms (GMOs)*](https://www.gmac.sg/pdf/Research/Singapore%20Biosafety%20Guidelines%20for%20GMO%20Research_Jan%202013.pdf)*For queries concerning GMOs, please contact the* *GMAC Secretariat* |

**24B. Radioactive Substances**

|  |  |  |
| --- | --- | --- |
| 1. Radioactive substances used?
 | [ ]  Yes | [ ]  No |
| *If yes, please ensure the risk that may arise is assessed in the risk assessment (RA) and provide Safety Data Sheet (SDS) and copy of applicable Licence.****If any radioactive substance is to be used in BRC, please contact*** ***BRC Safety office******.***  |

Please provide information on radioisotopes used in this project in the table below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Isotope** | **Half-life** | **Maximum dose/ volume** | **Carcass waste generation (kg/ month)** |
|  |  |  |  |
|  |  |  |  |

**24C. Chemical/ Pharmaceutical Substances**

*Note: Please exclude drugs that are listed in Paragraph 12E Surgical Procedures.*

|  |  |  |
| --- | --- | --- |
| 1. Chemical/ Pharmaceutical substance(s) used?
 | [ ]  Yes | [ ]  No |
| *If yes, please ensure the risk that may arise is assessed in the risk assessment (RA) and provide Safety Data Sheet (SDS).**A copy of BRC’s Guidelines for Cytotoxic and ABSL2 Waste Handling (Appendix VI) is available on* [*IACUC website*](https://www.a-star.edu.sg/brc/A-STAR-IACUC/Forms-Guidance-Guidelines) *for this project’s waste management consideration.* ***Note: ONLY WORKING VOLUME MAY BE BROUGHT INTO BRC. NO LONG TERM STORAGE OF CHEMICAL IS PERMITTED****.* |

Please provide information on chemical substance used in this project in the table below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Chemical/ Drug Name** | **CAS Number** | **GHS Classification3** | **Is Pharmaceutical grade available?**  | **Are you using Pharmaceutical grade4?** |
|  |  |  | [ ]  Yes [ ]  No | [ ]  Yes [ ]  No |
|  |  |  | [ ]  Yes [ ]  No | [ ]  Yes [ ]  No |

3Classification

*(e.g.: carcinogen/ teratogen/ mutagen/ oxidant/ toxic/ flammables/ reproductive hazard/ explosives etc)*

***4*If “NO” is checked while the pharmaceutical grade is available, please provide justification for not using pharmaceutical grade drugs and complete Appendix V Record Sheet:**

|  |
| --- |
| e.g. inappropriate formula (oral vs injection), however, price/cost cannot be justified as valid reasons. |

**24D. Novel Compounds**

|  |  |  |
| --- | --- | --- |
| 1. Novel substance(s) used?
 | [ ]  Yes | [ ]  No |
| *If yes, please ensure the risk that may arise is assessed in the risk assessment (RA) and provide Safety Data Sheet (SDS) - if available.**A copy of BRC’s Guidelines for Cytotoxic and ABSL2 Waste Handling (Appendix VI) is available on* [*IACUC website*](https://www.a-star.edu.sg/brc/A-STAR-IACUC/Forms-Guidance-Guidelines) *for this project’s waste management consideration.* ***Note: ONLY WORKING VOLUME MAY BE BROUGHT INTO BRC. NO LONG TERM STORAGE OF CHEMICAL IS PERMITTED*** |

Please provide information on the substance used in this project in the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Compound Name/ ID** | **Maximum dose/ volume**  | **Hazard Classification***(e.g.: cytotoxic, teratogen, mutagen, reproductive hazard)* | **Has toxicity test (MTD) been done?** | **In vitro cell culture tested?** |
|  |  |  | [ ]  Yes[ ]  No | [ ]  Yes [ ]  No |
|  |  |  | [ ]  Yes[ ]  No | [ ]  Yes[ ]  No |

If new chemical entities are to be tested, describe preliminary steps/ tests undertaken to ensure that pain and distress are minimised during the proposed study:

|  |
| --- |
|  |

* **For New Chemical Entities (NCEs), please complete Appendix V Record Sheet.**
* Please be informed to submit amendment request to IACUC should additional NCE is added after initial IACUC approval.
* Please provide to the IACUC office a copy of the Appendix V **before new drug** is used for testing.

**24E. Human Derived Materials**

|  |  |  |
| --- | --- | --- |
| 1. Human Derived Material(s) used?
 | [ ]  Yes | [ ]  No |
| *If yes, please ensure the risk that may arise is assessed in the Risk Assessment (RA) and provide the IRB approval/exemption letter.**A copy of IACUC Guideline for Cytotoxic and ABSL2 Waste Handling (Appendix VI) is available on* [*IACUC website*](https://www.a-star.edu.sg/brc/A-STAR-IACUC/Forms-Guidance-Guidelines) *for this project’s waste management consideration.* *The Human Biomedical Research Act (HBRA) has been in force on 1st November 2017. For research using human tissues requiring IRB approval, please refer to* [*A\*STAR HBR office website*](https://connect.a-star.edu.sg/groups/tWUYAKm5G8yPohRXha4jcK/overview_page/jRnorchHqi9pR6acqeVxdU) *for IRB Application process or contact the HBR Control Officer in your respective Institutes for enquiry. Please provide a copy of the IRB approval/exemption letter.*Please note that MOH approval is required for work that falls under the Fourth Schedule of the Human Biomedical Research Act 2015.***Note: Mycoplasma test is required for use of human cells/tissues at BRC facilities.***  |

**ii) Human Cell lines**

(e.g. commercially-available cell lines with de-identified donor information)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Source of Supply***(e.g. name of commercial company)* | **IRB Approved?** | **Mycoplasma tested?** | **Supplied Sterile?** |
|  |  | [ ]  Yes[ ]  No | [ ]  Yes[ ]  No | [ ]  Yes[ ]  No |
|  |  | [ ]  Yes[ ]  No | [ ]  Yes[ ]  No | [ ]  Yes[ ]  No |

**iii) Human Stem cells**

(e.g. embryonic stem cell, induced pluripotent stem cell, hematopoietic stem cells etc.)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Source of Supply***(e.g. name of commercial company, laboratory isolate, etc.)* | **IRB Appoved?** | **Mycoplasma tested?** | **Supplied Sterile?** |
|  |  | [ ]  Yes[ ]  No | [ ]  Yes[ ]  No | [ ]  Yes[ ]  No |
|  |  | [ ]  Yes[ ]  No | [ ]  Yes[ ]  No | [ ]  Yes[ ]  No |

**iv) Human Tissues**

(e.g. Human tissues directly obtained from patients or health subjects with or without laboratory processing or culture)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Source of Supply***(e.g. name of commercial company, laboratory isolate, etc.)* | **IRB Approved?** | **Mycoplasma tested5?** | **Supplied Sterile?** |
|  |  | [ ]  Yes[ ]  No | [ ]  Yes[ ]  No | [ ]  Yes[ ]  No |
|  |  | [ ]  Yes[ ]  No | [ ]  Yes[ ]  No | [ ]  Yes[ ]  No |

5For fresh human samples that need to be implanted immediately to the animals after taken from patients, such as the PDX samples, please submit the mycoplasma results within 4 weeks of implantation.

**24F. Other Biological Derived Materials (NON-HUMAN) *(e.g. murine cell lines)***

|  |  |  |
| --- | --- | --- |
| 1. Other Biological Derived Materials(s) used?
 | [ ]  Yes | [ ]  No |
| *If yes, please ensure the risk that may arise is assessed in the Risk Assessment (RA).**A copy of BRC’s Guidelines for Cytotoxic and ABSL2 Waste Handling (Appendix VI) is available on* [*IACUC website*](https://www.a-star.edu.sg/brc/A-STAR-IACUC/Forms-Guidance-Guidelines) *for this project’s waste management consideration.* **MAP/RAP/HAP Tests are required for use of mouse, rat and hamster cells/tissues at BRC facilities.** These are tests for microbial pathogen antibodies produced by inoculating test material into mice, rats or hamsters respectively. Direct PCR tests for the same pathogens are also acceptable. MAP/RAP/HAP tests are currently conducted by vendors such as Charles River Labs, Harlan and IDEXX. IMPACT tests are conducted by RADIL. You may contact the BRC vets for assistance. |

Please provide information on other biological derived materials (NON-HUMAN)

*(e.g.: murine cell lines)* used in this project in the table below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Species** | **Source of Supply***(e.g.: name of commercial company, laboratory isolate, etc)* | **Pathogen test done?** | **Supplied Sterile?** |
|  |  |  | [ ]  Yes[ ]  No | [ ]  Yes[ ]  No |
|  |  |  | [ ]  Yes[ ]  No | [ ]  Yes[ ]  No |

**24G. Biological Agent(s)**

(e.g. viruses/viral vector, bacteria, fungi, parasites, toxins etc.)

|  |  |  |
| --- | --- | --- |
| 1. Biological agent(s) or toxin(s) used?
 | [ ]  Yes | [ ]  No |
| 1. Is the agent included in one of the 5 schedules [in Biological Agents and Toxins Act (BATA)](https://sso.agc.gov.sg/Act/BATA2005)?
 | [ ]  Yes | [ ]  No |
| ***\* Biological agents and toxins under first and fifth schedules require ABSL3 containment.******\*\* Biological agents under second schedule requires ABSL4 containment.*** ***Biological agents listed in first and second schedule are prohibited in A\*STAR. Please contact*** ***BRC’s Safety Office*** ***for advice, shall you intend to conduct research involving biological agents that falls under first, second and fifth schedules.*** |

Please provide information on biological agent(s) or toxin(s) used in this project in the table below:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Strain / LD50** (applicable for toxin) | **Source of Supply** | [**BATA Schedule**](https://www.moh.gov.sg/biosafety/newsupdate/newsdetail/Index/Updated%20Biological%20Agents%20and%20Toxins%20List)(if applicable) | **Is it** [**Vet Biologics**](https://www.nparks.gov.sg/-/media/avs/migrated-content/animals-and-pets/bringing-animals-into-singapore-and-exporting/veterinary-biologics/select-list.pdf?la=en&hash=B644346BC96F0A6663D60F4FB48F89784AA6DED3)**?** | **Animal Biosafety Level (ABSL)** | **Supplied Attenuated?** |
|  |  |  | Choose an item. | [ ]  Yes[ ]  No | Choose an item. | [ ]  Yes[ ]  No |
|  |  |  | Choose an item. | [ ]  Yes[ ]  No | Choose an item. | [ ]  Yes[ ]  No |

**24H. Other Materials Used**

*(e.g.: microchip, osmotic minipump etc.)*

|  |  |  |
| --- | --- | --- |
| 1. Other Materials Used?
 | [ ]  Yes | [ ]  No |
| *If yes, please ensure the risk that may arise is assessed in the Risk Assessment (RA) including the toxic waste management (if any).* |

Please provide information on other materials used in this project in the table below:

|  |  |  |
| --- | --- | --- |
| **Name** | **Toxicity Information** | **Source of Supply***(e.g.: name of commercial company, laboratory isolate, etc)* |
|  |  |  |
|  |  |  |

**25. Staff Health**

It is the responsibility of the Principal Investigator (PI) to inform BRC staff of any risks to staff health.

Will the procedure result in the release of infectious or non-infectious organisms?

|  |  |
| --- | --- |
| [ ]  **YES**  | [ ]  **NO**  |

If “**YES”**, provide information how you intend to handle spills and unused stocks:

|  |
| --- |
|  |

**26. Assurance and Declaration**

PIs – Please read the following and inform all staff involved in this application.

1. **It is the PI’s responsibility to make the approved application available and understood by all the staff listed in this application. PI to ensure that the staffs only perform approved animal experimental procedures in this application. Any misconduct will be considered as Non-Compliance which may result in suspension of the application.**
2. PIs are to note that authorisation for entry into BRC is only for the personnel listed in this IACUC application. Each individual listed in this application must fill out the Access Requisition Form obtainable from BRC Dept. administrative office. It is also the responsibility of the PI to inform IACUC Secretariat of any new staff you wish to add to the list in Paragraph 6 AND when listed staff cease to work on this project. An IACUC Amendment form will be provided for this purpose.
3. Any personnel whose name is not on this application will NOT be permitted to enter the BRC for any reason whatsoever, UNLESS approval from the Director of BRC is obtained prior to entry. Anyone caught within the premises of the BRC either alone or accompanying authorized staff without prior approval shall explain their actions to the Director of BRC.
4. Access card is only for the granted personnel to enter the BRC. Anyone who has been granted access is found passing their access card to any other person, the person will be suspended from entering / using the BRC.
5. PI to certify that the MAP / RAP / HAP/ MYCOPLASMA (PATHOGEN)-tested materials to be used have not been passed through rodent species outside of the Biological Resource Centre and / or the material is derived from the original tested sample. To the best of PI’s knowledge, the material remains uncontaminated with rodent pathogens.
6. PIs must provide the IACUC with an annual update report at the end of the year, tabulating the number of animals used under each Pain or Distress classification for the full year. PIs should also apply for a renewal of the project three months before the project’s end date.
7. For this proposed project, I have provided, as accurately as possible, the description of the animal care and use that will be followed. I have also briefed all the staff involved in this project of the contents of the protocol and safety measures to be followed while working on this project. I will update the Biological Resource Centre and IACUC of any changes to personnel or termination of the project.
8. I will obtain IACUC approval prior to making any changes in the approved protocol.

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Signature of the Principal Investigator Date**

|  |
| --- |
| *You have reached the end of this form. Please ensure that you have responded to every question on this application, even if your response is “N/A”.*  |