DREXEL UNIVERSITY'S INSTITUTIONAL BIOSAFETY COMMITTEE

BIOSAFETY PROTOCOL APPLICATION

Recombinant DNA Registration Addendum (Form B)

Instructions

- *All funded and non-funded research involving recombinant DNA (rDNA) must be **registered** with the Drexel University's Institutional Biosafety Committee (IBC) using this form, which must also be accompanied by the **General Biohazard Form (Form A)**.*
- *This registration process applies to work that may include or involve:*
  - *Plasmid or viral vectors.*
  - *Any synthetic DNA, RNA, or synthetic nucleic acid molecules that have been chemically or otherwise modified but can base pair with naturally occurring nucleic acids.*
  - *Any RNA produced from rDNA, including messenger RNA (mRNA), small interfering RNA (siRNA), or micro RNA (miRNA).*
  - *Genetically modified organisms (e.g., animals, plants, bacteria, viruses, or fungi). This includes creation, cross-breeding, or manipulation of transgenic animals and plants.*
  - *Any such material obtained for research from another researcher or source.*
- *All persons involved in this work must complete rDNA Training (in addition to general laboratory safety training). Training dates should be recorded on the **General Biohazard Form (Form A)**.*
  - *Your investigations involving rDNA may be **exempt** from the NIH guidelines and registration with the IBC. Criteria for exempt rDNA experiments are specified in the current NIH guidelines (https://osp.od.nih.gov/wp-content/uploads/NIH_Guidelines.html#_Toc446948398) and can also be found at the end of this form. If your experiments involve rDNA molecules that meet these criteria, you are not required to submit an rDNA form.*
  - *More information about the NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules can be found at https://osp.od.nih.gov/biotechnology/nih-guidelines/.*
- *Changes to an approved biosafety protocol must be made by filing a **Protocol Amendment Form (Form E)** for Institutional Biosafety Committee review.*
- *If you have questions about rDNA registration or this form, please contact us by phone (215-762-7147) or e-mail (biosafety@drexel.edu).*

1. PROJECT AND INVESTIGATOR INFORMATION
Project Title (Must exactly match the grant title if externally funded)
Principal Investigator's Name

2. RESEARCH DESCRIPTION
Provide a brief description of the proposed research in the field below. If this is an externally funded project, please attach an abstract or Specific Aims page from your grant application or proposal.

3. TRAINING

a. Have you read the most recent NIH guidelines on research involving rDNA? https://osp.od.nih.gov/biotechnology/nih-guidelines/	☐ Yes ☐ No
b. Are you knowledgeable about Biosafety Levels? (http://www.cdc.gov/biosafety/publications/bmbl5/BMBL5_sect_IV.pdf)	☐ Yes ☐ No

4. rDNA REGISTRATION CATEGORIES

Check the registration categories that best describe your experiments involving rDNA. You may need to check more than one category. For more detailed information about the types of rDNA experiments covered under the Office of Biotechnology Activities NIH Guidelines, refer to Section III of the Guidelines at https://osp.od.nih.gov/wp-content/uploads/NIH_Guidelines.html#_Toc446948316

Section III-A	**Experiments that Require IBC approval, RAC (Recombinant DNA Advisory Committee) Review, and NIH Director Approval Before Initiation**	
-1.	Major Actions under the NIH Guidelines.	☐
-1-a.	The deliberate transfer of a drug resistance trait to microorganisms that are not known to acquire the trait naturally, if such acquisition could compromise the use of the drug to control disease agents in humans, veterinary medicine, or agriculture. **Note**: Consideration should be given as to whether the drug resistance trait to be used in the experiment would render that microorganism resistant to the primary drug available to and/or indicated for certain populations (e.g., children or pregnant women). If you have reason to believe that your rDNA experiments fall under one of the above categories, contact the Office of Research Compliance for additional guidance and instructions.	☐
Section III-B	**Experiments That Require NIH/OBA and IBC Approval Before Initiation**	
-1.	Deliberate formation of recombinant DNA containing genes for the biosynthesis of toxin molecules lethal for vertebrates at an LD_{50} of less than 100 nanograms per kilogram body weight (e.g., microbial toxins such as the botulinum toxins, tetanus toxin, diphtheria toxin, and Shigella dysenteriae neurotoxin).	☐
-2.	Experiments that have been approved (under Section III-A-1-a and Appendix D) as Major Actions under the NIH Guidelines.	☐
Section III-C	**Experiments that Require IBC Approval, IRB Approval, and RAC Review Before Research Participant Enrollment**	
-1.	Experiments involving the deliberate transfer of recombinant nucleic acid molecules, or DNA or RNA derived from recombinant nucleic acid molecules, into human research participants (human gene transfer). **Note**: Research protocols that fall under this category are sent to WIRB IBC for review.	☐
-2.	Experiments involving the deliberate transfer into human research participants synthetic nucleic acid molecules, or DNA or RNA derived from synthetic nucleic acid molecules that meet any one of the following criteria: • Contain more than 100 nucleotides; or • Possess biological properties that enable integration into the genome (e.g., *cis* elements involved in integration); or • Have the potential to replicate in a cell; or • Can be translated or transcribed. **Note**: Research protocols that fall under this category are sent to WIRB IBC for review.	☐

Section III-D	Experiments that Require IBC Approval Before Initiation	
-1.	Experiments using Risk Group 2, Risk Group 3, Risk Group 4, or restricted agents as host-vector systems.	☐
-2.	Experiments in which DNA from Risk Group 2, Risk Group 3, Risk Group 4, or restricted agents is cloned into non-pathogenic prokaryotic or lower eukaryotic host-vector systems.	☐
-3.	Experiments involving the use of infectious DNA or RNA viruses or defective DNA or RNA viruses in the presence of helper virus in tissue culture systems.	☐
-4.	Experiments involving whole animals in which the animal's genome has been altered by stable introduction of recombinant DNA, or DNA derived therefrom, into the germ-line (transgenic animals), and experiments involving viable recombinant DNA-modified microorganisms tested on whole animals. **Note**: Experiments with whole animals that require Biosafety Level 2 (BSL-2), BSL-3, or BSL-4 containment are covered under this section. Experiments that only require BSL-1 containment for the generation of transgenic rodents are covered under Section III-E-3 below.	☐
-5.	Experiments to genetically engineer plants by recombinant DNA methods, to use such plants for other experimental purposes (e.g., response to stress), to propagate such plants, or to use plants together with microorganisms or insects containing recombinant DNA. **Note**: The IBC does not currently have membership with expertise in plant-based rDNA experiments. If your experiments fall into this category, contact the Office of Research Compliance for guidance and instructions.	☐
-6.	Experiments involving more than 10 liters of culture.	☐
-7.	Experiments with influenza viruses generated by recombinant methods (e.g., generation by reverse genetics of chimeric viruses with reassorted segments, introduction of specific mutations). **Note**: Because this work may require BSL-3 containment, contact the Department of Environmental Health and Safety (EHS) at 215-895-5919 for more guidance and instructions.	☐
Section III-E	**Experiments that Require IBC Notice Simultaneous with Initiation**	
-1.	Experiments involving the formation of recombinant DNA molecules containing no more than two-thirds of the genome of any eukaryotic virus (propagated and maintained in cells in tissue culture using BSL-1 containment).	☐
-2.	Experiments involving recombinant DNA-modified whole plants, and/or experiments involving recombinant DNA-modified organisms associated with whole plants (except those that fall under Section III-A, III-B, III-D, or III-F).	☐
-3.	Experiments involving the generation of rodents in which the animal's genome has been altered by stable introduction of recombinant DNA, or DNA derived therefrom, into the germ-line (transgenic rodents). Experiments involving whole animals that require BSL-2, BSL-3, or BSL-4 containment are covered under Section III-D-4 above.	☐

5. USE OF rDNA IN YOUR EXPERIMENTS	
a. Does your project involve the use of rDNA from an outside source? If your answer is **Yes**, specify the source (e.g., a commercial source or collaborator).	☐ Yes ☐ No

b. Does your project involve the *de novo* generation and use of rDNA constructs?	☐ Yes ☐ No
c. Will animals serve as recipients of rDNA? If your answer is **Yes**, indicate the species below (include the strain for mice). **Note**: You must also submit an **Animal Use Addendum (Form D)**.	☐ Yes ☐ No
d. Will rDNA be used in tissue culture? If your answer is **Yes**, specify the cell line and its source.	☐ Yes ☐ No
e. Will cell lines modified with rDNA be used in animals? If your answer is **Yes**, specify the cell line name, its source, and the target animal species (include the strain for mice).	☐ Yes ☐ No
f. Does your project involve the use of one or more recombinant vectors? If your answer is **Yes**, list the name (e.g., pGL4) and indicate the nature (check all that apply) of each vector. **Note**: Please attach a map for each vector.	☐ Yes ☐ No

☐ Naked DNA/RNA	☐ Adeno-Associated Virus
☐ Bacterial plasmid	☐ Adenovirus
☐ Viral vector	☐ Retrovirus

g. Are you using a lentivirus vector? If your answer is **Yes**, describe the generation and use of the vector system.	☐ Yes ☐ No
h. Does your work require the use of a host cell line or packaging cells for recombinant vector propagation? If your answer is **Yes**, provide a brief description of the required cells.	☐ Yes ☐ No
i. Is this a virus-based vector? If your answer is **Yes**, indicate the amount (%) of the viral genome remaining in the vector.	☐ Yes ☐ No
j. Is the vector replication competent?	☐ Yes ☐ No
k. Is a helper virus required? If your answer is **Yes**, describe the helper virus.	☐ Yes ☐ No
l. Are you using a transgene? If your answer is **Yes**, provide the information requested below. **Note**: A transgene is a gene or genetic material that will be transferred from one organism to another.	☐ Yes ☐ No

Promoter and gene name	*Source of gene*	*Biological activity of sequence*

If any of the above genes are viral and comprise, in total, more than 2/3 of the original viral genome, provide more information about the virus and genes used.

m. Will a deliberate transfer attempt be made to obtain expression of the foreign gene encoded in the recombinant DNA or RNA?	☐ Yes ☐ No

n. Indicate the biosafety level required for this work.

Laboratory Biosafety Level (check one)	1 ☐ 2 ☐ 3 ☐
Animal Biosafety Level (check one)	1 ☐ 2 ☐ 3 ☐

6. CREATION OF TRANSGENIC RODENTS

Will your research involve the creation of transgenic rodents? If your answer is **Yes**, complete this section.	☐ Yes ☐ No

a. Provide the genus, species, and strain of the parent animal.

b. Provide the transgenic strain identification.

c. Provide information about the transgene(s) to be used in the creation of transgenic rodents.

Promoter and gene name	*Source of gene*	*Biological activity of sequence*

d. If any of the above genes are viral, do they comprise more than 2/3 of the original viral genome? If your answer is **Yes**, provide additional information about the virus and genes used.	☐ Yes ☐ No

e. Will a deliberate transfer attempt be made to obtain expression of the foreign gene encoded in the recombinant DNA or RNA?	☐ Yes ☐ No

f. Describe the method of gene transfer.

g. Indicate the biosafety level required for this work.

Laboratory Biosafety Level (check one)	1 ☐ 2 ☐ 3 ☐
Animal Biosafety Level (check one)	1 ☐ 2 ☐ 3 ☐

7. CROSSING TRANSGENIC RODENTS

Will your research involve the crossing of transgenic rodents? If your answer is **Yes**, complete this section.	☐ Yes ☐ No

a. Provide the genus, species, and strain of the parent animal(s).		
b. Provide information about the transgenic rodents to be crossed.		
Designation of transgenic line "A"	*Designation of transgenic line "B"*	*Designation and genotype of resulting cross-bred line "C"*

c. If any of the above genes are viral, do they comprise more than 2/3 of the original viral genome? If your answer is **Yes**, provide additional information about the virus and genes used.	☐ Yes ☐ No

d. Indicate the biosafety level required for this work.	
Laboratory Biosafety Level (check one)	1 ☐ 2 ☐ 3 ☐
Animal Biosafety Level (check one)	1 ☐ 2 ☐ 3 ☐

8. ADDITIONAL INFORMATION

Use this text field to provide any additional information pertinent to your work and this biosafety protocol form.

CERTIFICATION BY THE PRINCIPAL INVESTIGATOR

I affirm that, to the best of my knowledge, the information I have provided is complete and accurate. I understand my responsibilities as noted in this form. No changes will be made without prior approval of the Institutional Biosafety Committee.

Signature of Principal Investigator	Date
Signature of Co-Principal Investigator (if applicable)	Date
Name of preparer (if prepared by someone other than the PI)	Position

Once you have completed, printed, and signed this form, scan it and create an Adobe PDF file. Alternatively, convert the completed form directly to an Adobe PDF file and electronically sign the form using the E-signature feature of Adobe Acrobat. Send the completed form by e-mail as an attachment to biosafety@drexel.edu.

Criteria for Exempt rDNA Experiments

*Some investigations involving rDNA may be **exempt**. The following eight categories of recombinant or synthetic molecules are exempt from the NIH Guidelines and registration with the IBC. **Note**: Other federal and state standards of biosafety may still apply to such research (e.g., standards outlined in the CDC/NIH publication Biosafety in Microbiological and Biomedical Laboratories).*

- *Those synthetic nucleic acids that (1) can neither replicate nor generate nucleic acids that can replicate in any living cell (e.g., oligonucleotides or other synthetic nucleic acids that do not contain an origin of replication or contain elements known to interact with either DNA or RNA polymerase), and (2) are not designed to integrate into DNA, and (3) do not produce a toxin that is lethal for vertebrates at an LD_{50} of less than 100 nanograms per kilogram body weight. If a synthetic nucleic acid is deliberately transferred into one or more human research participants and meets the criteria of Section III-C-1, it is not exempt under this Section.*
- *Those that are not in organisms in cells or viruses that have not been modified or manipulated (e.g., encapsulated into synthetic or natural vehicles) to render them capable of penetrating cellular membranes.*
- *Those that consist solely of the exact recombinant or synthetic nucleic acid sequence from a single source that exists contemporaneously in nature.*
- *Those that consist entirely of nucleic acids from a prokaryotic host including its indigenous plasmids or viruses when propagated only in that host (or a closely related strain of the same species), or when transferred to another host by well-established physiological means.*
- *Those that consist entirely of nucleic acids from a eukaryotic host, including its chloroplasts, mitochondria, or plasmids (but excluding viruses), when propagated only in that host (or a closely related strain of the same species).*
- *Those that consist entirely of DNA segments from different species that exchange DNA by known physiological processes, though one or more of the segments may be a synthetic equivalent. A list of such exchangers will be prepared and periodically revised (NIH Guidelines at https://osp.od.nih.gov/wp-content/uploads/NIH_Guidelines.html#_Toc446948372).*
- *Those genomic DNA molecules that have acquired a transposable element, provided the transposable element does not contain any recombinant and/or synthetic DNA.*
- *Those that do not present a significant risk to health or the environment (see Section IV-C-1-b-(1)-(c) and Appendix C of the NIH Guidelines.*