

SAM HOUSTON STATE UNIVERSITY

Notification of Use (NOU)

Biological Agents, Recombinant Materials, CDC and USDA Regulated Agents

The purpose of this document is to ensure adequate review of occupational health and safety precautions and the procedures for use, handling, storage and disposal of biohazardous agents. The Principal Investigator (P.I.) or Supervisor must be fully aware of the potential hazards associated with the agent(s) used in the work area.

NOU(s) expire after 5 years. Continuing reviews must be submitted annually [form sent by Environmental Health and Safety (EHS)]. Amendments to the NOU do not change the renewal date, the original approval dates apply. No human or animal pathogen can be studied without prior written approval of the Institutional Biosafety Committee.

THIS MAY BECOME A PUBLIC DOCUMENT: DO NOT INSERT PROPRIETARY OR SECURITY SENSITIVE INFORMATION.

Type of Submission: New Renewal Amendment (NOU #: _____)

Type of Agent: Biological agent, list agent(s):
 Recombinant material

Animals: Yes No Creation of transgenic animals

Arthropods: Yes No Creation of transgenic arthropods

Biosafety Level at which this agent will be used: BSL1 BSL2
(One biosafety level per NOU.)

Select the Risk Group (RG) for this agent: RG1 RG2
(RG definitions: <https://osp.od.nih.gov/biotechnology/nih-guidelines/>)

I am familiar with and agree to comply with the SHSU Safety Manual, the SHSU Risk Management, the CDC/NIH *Biosafety in Microbiological and Biomedical Laboratories* (current edition) and the NIH *Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules*.

The information provided in this document is accurate to the best of my knowledge. I agree to abide by the provisions set forth in this plan as approved by the Sam Houston State University Institutional Biosafety Committee.

I acknowledge if an unexpected increase in virulence is observed, I will notify EHS immediately. I accept responsibility for providing all lab personnel with a copy of this NOU, and providing training for all lab personnel involved in the research project described in this NOU before commencement of work.

P.I. (Signature) Title Extension Date Submitted

P.I. (Printed Name, Credentials) SHSU ID# Department Route

Institutional Biosafety Committee Use Only

Date Approved				Date for Resubmission				NOU Number			
				DURC	Yes	No					
A	B	C	D1	D2	D3	D4	D5	D6	D7	E	F
				NIH categories							
IBC Chairman Signature								Print Name			

SECTION I: General information

1. List agent(s) (include strains or generation; no abbreviations):

Attach a copy of the pathogen safety data sheet if available, or supporting safety information (eg, manufacturer safety, data or fact sheet).

(eg, <http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/index-eng.php>,
<https://www.cdc.gov/az/a.html>)

2. Goal of the project (1-2 sentences):
3. Description of use (include techniques used for in-vitro, in-vivo and vector work. Do not copy detailed protocols or grant information; this section should be ¼ to ½ page long):

4. Location:

Building(s)/Room Number(s):

5. Occupational Health

a. Are all personnel enrolled in the Employee Occupational Health Program?

No Yes

b. Can this agent infect humans?

No (proceed to question 6)

Yes

Unknown

c. Is the infection associated with replication in humans or is it abortive (no infectious progeny, for example viral replicons or defective adenoviral vectors)?

Abortive (proceed to question 6)

Unknown

Replicative

i. Can the agent cause disease in healthy humans? No Yes Unknown

- If yes and no are both checked (e.g., multiple agents are listed in #1), provide an explanation:

ii. Can the agent cause disease in immunocompromised humans? No Yes Unknown

- If yes and no are both checked (e.g., multiple agents are listed in #1), provide an explanation:

d. Is medical surveillance recommended for the agent(s) prior to commencement of work, and/or ongoing during project?

No Yes

e. If yes, what type of surveillance is recommended?

Initial Ongoing

Please explain:

f. Is a vaccine available for the agent?

No (proceed to question 6)

Yes

FDA approved

Internationally available

Experimental (IND)

List vaccine:

g. Is immunization recommended by the ACIP at the listed biosafety level?(Advisory Committee on Immunization Practices (ACIP) at www.cdc.gov)

No Yes

6. Agent Assessment (Answers are to be based on this scope of work *in-vitro*)

a. Provide the following:

- i. Maximum volume to be cultured/handled at one time per container (e.g. flask, tubes, roller bottles):
- ii. Maximum number of containers cultured/handled at one time:

If agent is abortive, skip to b.

iii. Maximum concentration to be cultured/handled at one time (units eg, pfu/mL):

iv. Will the agent be concentrated prior to experimental use? No Yes:

- Final total volume:
- Final concentration:
- Describe use of the concentrated material:

b. Will infectious material be manipulated outside of primary containment (eg., BSC)?

No

Yes, provide scientific justification:

c. Describe agent stability in the environment

- i. Agent stability in regards to spill, fomites, survival outside of host:
- ii. Susceptibility to decontamination as it pertains to the lab (heat, chemical inactivation):

d. Describe potential routes of lab transmission (including recombinant material).

Inhalation

Mucous membrane

Ingestion

Sharps (including needle sticks)

Other:

e. What is the origin of the infectious material and from where will you specifically receive the agent?

Existing stock

Clinical isolate location:

Field sample location:

Commercially purchased

Collaborator

Other:

f. In the box below, describe pathogenicity for each agent, including disease incidence and severity in humans.

Not infectious (proceed to question 7)

- g. What is the infectious dose for each agent in humans? Provide reference. (If unknown, state whether or not the dose being used can be expected to cause infection and an explanation.)
- h. If human data is not available, summarize from the most appropriate animal model studies (pathogenicity, infectivity and route of shedding from animals)?

7. Agent Inactivation

a. Will the project involve inactivating agent or samples?

No (proceed to question 8)
Yes

b. Reason for agent/sample inactivation

To work at the same biosafety level
To work at a lower biosafety level or on bench-top
For shipment
Other: Please describe below.

c. Inactivation and Verification Procedure(s)

No samples will be brought to a lower biosafety level prior to inactivation validation.

Please provide a detailed SOP* of the inactivation procedure(s) and validation procedure(s) for complete inactivation. This should also include the frequency of validation testing.

***Note: this must be attached to your IBC protocol documentation or available during inspection.**

9. Evaluation of Dual Use potential experiments of concern (US Government Policy for Institutional Oversight of Life Sciences Dual Use Research of Concern). If answer is “yes”, please explain in detail.

- a.** Is it likely that the harmful consequences of the agent will be enhanced?

No

Yes, explain in detail:

- b.** Is it likely that the immunity or effectiveness of an immunization against the agent without clinical and/or agricultural justification will be disrupted?

No

Yes, explain in detail:

- c.** Is it likely that:

- i.** resistance to clinically and/or agriculturally useful prophylactic or therapeutic interventions will be conferred to the agent?

No

Yes, explain in detail:

- ii.** the agent’s ability to evade detection methodologies will be facilitated?

No

Yes, explain in detail:

- d. Is it likely that the stability, transmissibility, or the ability to disseminate the agent will be increased?
No Yes, explain in detail:
- e. Is it likely that the host range or tropism of the agent will be altered?
No Yes, explain in detail:
- f. Is it likely that the susceptibility of a host population to the agent will be enhanced?
No Yes, explain in detail:
- g. Is it likely that an eradicated or extinct agent will be generated or reconstituted?
No Yes, explain in detail:

10. Agent Propagation

- a. **Will agent(s) be propagated on this study?**
No
Yes
- b. **What systems (cells and bacteria) will be used with the agent(s) listed (e.g. propagation, transduction, etc.)?**
N/A (e.g. broth or agar)
i. Cells of arthropod or animal origin:
ii. Cells of human or nonhuman primate origin:
Human or nonhuman primate product NOU approval number(s):
iii. Bacteria:

11. Check the personal protective equipment (PPE) worn when handling agent(s) in-vitro:

Lab coat or gown/gloves/eye & face protection as needed (BSL1)

Lab coat/gloves/eye & face protection as needed (BSL2)

12. Respiratory Protection

N95 respirator explain when and why this is worn:

13. Additional PPE

Face Shield, explain when and why this is worn:

Surgical mask, explain when and why this is worn:

14. Check lab equipment used when handling agent(s) in-vitro:

Centrifuge (Sealed lid and cups/bucket) Building/Room:

Blender

Homogenizer, type:

Sonicator

Shaker

Building/Room:

Chemical Fume Hood:

Building/Room:

Biological Safety Cabinet (BSC):

Building/Room:

Other specify:

15. Method for disposal of biohazardous waste:

Placed in red bag for disposal.

Autoclaved, then placed in the biohazard trash.

Chemically disinfected, then placed in the biohazard trash.

Chemical disinfection or autoclave of bulk liquid, then disposed of based on MSDS

Autoclaved, then packaged for incineration. [for only ABSL-1/ABSL-2]

Other:

16. List disinfectant(s) used for surface decontamination and spills:

CaviCide

MicroChem

Bleach

Other

%

**17. If you are planning recombinant or synthetic nucleic acid molecules work,
please fill out Section II**

N/A

If you are planning any animal work, please fill out Section III

N/A

If you are planning any arthropod vector work, please fill out Section IV

N/A

SECTION II: Recombinant Material

<https://osp.od.nih.gov/biotechnology/nih-guidelines/>

Definition of recombinant and synthetic nucleic acid molecules per NIH-OBA guidelines

In the context of the NIH Guidelines, recombinant and synthetic nucleic acids are defined as: (i) molecules that are constructed by joining nucleic acid molecules that can replicate in a living cell, or (ii) nucleic acid molecules that are chemically or by other means synthesized or amplified, including those that are chemically or otherwise modified but can base pair with naturally occurring nucleic acid molecules, or (iii) molecules that result from the replication of those described in (i) or (ii) above.

1. Goal of the project involving recombinant work:

2. Description of recombinant work:

3. Location:

Building(s)/Room Number(s):

Revised 9/2020

4. Will synthetic DNA other than primers be used, or will material be sent to be synthesized?
No Yes, please explain:

5. Clone manipulation

- a. Will there be clone modification performed in your lab?

N/A, there will be no clone manipulation performed. Proceed to question 7.

Yes, please explain:

- b. At what biosafety level will you be conducting the cloning portion (not rescue) of your research:

BSL1

BSL2

- c. Will full-length clones be created?

No

Yes, please explain:

6. Gene editing

- a. Are you using gene editing, transcription, genome modification, or similar technology (CRISPR, TALENs, zinc fingers, etc.)?

No (proceed to question 7)

Yes, please explain

- b. Are guide RNA and Cas9 in the same construct?

Yes

No

N/A

- c. Will a germline be modified?

No, proceed to d.

Yes

- i. What organism(s) is being modified?

Human

Other, please specify:

- d. What organism(s)/cell type is being modified/silenced?**
- e. Delivery system:**
Expressed guide RNA Purified N/A
- f. Describe how the CRISPR will be dosed (viral vector, plasmid, liposome, etc.).**
- g. Describe the function of the gene(s) being modified/silenced:**
- h. Describe the expected function/loss-of-function of the gene(s) once modified/silenced:**
- i. CRISPR Information: Discuss the desired effect of gene editing on the animal or cell line.** An example of a source for understanding the transgene being silenced or over-expressed is GENE CARDS (<http://www.genecards.org/>).
- i. Is the guide RNA sequence specific to animals, arthropods, humans, or could it affect any combination thereof?
No Yes, describe any homology between human and animal guide sequences:
- ii. Describe what is known about off-target effects with the system you are using:

7. Answer the following questions.	
a. Does the inserted gene encode a known oncogene?	Yes No
b. Does the viral DNA integrate into the host genome?	Yes No
c. Does the inserted gene have the potential for altering the cell cycle?	Yes No
d. Is there a probability of generating replication-competent viruses?	Yes No
If yes to any of the above, please explain:	

8. Are you cloning risk group 2-4 nucleic material into a risk group 2-4 agent? (D1)

No

Yes, please provide the following information:

- a. List the agent used to provide the inserted nucleic material:
 - i. List the region of the insert:
- b. List the agent used as a backbone:
 - i. List the region of the insertion:

9. Are you creating point mutation in a risk group 2-4 agent? (D1)

No

Yes, please provide the following information:

- a. List the location of the point mutations:
- b. Indicate the expected outcome of the mutation(s):

10. Are you cloning risk group 2-4 nucleic material into nonpathogenic prokaryotic or lower eukaryotic host-vector systems? (eg., *E. coli*) (D2)

No

Yes, please provide the following information:

- a. List prokaryote/eukaryote strain used:
- b. List the vector(s) used:
- c. If the DNA is from a Risk Group 4 agent, does the recombinant material contain a totally and irreversibly defective fraction of the agent's genome?

No Yes N/A
- d. Are you only using *E. coli* to express a protein (end of recombinant work)

No Yes, list proteins expressed:

11. Are you propagating the recombinant virus in tissue culture? (D3)

No

Yes, please provide the following information:

a. Will a helper virus be used?

No

Yes, list proteins expressed:

b. Is there a probability of generating replication-competent viruses?

No

Yes

12. Are you going to inoculate animals and/or arthropods with the proposed recombinant material? (D4)

No

Yes

13. Are you going to creating transgenic animals by stable introduction of the proposed recombinant material to alter the animal's genome?

No

Yes, please provide the recommended biosafety level:

BSL2 (D4)

BSL1, used in rodents (E3)

BSL1, not used in rodents

14. Will this work involve the deliberate transfer of a drug resistance trait to microorganisms that are not known to acquire the trait naturally (other than <i>Escherichia coli</i> cloning selection)? Could this acquisition compromise the use of the drug to control disease agents in humans, veterinary medicine, or agriculture?	Yes No Yes No	A-1a
15. Will this experiment involve the cloning of toxin molecules with LD₅₀ of less than 100 nanograms per kilogram body weight (e.g., microbial toxins such as the botulinum toxins, tetanus toxin, diphtheria toxin, and <i>Shigella dysenteriae</i> neurotoxin)?	Yes No (proceed to C-1)	B-1
a. Provide LD₅₀ ng/kg of body weight:		
b. Is this molecule lethal to vertebrates at 100 ng to 100 mg per kg body weight?	Yes No	
c. Is the cloning done in <i>Escherichia coli</i> K-12?	Yes No	
16. Will this experiment involve the deliberate transfer of recombinant or synthetic nucleic acid molecules, or DNA/RNA derived from recombinant or synthetic nucleic acid molecules, into one or more human research participants.	Yes No	C-1
17. Will this experiment involve using Risk Group 2, Risk Group 3, Risk Group 4, or restricted agents as host-vector systems?	Yes No	D-1
If yes, please explain:		

18. Will this experiment involve the use of whole plants?	Yes No	D-5 / E-2
19. Will this experiment involve more than 10 liters of culture?	Yes No	D-6
20. Will this experiment involve work with influenza virus? Experiments with influenza viruses generated by recombinant or synthetic methods (e.g., generation by reverse genetics of chimeric viruses with re-assorted segments, introduction of specific mutations) shall be conducted at the biosafety level corresponding to the risk group of the virus that was the source of the majority of segments in the recombinant or synthetic virus.	Yes No (proceed to E-1)	D-7
21. Will experiments involve work with the following influenza viruses? a. Human H2N2 (1957-1968) -virus containing H2 hemagglutinin (HA) gene in cold-adapted, live attenuated vaccine strains (e.g., A/Ann Arbor/6/60 H2N2) in which the segments with mutations conferring temperature sensitivity and attenuation are not altered in the recombinant virus. b. Human H2N2 (1957-1968) -virus containing genes from human H2N2 other than the HA gene.	Yes No Yes No	D-7a
c. Highly Pathogenic Avian Influenza H5N1 strains (within the Goose/Guangdong/96-like H5 lineage (HPAI H5N1) containing a minority of genes and/or segments from a HPAI H5N1 influenza virus. d. Highly Pathogenic Avian Influenza H5N1 strains (within the Goose/Guangdong/96-like H5 lineage (HPAI H5N1) containing a majority of genes and/or segments from a HPAI H5N1 influenza virus.	Yes No Yes No	D-7b
e. Influenza viruses containing any gene or segment from 1918 H1N1.	Yes No	D-7c
f. Will the experiment involve work with an influenza virus containing genes from one of 1918 H1N1, HPAI H5N1, and human H2N2 (1957-1968) viruses that is resistant to both classes of current antiviral agents, adamantanes and neuraminidase inhibitors? If yes, contact EHS before submission	Yes No	D-7d (if yes, mark A-1 yes also)
22. Will this experiment involve the formation of recombinant or synthetic nucleic acid molecules containing more than two-thirds of the genome of any eukaryotic virus?	Yes No	E-1
23. Will this experiment involve the use of arthropods or small animals with recombinant or synthetic nucleic acid molecule-modified microorganisms?	Yes No	E-2-b-5
24. Will this experiment involve the use of recombinant DNA-modified arthropods or small animals associated with plants?	Yes No	

Exempt Experiments. The following recombinant or synthetic nucleic acid molecules are exempt from the NIH Guidelines. If the answer for questions 8-24 were No, then registration with the Institutional Biosafety Committee (IBC) is not required.

25. Will the experiment include synthetic nucleic acids that:		
a. Can either replicate or generate nucleic acids that can replicate in any living cell?	Yes No	F-1
b. Are designed to integrate into DNA?	Yes No	
c. Produce a toxin that is lethal for vertebrates at an LD ₅₀ of less than 100 nanograms per kilogram body weight?	Yes No	
26. Will the experiment include recombinant or synthetic nucleic acids that are not in organisms, cells or viruses and that have not been modified or manipulated (e.g., encapsulated into synthetic or natural vehicles) to render them capable of penetrating cellular membranes?	Yes No	F-2
27. Will the experiment include recombinant or synthetic nucleic acids that consist solely of the exact recombinant or synthetic nucleic acid sequences from a single source that exists contemporaneously in nature?	Yes No	F-3
28. Will the experiment include recombinant or synthetic nucleic acids 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?	Yes No	F-4
29. Will the experiment include recombinant or synthetic nucleic acids 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)?	Yes No	F-5
30. Will the experiment include recombinant or synthetic nucleic acids 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? See Section IV-C-1-b-(1)-(c), <i>Major Actions</i>), as determined by the NIH Director, with the advice of the RAC, and following appropriate notice and opportunity for public comment. See Appendices A-I through A-VI, <i>Exemptions under Section III-F-6</i> for a list of natural exchangers that are exempt from the <i>NIH Guidelines</i> .	Yes No	F-6
31. Will this experiment include genomic DNA molecules that have acquired a transposable element, provided the transposable element does not contain any recombinant and/or synthetic DNA?	Yes No	F-7
32. Will the experiment include recombinant or synthetic nucleic acids that do not present a significant risk to health or the environment? See Section IV-C-1-b-(1)-(c), <i>Major Actions</i> , as determined by the NIH Director, with the advice of the RAC, and following appropriate notice and opportunity for public comment. See Appendix C, <i>Exemptions under Section-III-F-8</i> for other classes of experiments which are exempt from the <i>NIH Guidelines</i> .	Yes No	F-8

If you are planning any animal work, please fill out Section III

N/A

If you are planning any arthropod vector work, please fill out Section IV

N/A

Section III: Animal Use

SUBMIT A SEPARATE ANIMAL USE SECTION FOR EACH SPECIES.

(Mice and rats may be submitted together)

IACUC Protocol #:

IACUC Approval date:

PI name if different from NOU PI:

1. **Animal Species:**

Mouse	Rat	Cattle	Aquatic species
Chickens	Horses	Goats	Other:
2. **Provide a project description specific to animal study; include procedures, treatments, challenge materials and sampling per species:**

3. **Will the infected animal present a human health risk after administration?**

No Yes, provide the following information:

Route of exposure:	Respiratory	Milk	Urine	Feces
	Saliva	Blood	Other:	

4. What animal facility/housing is recommended?

ABSL1 ABSL2 Other

5. Check the PPE that will be worn (eye protection is to be used at all biosafety levels):

Standard PPE for the animal facility N95 respirator
PAPR Other (specify):

6. Check lab equipment that will be used:

Biological safety cabinet
Chemical fume hood
Other (specify):

7. Dose per animal:

- a. Maximum volume to be administered at one time:
- b. Maximum concentration to be administered at one time:

8. Route of administration:

Intracranial	Intraperitoneal	Intradermal	Intramuscular
Intravenous	Subcutaneous	Intracardiac	Intranasal
Aerosol	Gavage	Topical	Oral
Bronchial	Intrathecal	Other:	

9. Sampling:

Intravenous bleeds	Feces	Intracardiac bleeds
IV Retro-orbital bleeds	Urine	Organs
IV Saphenous bleeds	Throat swabs	Bronchoalveolar lavage
IV Submandibular bleeds	Nasal Swabs	Other:

10. Will any manipulations be performed without the animal under anesthesia?

No Yes (provide justification below and attach written protocol)

11. Will tissue homogenization be performed?

No Yes (provide a written protocol)

12. Please describe how body fluids from perfusions will be collected and treated for disposal.

N/A, no perfusions are performed

13. Will the study use:

- | | | | |
|----|--|-----|-----------------------|
| a. | Recombinant material | Yes | No |
| b. | Viral vectors | Yes | No (if no go to 13.c) |
| | i. Are the vectors replication deficient? | Yes | No |
| | ii. Are there safety concern(s) associated with the vectors used; if so, please explain (please indicate if the vector is expected to shed within 72 hours). | | |
| | ii. Are there any toxins, virulence factors or oncogenes associated with the expression of the transgene; if so, please explain. | | |
| c. | Gene transfer experiments | Yes | No |
| d. | Creation of transgenic animals (other than maintaining BSL-1 breeding colonies) | Yes | No |

14. Will infected animals be transported by laboratory staff out of or between the vivarium(s)?

No (proceed to question 15)

Yes, please describe below:

- a. Reason for removal:
- b. Location of animal manipulation/necropsy:
- c. Procedures for transportation of cages to and from vivarium:
- d. PPE worn by all personnel present in the lab:
- e. PPE worn by those handling animals:

15. Are there any deviations from standard facility procedures?

No

Yes , please describe below

If you are planning any arthropod vector work, please fill out Section IV.

N/A