NATURAL SCIENCES BIOSAFETY POLICY MANUAL

MGA

MIDDLE GEORGIA STATE UNIVERSITY

Contents

ABOUT THE MGA DEPARTMENT OF NATURAL SCIENCES BIOSAFETY COMMITTEE

The MGA Department of Natural Sciences Biosafety Committee is **responsible for oversight of activities involving biohazardous materials** as required by the National Institutes of Health *Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules* (NIH Guidelines) and the Centers for Disease Control and Prevention (CDC) *Biosafety in Microbiological and Biomedical Laboratories* (BMBL). Further information about this committee may be found in Appendix E.

All RESEACHERS must secure approval for their activities with 1) recombinant or synthetic nucleic acid molecules (r/sNA) or 2) biohazardous materials by submitting a **Memorandum of Understanding and Agreement (MUA)** with the NS Biosafety Committee (Appendix A). **Research at Biosafety Level-3 and higher is not permitted at MGA.**

Examples of r/sNA or Biohazardous materials that requires review when used in research:

- transgenic plants or animals
- infectious organisms (bacteria, fungi, parasites, prions, viruses, yeasts, etc.) which can cause disease in humans and animals
- human or non-human-primate materials (body fluids, tissues, cell lines, etc.)
- biotoxins
- investigational live, recombinant, synthetic or attenuated virus strains
- plant pathogens
- mammalian cell culture

Examples of Activities not requiring approval

- Activities that involve only the *in vitro* use of nucleic acids (i.e., PCR, synthetic double stranded RNA) and does not involve the cloning and propagation of recombinant or synthetic nucleic acid molecules in cells, organisms or viruses.
- Use of microorganisms that can be contained at Biosafety level-1.

ACTIVITIES REQUIRING APPROVAL

Research or Teaching involving materials that fall under any of these categories is required to have MGA Natural Sciences Biosafety Committee approval:

1. **Recombinant or Synthetic Nucleic Acid molecules (r/sNA)** activities as required by the NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules.

   The following types of activities using rDNA must be reviewed and approved by the IBC.

   - In the context of the NIH Guidelines, recombinant DNA molecules are defined as either: (i) molecules that are constructed outside living cells by joining natural or synthetic DNA segments to DNA molecules that can replicate in a living cell, or (ii) molecules that result from the replication of those described in (i) above.

   - Synthetic DNA segments which are likely to yield a potentially harmful polynucleotide or polypeptide (e.g., a toxin or a pharmacologically active agent) are considered as equivalent to their natural DNA counterpart. If the synthetic DNA segment is not expressed *in vivo* as a biologically active polynucleotide or polypeptide product, it is exempt from the NIH Guidelines.

   - Genomic DNA of plants and bacteria that have acquired a transposable element, even if the latter was donated from a recombinant vector no longer present, are not subject to the NIH Guidelines unless the transposon itself contains recombinant DNA.

2. **Any Use of Infectious Microorganisms** - Excluding those considered low risk to healthy humans and that are contained at Biosafety Level 1 (BSL-1). Proposals involving microorganisms that require Biosafety Level 3 (BSL-3) containment are not permitted and will not be considered by the Committee.

   The following charts from CDC *Biosafety in Microbiological and Biomedical Laboratories* (BMBL) are provided to help assess the risk level and biosafety level of the agent(s) with which you are working:

   Classification of Infectious Microorganisms By Risk Group
   Note: Risk Groups correlate with but do not equate to biosafety levels.

RISK GROUP CLASSIFICATION	NIH GUIDELINES FOR RESEARCH INVOLVING RECOMBINANT DNA MOLECULES 2013	WORLD HEALTH ORGANIZATION LABORATORY BIOSAFETY MANUAL 3RD EDITION 2004
Risk Group 1	Agents that are not associated with disease in healthy adult humans.	(No or low individual and community risk) A microorganism that is unlikely to cause human or animal disease.
Risk Group 2	Agents that are associated with human disease which is rarely serious and for which preventive or therapeutic interventions are often available.	(Moderate individual risk; low community risk) A pathogen that can cause human or animal disease but is unlikely to be a serious hazard to laboratory workers, the community, livestock or the environment. Laboratory exposures may cause serious infection, but effective treatment and preventive measures are available and the risk of spread of infection is limited.
Risk Group 3	Agents that are associated with serious or lethal human disease for which preventive or therapeutic interventions may be available (high individual risk but low community risk).	(High individual risk; low community risk) A pathogen that usually causes serious human or animal disease but does not ordinarily spread from one infected individual to another. Effective treatment and preventive measures are available.
Risk Group 4	Agents that are likely to cause serious or lethal human disease for which preventive or therapeutic interventions are not usually available (high individual risk and high community risk).	(High individual and community risk) A pathogen that usually causes serious human or animal disease and that can be readily transmitted from one individual to another, directly or indirectly. Effective treatment and preventive measures are not usually available.

3. **Any Use of Human Derived Materials including blood, blood components, fluids, unfixed organs, tissues and cell lines (primary and established).**

4. **Any Use of Non-Human Primate Derived Materials including established cell lines.**

   All cell and organ cultures of human and non-human primate origin, including well established cell lines, shall be handled in accordance with the OSHA Bloodborne Pathogens Standard and under BSL-2 containment.

5. **Biotoxins with an LD 50 of less than 100 micrograms per kilogram of body weight in vertebrates.**
6. **Plant Pathogens**
7. **Mammalian Cell Culture**

CHANGES TO THE MUA:

PIs must submit to the NS Biosafety Committee for review and approval any changes to their MUA. Changes are made within the existing MUA and not as a separate document. Unless specified otherwise, the proposed changes must not be implemented until the PI receives a written approval notice from the NS Biosafety Committee. The types of changes that require an amendment to the MUA are:

- Addition or deletion of individuals on the MUA
- Change in facility or use of facility
- Additional objectives to the project
- New sources of nucleic acids (including RNA and DNA)
- New vectors
- New recipient organisms
- New biohazardous materials (toxins, viral vectors)
- Change in procedures or use of biohazardous materials

RENEWAL:

MUA'S will be valid for 3 years, or if amendments have been made, 3 years from the last approved amendment. PI's must submit a renewal of the MUA at the time of expiration in order to continue research.

PI ELIGIBILITY

Full time members of the Faculty may serve as Principal Investigators/Project Directors on NS Biosafety MUAs. The MUA is a form that requires a description of work involving r/sNA and biohazardous materials that is being conducted as part of the Principal Investigator's (PI) research or teaching program. A separate MUA must be submitted for each research project involving biohazardous materials. When teaching laboratories use biohazardous materials, the Course Coordinator shall serve as the PI for the MUA; every instructor who teaches the course should be listed, should be trained, and should sign the MUA as an agreement to follow the biosafety guidelines set forth in this policy. Any use of biohazardous materials in a course by a specific instructor, and not by the group, will require a separate MUA.

REQUESTING EXCEPTIONS TO THIS POLICY

Individuals holding academic appointments not covered by this policy may serve as Principal Investigator upon request to the Chair of the NS Biosafety Committee. Requests will be considered under the following condition: the individual must be deemed to have the necessary experience and independence to safely administer the project.

TRAINING

All personnel listed on the MUA must complete any training required by the NS Biosafety Committee before they can be approved to work with the biohazardous materials. See Appendix E for more information on Resources and Training.

PROCEDURES FOR REPORTING INCIDENTS INVOLVING BIOHAZARDOUS MATERIALS

Reportable Incidents, Examples:

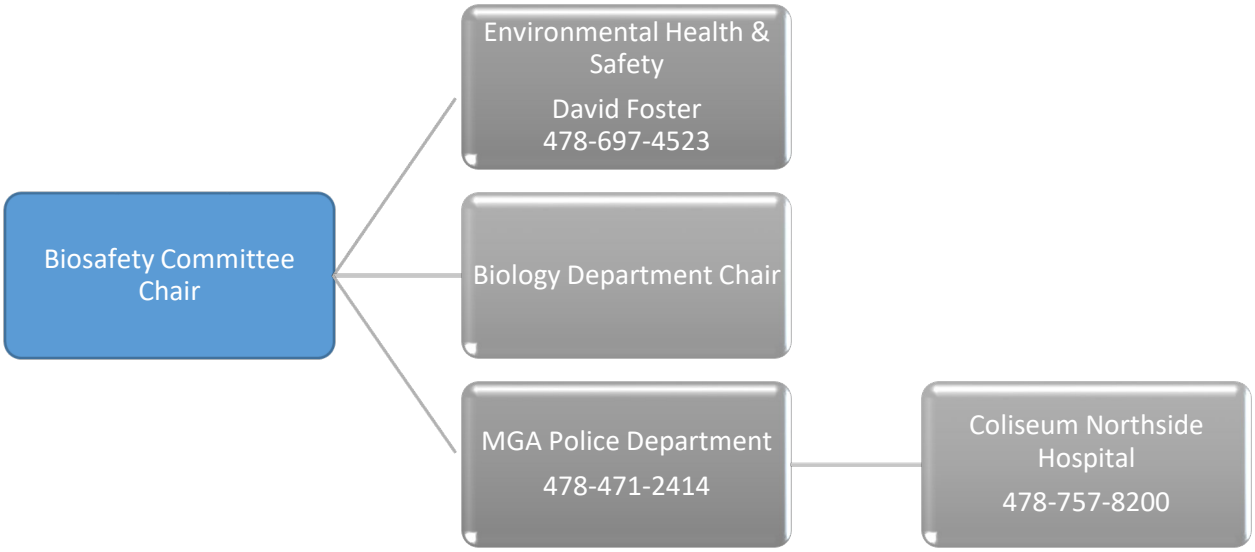
- Needlestick
- Contact with eyes, nose, mouth
- Inhalation of aerosolized material (e.g., large spill outside of biological safety cabinet agents at BSL-3)
- Contact with open wounds, cuts, scratches
- Bites/scratches from infected animals
- Bites from animals with introduced r/sNA molecules
- Release or loss of transgenic plants, animals or materials

Immediate Action:

If personnel are exposed to infectious agents or r/sNA:

- Splash to eyes: Flush with water at eyewash for 10 minutes
- Needlesticks, cuts, scratches, animal bites: Wash area with soap and water for 10 minutes
- Perform first aid, if applicable
- Notify supervisor/principle investigator and/or Biosafety Committee Chair to initiate the Emergency Response Plan.

EMERGENCY RESPONSE PLAN CALL TREE



Health Emergencies should be reported by EH&S to:

North Central Health District
Epidemiology Program
Business Hours: 478-751-6034 OR 478-751-6327
After Hours/24/7: 1-866-PUB-HLTH (782-4524)

INVESTIGATOR RESOURCES

APPLICATION FOR MUA (APPENDIX A)

GUIDELINES FOR MICROBIOLOGY TEACHING LABORATORIES (APPENDIX B)

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NS BIOSAFETY COMMITTEE MEMBERSHIP AND GUIDELINES (APPENDIX D)

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APPENDIX A

Middle Georgia State University

Natural Sciences Biosafety Committee

BIOSAFETY MEMORANDUM OF UNDERSTANDING AND AGREEMENT

Registration of Biohazardous Materials and Recombinant or Synthetic Nucleic Acid Molecules Experiments

Date Received		
Date Approved		
Date Renewed (if applicable)		
NS Biosafety Committee Chair		
	Yes (check)	**No (check)**
Agreement pertains to Teaching Laboratories	☐ Complete Sections A, B	☐
Agreement pertains to Research	☐ Complete Sections A, C	☐
SECTION A: NATURE OF ACTIVITY		
Proposed Activity Involves	**Yes (check)**	**No (check)**
1. Recombinant DNA	☐	☐
2. BSL2 Microorganisms	☐	☐
3. Biotoxins	☐	☐
4. Blood/cell lines	☐	☐
5. Other	☐	☐
Principle Investigator or Coordinator Name		
Faculty ID number		
Office contact phone number		
Alternative phone number		
Email address		
Campus and location		
SECTION B: TEACHING LABORATORIES		
Teaching Lab Coordinator Name		
Emergency Contact phone number		

Instructors/Personnel Teaching Laboratories	Campus and location	Office phone
Laboratories for proposed activities:		
Campus/Building	Meets Set Standards (See Biosafety Checklist)	
	☐ Yes ☐ No	
	☐ Yes ☐ No	
	☐ Yes ☐ No	
	☐ Yes ☐ No	
Lab Coordinator Is Responsible For:	Initial for Acknowledgment	
1. Making faculty aware of biosafety policies/making aware of policy manual.		
2. Ensure proper biosafety equipment is located in respective teaching labs.		
3. Reporting any known violations of biosafety policy to EHSO.		
4. Serving as liaison for Biosafety Committee and materials/procedures used in teaching laboratories.		
SECTION C: RESEARCH LABORATORIES		
Researcher (Point of Contact) Name		
Emergency Phone Number		
Co-investigator(s) Names		
Will students be working with any materials in section A?	☐ Yes ☐ No	
Is there a grant associated with this research?	☐ Yes ☐ No	
Granting Agency & Grant Number		
Location(s) of proposed activities (building and room number)		

Please list all laboratory personnel (including students or volunteers). Laboratory personnel working at BSL-2 are required to have medical insurance if they are not paid by the University payroll. Please provide name, title and insurance carrier for non-university laboratory personnel. Please provide name, title and personnel ID numbers for all personnel.			
MGA ID Number	Name	Title (or Student)	Insurance Carrier

Describe, in terms that a general science audience should understand, the nature of your research and how the materials listed above will be used in that research activity.

List any BSL2 organisms to be used in this study (BSL3 and BSL4 organisms are prohibited, select agents are prohibited), and indicated from where the organism was/will be acquired.

List any recombinant DNA or synthetic nucleic acids to be used in this study (select agents prohibited).			
Host	Vector	DNA insert	Will there be gene expression or protein purification?
			□ Yes □ No
			□ Yes □ No
			□ Yes □ No
Will a viral vector that produces infectious virus be produced (select agents prohibited)?		☐ Yes ☐ No	

Will biological toxins be used/produced (select agents prohibited)?	☐ Yes ☐ No If yes, what toxin, how much, and what is its risk group?
Will human derived samples be used in this study?	☐ Yes ☐ No If yes, what type? ☐ Cell lines ☐ Blood ☐ Tissues ☐ Urine ☐ Spinal Fluid ☐ Serum ☐ Feces ☐ Semen ☐ Other _____ Do you have IRB approval? ☐ Yes ☐ No Have the human samples used in this project been screened for infectious diseases? ☐ Yes ☐ No Have laboratory personnel received or been offered the Hepatitis B Vaccination? ☐ Yes ☐ No
Summarize the protocols/procedures involving risk of exposure to agents checked above.	
Describe where safety exposure risks could occur.	

Describe protective measures that will be used to prevent exposures.	
Do you agree to abide by the MGA policy set forth for the handling and disposal of biohazardous materials?	☐ Yes ☐ No
Does your laboratory location meet the biosafety standards set forth by the MGA policy (see Biosafety Checklist)?	☐ Yes ☐ No
Do you agree to ensure the proper training of personnel and/or students with respect to the handling and disposal of biohazardous materials listed the research activities described above?	☐ Yes ☐ No

The Principal Investigator (PI) is responsible for: (please initial each statement)

___ Notifying the Natural Sciences Biosafety Committee Chair and EHSO when work with any potentially infectious material is terminated or when other significant changes occur, such as changes in protocol, personnel or relocation of the laboratory.

___ Reporting any adverse events, such as exposures or injuries, immediately to the Natural Sciences Biosafety Committee Chair and EHSO.

____ Informing all laboratory personnel of the potential hazards associated with this work, the appropriate safety practices to be used, the availability of medical programs, and applicable training requirements.

____ Verifying medical insurance if BSL2 work is conducted in the laboratory.

____ Ensuring that all laboratory personnel handling human samples (including cell/tissue culture) have a completed Hepatitis B Vaccination form on file with the Biosafety Office.

_____ Ensuring that all laboratory personnel receive laboratory and protocol specific training, in addition to General Laboratory Safety and Biological Safety trainings, before initiation of any laboratory activities.

_____ Ensuring that all laboratory personnel have read and are aware of the contents of the Biosafety manual and are able to access it.

_____ Ensuring that all laboratory personnel wear the required personal protective equipment; laboratory coat, gloves, long pants, closed-toe shoes and eye/face protection (if aerosols are anticipated).

Experiments using biohazardous materials and toxins must follow the CDC/NIH Biosafety in Microbiological and Biomedical Laboratories (BMBL) Guidelines (5th Edition-2009). Experiments using recombinant or synthetic nucleic acid molecules must follow the NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules, (April 2016).

I, _____ (printed name), acknowledge that the above information is correct to the best of my knowledge.

_____ _____
Researcher or Lab Coordinator Date

_____ _____
Chair, Department of Natural Sciences Date

_____ _____
Chair, Natural Science Biosafety Committee Date

_____ _____
MGA Environmental Health & Safety Officer Date

Biosafety Committee Decision on Proposed Activity:

□ Approve □ Deny □ Modify and Resubmit _____
Date

Statement from NS Biosafety Committee on Decision:

APPENDIX B

TEACHING LABORATORY SAFETY STATEMENT

MIDDLE GEORGIA STATE UNIVERSITY MICROBIOLOGY LABORATORY

The lab exercises in this course involve the use of living organisms. Although the microorganisms we use are not considered to be highly virulent, all microorganisms should be treated as potential pathogens (organisms capable of causing disease).

The following rules must be observed **at all times** to prevent accidental injury to and infection of yourself and others and to minimize contamination of the lab environment:

Before you begin class:

1. Do NOT enter the laboratory when your laboratory course is not in session.
2. Know the location of all emergency equipment.
3. If instructions are unclear, ASK before you begin.
4. Perform only those tasks and experiments that are authorized by your instructor.
5. Place all personal items, such as bags, purses, and jackets in the location designated by your instructor.
6. Clean your work area with dilute disinfectant solution at the beginning AND end of each lab.

To avoid injury:

1. Pay attention to what you are doing.
2. No running or playing around in the laboratory.
3. Be careful when using Bunsen burners or alcohol burners. Long hair should be tied back. Be aware of loose clothing that could catch on fire. The flames burn quite hot and are often blue, this makes the flame difficult to see.
4. Avoid wearing scarves, necklaces or large earrings that could become contaminated.
5. Turn your Bunsen burner or alcohol burner off when you have completed your task. Do not leave a flame unattended.
6. Make sure your gas supply is completely off before you leave the lab.
7. Ethanol and other reagents that you will use are flammable, DO NOT place them near a flame.

To avoid contamination or possible infection:

1. Consider all microorganisms that you work with as potential pathogens.
2. Eating, drinking and smoking are prohibited in the laboratory. Do not bring food or drink into the laboratory. Do not place anything in your mouth or eyes while in the lab. Keep your hands away from your mouth and eyes.

3. Do not sit on lab benches!!
4. No open toed shoes or open heeled shoes are allowed in the laboratory.
5. Long pants are strongly recommended in the lab.
6. Lab coats and gloves are required while working in the lab for the student's protection. Lab coat replacement cost will be the responsibility of the student if the lab coat provided by the department at the beginning of the semester cannot be used until the end of the term. Lab coats may not be removed from the laboratory unless they have been decontaminated.
7. Do not place pipets, pens, pencils, fingers or anything else in your mouth while in the lab.
8. With the exception of your lab manual and data book, no personal items may be placed on the lab bench-this includes book bags and jackets.
9. Organize your work area at the beginning of the laboratory to avoid spills. Liquids in racks should be kept at the back of the bench. Hold tubes firmly by the glass, not by the cap. The caps come off easily and the tube will drop.
10. Remove gloves and wash your hands thoroughly before leaving the lab.
11. Safety glasses are strongly recommended and are available for your use, or you may purchase your own. Ethanol and/or ethanol wipes are provided in the laboratory to clean borrowed safety glasses before and after use.
12. Do not place contaminated instruments such as inoculating loops, needles, and pipettes on bench tops. Loops and needles should be sterilized by incineration, and pipettes should be disposed of in designated receptacles of disinfectant.
13. Carry cultures in a test tube rack when moving around the lab or when keeping cultures on bench tops for use. This prevents accidents and contamination of your person or belongings.
14. Label all materials with: 1. YOUR NAME, 2. THE DATE, 3. THE ORGANISM OR EXERCISE, and 4. THE MEDIA USED FOR CULTURE. Example: Mary Smith, 6 Jul 94, E. coli, NA, (NA is the abbreviation for nutrient agar.)

To maintain pure cultures:

1. Keep doors closed while experiments are in progress.
2. Thoroughly disinfect lab benches BEFORE and AFTER each lab period.
3. Use standard bacteriological techniques when handling cultures as outlined in your lab manual or demonstrated by your instructor.

Proper clean up:

1. Return all reagents and equipment to their proper storage area.

2. Discard all old cultures and used media into the appropriate receptacles to be autoclaved. Discard plastic Petri dishes and swabs in the BIOHAZARD BAG. Discard glass tubes in DISCARD RACKS. Never put contaminated materials in the wastebaskets.

3. Never remove cultures, media, books or equipment from the laboratory. This is absolutely prohibited and unnecessary.

General:

1. Report ALL accidents, regardless of size to your instructor. This includes spills, breakage, personal cuts or burns, etc. In the case of a spill, call your instructor to your area to avoid contaminating other areas of the laboratory.

2. During this laboratory course you will work with many different types of bacteria. Some of these bacteria are capable of causing disease in humans (pathogens) under the proper conditions. With careful laboratory technique, which you will learn in this class, healthy adults are usually not at risk for acquiring infections with these strains. However, this course can pose a substantial, even life-threatening health risk for students whose vitality is compromised by any of the following circumstances:

   Immunosuppresive drug therapy

   Cystic fibrosis

   Human Immunodeficiency Virus infection

   Congenital immunodeficiency including complement deficiency, B cell deficiency, T cell deficiency or other immune disorders

   If you have any health conditions which you suspect may place you at risk for infection during this laboratory course, consult your physician first, then discuss the situation with the course instructor prior to the end of the first week of lab class. If you are pregnant or become pregnant, please consult with your physician and discuss your status with the course instructor as soon as you are aware of your pregnancy.

OSHA INFORMATION

MACON, JONES 345:

Safety Data Sheets (SDS) are located in the stockroom between Jones 343 and 345.

The first aid kit is located in the stockroom between Jones 343 and 345.

The eyewash station is located near the front of Room 345 on the wall closest to the hall.

The shower is located near the front of Room 345 on the wall closest to the hall.

The fire extinguishers are located at the front and rear of Room 345.

WRC STEM 250

Safety Data Sheets (SDS) located in chemical storage prep-room

The first aid kit is located in supply storage prep-room

The eyewash station is located on side of classroom next to supply storage prep-room

The shower is located is located on side of classroom next to supply storage prep-room

The fire extinguishers are located in front of classroom next to doorway

COCHRAN, DILLARD 89:

Safety Data Sheets (SDS) are located on back shelf.

The first aid kit is located on the goggle sterilization cabinet at the front of the lab.

The eyewash station is located beside each lab sink.

The shower is located at the front of lab.

The fire extinguishers are located by the prep room door.

DUBLIN, DC_DUB 110:

Safety Data Sheets (SDS) are located between the slide cabinets on the counter walking straight into the lab.

The first aid kit is located on the shelf at eye level behind lab door entrance.

The eyewash station is located mid-lab along the window side of the room.

The shower is located at the back of the lab on the window side.

The fire extinguishers are located on the wall past the whiteboard at the lab entrance.

STUDENT AGREEMENT ON LABORATORY SAFETY

I have read the Laboratory Safety Statement of the Department of Natural Sciences and Engineering, Middle Georgia State University, and I understand its content. I agree to abide by all laboratory rules set forth by the instructor. I realize that violation of any of these rules could result in my withdrawal from the course by my instructor. I understand that my safety is entirely my own responsibility and that I may be putting myself and others in danger if I do not abide by all the rules set forth by the instructor. Furthermore, I do not fall into any of the health risk categories described above.

COURSE NUMBER, SECTION, AND SEMESTER: _____

DATE:_____

Student Name (Please print)	Student Signature

APPENDIX C

BIOSAFETY CHECKLIST FOR LABS

THE SATETY PROCEDURES OUTLINED IN THIS DOCUMENT SHOULD BE UNDERTAKEN IN ALL LABS WHERE THE FOLLOWING TYPES OF WORK REQUIRING NS BIOSAFETY COMMITTEE APPROVAL ARE PERFORMED:

1. **Recombinant or Synthetic Nucleic Acid molecules (r/sNA)** activities as required by the NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules.
2. **Any Use of Infectious Microorganisms** - Excluding those considered low risk to healthy humans and that are contained at Biosafety Level 1 (BSL-1). Proposals involving microorganisms that require Biosafety Level 3 (BSL-3) containment are not permitted and will not be considered by the Committee.
3. **Any Use of Human Derived Materials** including blood, blood components, fluids, unfixed organs, tissues and cell lines (primary and established).
4. **Any Use of Non-Human Primate Derived Materials** including established cell lines.
5. **Biotoxins** with an LD 50 of less than 100 micrograms per kilogram of body weight in vertebrates.
6. **Plant Pathogens**
7. **Mammalian Cell Culture**

Special Practices

1. A laboratory-specific biosafety manual/guide must be prepared and adopted as policy. The biosafety manual must be available and accessible. For teaching labs, see appendix B, as a preferred example.

2. The laboratory supervisor/instructor/principle investigator must ensure that laboratory personnel demonstrate proficiency in standard and special microbiological practices before working with BSL-2 agents or recombinant DNA.

3. Potentially infectious materials must be placed in a durable, leak proof container during collection, handling, processing, storage, or transport within a facility.

4. Laboratory equipment should be decontaminated routinely, as well as, after spills, splashes, or other potential contamination.

    a. Spills involving infectious materials must be contained, decontaminated, and cleaned up by staff properly trained and equipped to work with infectious material.

    b. Equipment must be decontaminated before repair, maintenance, or removal from the laboratory.

5. Incidents that may result in exposure to infectious materials must be immediately evaluated and treated according to procedures described in the laboratory biosafety manual. All such incidents must be reported to the laboratory supervisor.

6. Animal and plants not associated with the work being performed must not be permitted in the laboratory. No eating, drinking, smoking, handling contact lenses, applying cosmetics, and storing food or beverages for consumption are allowed in the laboratory.

7. All procedures involving the manipulation of infectious materials that may generate an aerosol should be conducted within a biological safety cabinet (BSC) or other physical containment devices.

8. Laboratory personnel must be trained on the hazards associated with the material they are manipulating, the precautions to prevent exposures, and exposure evaluation procedure. Training must be conducted prior to assuming their duties, annually and when policies change.

Safety Equipment (Primary Barriers and Personal Protective Equipment)

1. Properly maintained BSCs, appropriate personal protective equipment, and/or other physical containment devices must be used whenever:

    a. Procedures with a potential for creating infectious aerosols or splashes are conducted.

    b. High concentrations or large volumes of infectious agents are used.

2. Such materials may be centrifuged in the open laboratory using sealed rotor heads or centrifuge safety cups.

3. Protective laboratory coats, gowns, smocks, or uniforms designated for laboratory use must be worn while working with hazardous materials.

4. Remove protective clothing before leaving for non-laboratory areas, e.g., cafeteria, library, and administrative offices. It is recommended that laboratory clothing not be taken home.

5. Eye and face protection (goggles, mask, face shield or other splatter guard) should be used when there is the potential for splashes or sprays of hazardous materials outside the BSC or containment device.

6. Appropriate gloves must be worn to protect hands from exposure to hazardous materials.

7. Gloves must not be worn outside the laboratory. In addition, BSL-2 laboratory workers should change gloves when contaminated, glove integrity is compromised, or when otherwise necessary.

Laboratory Facilities (Secondary Barriers)

1. Laboratories should have doors for controlled access.

2. Laboratories must have a sink for hand washing.

3. The laboratory should be designed so that it can be easily cleaned. Carpets and rugs in laboratories are not appropriate.

4. Laboratory furniture must be capable of supporting anticipated loads and uses. Spaces between benches, cabinets, and equipment should be accessible for cleaning.

a. Bench tops must be impervious to water and resistant to heat, organic solvents, acids, alkalis, and other chemicals.

b. Chairs used in laboratory work must be covered with a non-porous material that can be easily cleaned and decontaminated with appropriate disinfectant.

5. Laboratories windows that open to the exterior should not be opened.

6. BSCs must be installed so that fluctuations of the room air supply and exhaust do not interfere with proper operations. BSCs should be located away from doors, windows that can be opened, heavily traveled laboratory areas, and other possible airflow disruptions.

7. Vacuum lines used for work with BSL-2 organisms should be protected with liquid disinfectant traps or HEPA filters.

8. An eyewash station must be readily available.

9. HEPA filtered exhaust air from a Class II BSC can be safely recirculated back into the laboratory environment if the cabinet is tested and certified at least annually and operated according to manufacturer's recommendations. BSCs can also be connected to the laboratory exhaust system by either a thimble (canopy) connection or directly exhausted to the outside through a hard connection. Provisions to assure proper safety cabinet performance and air system operation must be verified.

10. A method for decontaminating all laboratory wastes should be available in the facility (e.g., autoclave, chemical disinfection, incineration, or other validated decontamination method).

11. An effective pest management system must be in place.

12. Laboratories must have an appropriate container for the disposal of sharps.

13. Laboratories must have the appropriate signs posted to notify workers and others entering the laboratory of potential hazards and who is responsible for the laboratory.

APPENDIX D

NS BIOSAFETY COMMITTEE MEMBERSHIP AND GUIDELINES

Definitions

Biological Materials: These shall include living organisms, products produced by such organisms, organic chemicals produced to mimic activity/actions of such products, and recombinant DNA molecules.

Hazardous Materials: Any biological materials which present a risk to the well-being of humans, animals, or plants either directly or indirectly.

Incident: Any situation involving a hazardous agent(s) that results in potential imminent danger to the public health or welfare.

Duties and Powers of the Natural Sciences Biosafety Committee

1. The NS Biosafety Committee shall be comprised of at least five faculty/staff members; at least four members should have direct experience in working with hazardous biological or chemical agents. The Environmental Health and Safety Officer at Middle Georgia State University shall serve as an *ex officio* member of this Committee.

2. Members of the NS Biosafety Committee and its Chair shall be appointed by and report to the Chair of Natural Sciences at Middle Georgia State University. Except for the Environmental Health and Safety Officer, terms of appointment shall last for two years.

3. The NS Biosafety Committee shall have three principal functions:

a. The development and implementation of policies for the safe conduct of research and teaching involving potentially hazardous biological materials and any research involving recombinant DNA.

b. The authorization of projects involving potentially hazardous biological materials or recombinant DNA through review of each researcher's Memorandum of Understanding and Agreement (MUA).

c. The protection of the University community by halting unauthorized or non-compliant projects.

Duties and Powers of the Environmental Health and Safety Officer

1. The Environmental Health and Safety Officer shall function as a primary agent of the NS Biosafety Committee in the routine administration of the biological safety program. Specifically, the Environmental Health and Safety Officer shall monitor and enforce compliance with the safety guidelines established by the NS Biosafety Committee.

2. The Environmental Health and Safety Officer shall have responsibility for making periodic, inspections of all facilities using biological materials considered hazardous under existing University standards.

3. All decisions by the Environmental Health and Safety Officer shall be binding pending review by the NS Biosafety Committee.

Procedures for Acting on and Reporting Violations

In the event of failure to observe safety regulations and rules on the part of any University personnel, the Environmental Health and Safety Officer shall:

1. Inform the NS Biosafety Committee Chair if such deficiencies are not corrected promptly.

2. If necessary, the Environmental Health and Safety Officer has authority to order immediate shutdown or cessation of work in any facility where it is evident that health hazards exist to the extent that continued operation would result in violation of University-adopted biosafety standards.

The Chairperson of the NS Biosafety Committee shall report the violation to the NS Biosafety Committee at its next regular meeting, or call a special meeting to review the violation if urgency makes it necessary. The NS Biosafety Committee, after consideration, may:

1. Recommend mandatory remedial action to the Chair of Natural Sciences and Dean of the College of Arts and Sciences. Failure to comply may result in withdrawal of the NS Biosafety Committee approval of the existing project/activities.

2. Withdraw or rescind approval of the project. In the event the NS Biosafety Committee takes such action, the project may no longer be conducted at the University until such time as corrections are made to qualify the project for reinstatement.

Appeal Procedure

Any restraining order, decision, or application disapproval by the NS Biosafety Committee or the Environmental Health and Safety Officer may be appealed directly to the NS Biosafety Committee. The staff member(s) involved in such consideration may be present at the NS Biosafety Committee meeting and may present facts pertinent to the deliberations. A simple majority vote of the NS Biosafety Committee is needed to uphold or reverse decisions made by the Environmental Health and Safety Officer or NS Biosafety Committee.

NS Biosafety Committee decisions may be appealed to the Dean of the College of Arts and Sciences and then to the Provost of the University. Appeals must be submitted in writing with necessary supporting documentation to the NS Biosafety Committee Chair who shall forward the appeal to the Dean of the College of Arts and Sciences and then to the Provost.

Actions/decisions by the NS Biosafety or the Environmental Health and Safety Officer must be adhered to pending final action on the appeal. Failure to adhere to decisions made by the NS Biosafety or the Environmental Health and Safety Officer may result in immediate loss of lab and lab support area access and/or could be used as grounds for dismissal of the employee.

Reporting Incidents (Also, see Procedures for Reporting Incidents)

All persons listed above shall have the authority to evacuate and close down rooms, buildings, or any effected areas if an incident warrants such action.

The affected areas shall remain closed until the Environmental Health and Safety Officer is available to direct cleanup and/or decontamination procedures. The Environmental Health and Safety Officer, the

NS Biosafety Committee Chair, and Chair of Natural Sciences will together determine when and under what conditions a research facility may be reopened following an incident.

APPENDIX E

TRAINING AND RESOURCES

https://www.usg.edu/facilities/rtk-ghs -Right to Know (University System of Georgia)

https://www.usg.edu/facilities/training/pathogens/ - Blood Borne Pathogens (University System of Georgia)

https://www.cdc.gov/biosafety/publications/bmbl5/BMBL.pdf - Biosafety in Microbiological and Biomedical Laboratories 5th edition (CDC)

http://researchcompliance.uc.edu/Biosafety/Training/ViralVectorWebtraining.aspx -Viral Vectors (University of Cincinnati)

http://researchcompliance.uc.edu/training/PPE-eManual/story_html5.html -PPE (University of Cincinnati)

https://www.asm.org/index.php/tools-in-the-classroom/guidelines-for-biosafety-in-teaching-laboratories - ASM Guidelines for Biosafety in Teaching Laboratories: Building a Culture of Biosafety (American Society of Microbiologist)

https://www.asm.org/images/asm_biosafety_guidelines-FINAL.pdf - Guidelines for Biosafety in Teaching Laboratories (American Society of Microbiologist)

http://www.who.int/csr/resources/publications/biosafety/Biosafety7.pdf - Laboratory Biosafety Manual (World Health Organization)

https://www.fda.gov/medicaldevices/productsandmedicalprocedures/homehealthandconsumer/consumerproducts/sharps/default.htm -Safely Using Sharps (Needles and Syringes) at Home, at Work and on Travel (FDA)

https://www.osha.gov/Publications/laboratory/OSHA3404laboratory-safety-guidance.pdf Laboratory Safety - (OSHA)

APPENDIX F

GUIDELINES FOR APPROPRIATE SIGNAGE

- **Approved sign indicating the presence of a biohazard must be posted at all access points**

- **Sign must incorporate the universal biohazard symbol**

- **All equipment used with biohazardous materials must have biohazard label**

- **Posted information must include: the laboratory's biosafety level, the supervisor's name (or other responsible personnel), telephone number, and required procedures for entering and exiting the laboratory. Agent information should be posted in accordance with the institutional policy.**

APPENDIX G

SAMPLE OCCUPATIONAL EXPOSURE SHEET FOR AVAILABILITY IN LABORATORIES

Occupational Exposure to *Bartonella henselae*

Workers are encouraged to seek medical evaluation for symptoms that they suspect may be related to exposure to *Bartonella henselae* in their work area, without fear of reprisal.

FIRST AID/TREATMENT:

1) Contact With Skin or Puncture Wound: Immediately wash area or wound thoroughly with soap and water. Apply an antiseptic, such as 70% ethanol to the skin or wound. Seek medical attention.
2) Contact With Aerosols: Seek medical attention for possible prophylactic treatment.

The majority of cases of cat-scratch disease occurring in normal hosts do not require anti-infective therapy for resolution of infection. Cat-scratch disease is usually self-limiting within several weeks. If an antibiotic regime is required tetracycline or erythromycin are effective treatments.

IMMUNIZATION: None.

PROPHYLAXIS: None

SYMPTOMS OF OCCUPATIONAL EXPOSURE to *Bartonella henselae*, which may occur through aerosolized liquids or through puncture wounds, may include*:

fever, fatigue, malaise, swollen lymph nodes, joint aches and swelling, neurological abnormalities, and skin rash or markings

*documented occupational exposure unknown, symptoms based on natural infection (The cat flea (*Ctenocephalides felis*) is thought to be the major vector by which the cat becomes infected. Humans become infected with *Bartonella henselae* by direct or indirect contact with kittens or cats harboring the organism. Humans rarely become infected following exposure to animals other than cats. Human infection results from inoculation of infective flea feces at time of injury.)

PRIMARY HAZARDS: Scratches, bites, and/or licks from infected laboratory animals.

SPECIAL HAZARDS: None.

COMMUNICABILITY: Human-to-human transmission has not been documented.

DRUG SUSCEPTIBILITY/RESISTANCE: *Bartonella henselae* is susceptible to several antibacterial agents. Rifampin, ciprofloxacin, gentamicin, trimethoprim, and sulfamethoxazole have the greatest effect. Erythromycin, doxycycline, isoniazid, and rifampin have been effective in treatment of bacillary angiomatosis in immunocompromised patients.

DRUG RESISTANCE: Penicillins, cephalosporins, tetracycline, and erythromycin have little to no clinical effect in cat-scratch disease. Resistance to macrolides and to fluoroquinolones has been observed.

SUSCEPTIBILITY TO DISINFECTANTS: Information specific to *Bartonella henselae* is not available, but most bacteria have been shown to be susceptible to low concentrations of chlorine, 70% ethanol, phenolics such as orthophenylphenol, ortho-benzyl-paua-chlorophenol, 2% aqueous glutaraldehyde, peracetic acid (0.001% to 0.2%).

PROTECTIVE CLOTHING: Lab coat. Gloves. Eye protection must be used where there is a known or potential risk of exposure to splashes.

OTHER PRECAUTIONS: All procedures that may produce aerosols, or involve high concentrations or large volumes

should be conducted in a biological safety cabinet (BSC). The use of needles, syringes, and other sharp objects should be strictly limited.

SPILLS: Allow aerosols to settle and, wearing protective clothing, gently cover spill with paper towels and apply an appropriate disinfectant, starting at the perimeter and working towards the center. Allow sufficient contact time before clean up.

DISPOSAL: Decontaminate all wastes that contain or have come in contact with the infectious organism before disposing by autoclave, chemical disinfection, gamma irradiation, or incineration.

STORAGE: The infectious agent should be stored in leak-proof containers that are appropriately labelled.

EXPOSURE to *Bartonella henselae*, should be immediately reported to your supervisor and your medical provider. Your supervisor must receive a description of the accident or incident, confirm the circumstances of the injury or exposure and provide relevant advice. The supervisor must also report the incident to all other relevant parties, such as the Environmental Health Officer.

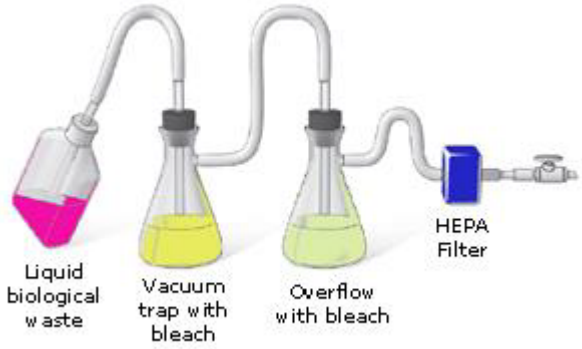
Supervisors are expected to 1) properly train personnel to safely handle infectious materials; 2) report any incident involving direct contact with an infectious agent; 3) make personnel aware of the risks associated with handling infectious agents, 4) maintain a high level of suspicion for any worker who does not report to work or reports an illness with related symptoms.

APPENDIX H

INFORMATION ON SELECT SAFETY EQUIPMENT OR PROCEDURES

VACUUM LINE PROTECTION

The first sidearm flask functions as the vacuum trap and the second acts as the overflow back-up. These two flasks contain enough household bleach so that the final concentration of waste is 10% bleach when full. An in-line HEPA filter is the last defense and prevents aerosols from entering the line. The flasks should be set in a plastic bucket or tray so that if they break, the spill is easily contained. This image is adapted from the Biosafety in Microbiological and Biomedical Laboratories (BMBL) 5th Edition, Appendix A.



SECONDARY CONTAINMENT TRAYS

Sides should be high enough to contain liquids in case a flask breaks (Nalgene Polypropylene Sterilizing Trays Fishersci cat# 13-359)

IN-LINE HEPA FILTERS

HEPA filters remove 99.97% of .3mm particles and protect house vacuum lines from contamination (Millipore Millex Filter Units Fishersci cat# SLFG85010 and SLFG025LS)

APPENDIX J

LABORATORY INCIDENT/NEAR-MISS REPORT

Return to the Environmental Health & Safety Office

(478) 471-2424

This report must be completed and submitted to Middle Georgia State University's EH&S office by **Email** ron.ardelean@mga.edu within 24 hours after there is an incident or a near miss in involving a Middle Georgia State University laboratory.

An incident is an event that results in one or more of the following:

- accident and/or injury to personnel
- damage to project equipment, facilities or property
- impact to the public or environment
- release or spill that could result in fire or exposure above established limits

A **near-miss** is an event that under slightly different circumstances could have become an incident.

Date and Time of Incident or Near-Miss: _____

Location of Incident or Near-Miss: _____

Person(s) Involved (Name and MGA ID):

Witness(es) to Event (Name(s) and MGA ID(s)):

Brief Description of Incident or Near-Miss:

Preliminary Identification of Cause:

Initial Corrective Actions Taken:

Date and Time of Notification to Principle Investigator: _____

Principal Investigator: _____

Principal Investigator Signature: _____

Date & Time of Notification to Biosafety Officer: _____

Biosafety Officer: _____

Biosafety Officer Signature: _____

APPENDIX K

BIOSAFETY INCIDENT & INVESTIGATION REPORT

All reports must be submitted to the institutional Biosafety Officer, Ron Ardelean

Submit report as an electronic Word Document to: ron.ardelean@mga.edu , if you have any questions call **(478) 471-2424**

SECTION 1. PERSON REPORTING

Principal Investigator:	**CONTACT NUMBER:**
Name of Investigator *(if not the primary investigator)*	**CONTACT NUMBER:**
DEPARTMENT:	**DATE & TIME INVESTIGATION BEGAIN:**

SECTION 2. INCIDENT INFORMATION

DATE and TIME OF INCIDENT:	**NAME,ADDRESS, AND PHONE NUMBER OF FACILITY WHERE MEDICAL TREATMENT WAS ADMINISTERED** (If applicable)**:**
BUILDING & ROOM NUMBER:	**PART(s) of BODY INJURED:**
INJURED NAME *(include MGA ID Number) :*	**NATURE OF INJURY:** ☐ **Needle stick** ☐ **Splash** ☐ **Cut** ☐ **Other (describe):**

MATERIALS INVOLVED *(*check all that apply*)*

- ☐ **Recombinant or synthetic DNA**
- ☐ **Infectious Agent**
- ☐ **Human blood, other body fluids, cell lines, and/or OPIM**
- ☐ **Other (explain in as much detail as possible below):**

TYPE OF INCIDENT *(Check all that apply)*

☐ **Personnel injury or exposure** ☐ **Spill/release** ☐ **Other anticipated event(explain in as much detail as possible):**

Biosafety Incident & Investigation Report (continued)

DESCRIBE HOW THE INCIDENT OCCURRED, INCLUDE TIME LINE AND SPECIFIC DETAILS:

INJURY/EXPOSURE	**SPILL/RELEASE**
Immediate Action Taken: ☐ **Cleansed affected area** ☐ **Rinsed with eyewash/safety shower** ☐ **Person received medical attention** ☐ **Notified Biosafety Officer** ☐ **Notified Biosafety Committee** ☐ **Other:**	Immediate Action Taken: ☐ **Spill contained and disinfected (small spill)** ☐ **Room evacuated (large spill)** ☐ **Notified Biosafety Officer** ☐ **Notified Biosafety Committee** ☐ **Other:**

SECTION 3. TREATMENT/CLEANUP

DESCRIBE TREATMENT/CLEANUP PROCEDURE INCLUDE TIME LINE AND SPECIFIC DETAILS:

Biosafety Incident & Investigation Report (continued)

SECTION 4. ADDITIONAL INFORMATION

1. Has there been any signs of illness associated with the incident?
2. List relevant training received by the individual(s) involved, as well as the date(s) that training was conducted (attach supporting documentation):
3. Does the lab have standard operating procedures (SOPs) for this research? Yes or no ***If yes, was there any deviation from the SOP at the time of incident? Please describe.***

4. List personal protective equipment (PPE) donned at the time of incident:
5. Was an equipment failure associated with the incident? Yes or No ***If yes, please describe.***
6. Has the root cause of the incident been identified? Yes or No ***If yes, please describe.***
7. Discuss in detail corrective actions taken
Biosafety Committee & Biosafety Officer's recommended follow up procedures:

Principal Investigators Name: _____

Principal Investigators Signature: _____

Biosafety Officer's Name: _____

Biosafety Officer's Signature: _____