

# Biological Safety Highlights for MSU Researchers

*This document has been prepared as a summary of biosafety-related current events and regulatory considerations for researchers at MSU. For further information, please refer to the MSU Biosafety Manual, the ORCBS website ([www.orcbs.msu.edu](http://www.orcbs.msu.edu)), or contact the ORCBS Biosafety Staff at 355-0153.*

## MSU's Institutional Biosafety Committee

The MSU Institutional Biosafety Committee (IBC) was originally assembled as a requirement of the NIH "Guidelines for Research Involving Recombinant DNA Molecules". The primary charge of the IBC was to review recombinant DNA research proposals using the NIH Guidelines as a minimum standard. The purpose of the NIH Guidelines and the IBC review process was to provide researchers with guidance for conducting their recombinant DNA studies in a manner that minimized exposure risk for research personnel and the environment at large.

Over the years, the role of IBCs in the university setting has expanded to include areas such as research use of human and animal cells, infectious agents, select agents, and toxins. This is a timely trend in light of recent bioterrorism events.

The MSU Institutional Biosafety Committee membership and mission has been recently revised to meet the changing needs of the MSU research community. In addition to recombinant DNA reviews, the committee may provide guidance and assistance on matters such as animal and plant research containment facilities, use of infectious agents, accreditation issues, and emergency response.

### 2002 MSU Institutional Biosafety Committee Members include:

**Ned Walker- Chairperson**  
Microbiology & Molecular Genetics

**Rebecca Grumet**  
Horticulture

**Susan Ewart**  
Large Animal Clinical Sciences

**David Douches**  
Crop & Soil Science

**Patrick Venta**  
Small Animal Clinical Sciences

**Steve Bolin**  
Animal Health Diagnostic Laboratory

**Patty Weber**  
Animal Science

**John Gerlach**  
Medical Technology Program

**Robert Silva**  
USDA Avian Disease Oncology Lab

**2 Community Representatives**

### MSU Office of Radiation, Chemical & Biological Safety (ORCBS) Biosafety Resources

**John Parmer**  
Director  
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**Robin Mecklem**  
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## CDC's Select Agents Regulation & USA Patriot Act

The purpose of the CDC's Select Agents regulation (42CFR72) is to provide a means of accountability for the use of select agents - biological agents that could pose a severe threat to public health and safety. In accordance with this regulation, anyone who transfers a select agent (see table on Page 3) must develop accountability procedures and register with the CDC via the ORCBS.

In November 2001, the ORCBS developed a "Select Agents Declaration" document to be completed by professorial personnel in departments & programs where the likelihood of Select Agent use was anticipated. These departments include:

Agricultural Engineering	Animal Health Diagnostic Laboratory	Animal Science
Biochemistry & Molecular Biology	Chemical Engineering & Material Science	Chemistry
Civil & Environmental Engineering	Crop & Soil Science	DOE Plant Research
Entomology	Fisheries & Wildlife	Food Science & Human Nutrition
Family Practice- College of Human Medicine	Genetics Program	Horticulture
Kellogg Biological Station	Large Animal Clinical Sciences	Medicine
Microbiology & Molecular Genetics	National Food Safety & Toxicology Center	Osteopathic Manipulative Medicine
Pediatrics & Human Development	Pharmacology & Toxicology	Physiology
Plant Biology	Plant Pathology	Population Medicine Center
Psychology	Radiology	Small Animal Clinical Sciences
Zoology		

The "Select Agents Declaration" form has been distributed to these departments and over 81% of the 900 affected researchers have returned a completed form. This cooperation and information has been critical for assuring proper security of Select Agents on campus and for completion of CDC registration requirements.

Please note that the departments above may not be all-inclusive for potential use of Select Agents. If biological research materials or toxins are in use in your department and it is not listed above, please contact Robin Mecklem at 355-1283.

### What You Need To Know...

It is essential for all departments who conduct research with biological materials to be aware of the Select Agents list and the need for notification and registration of Select Agent use. As our campus and research endeavors continue to grow, so does the potential for Select Agent use.

Please keep the following in mind:

- When considering research/faculty candidates, inquire about any intentions to conduct work with Select Agents. Please note there are specific facility, administrative and training requirements for Select Agent work.
- Before visiting research personnel from other countries come to campus, assure that they are aware of the Select Agents rule. If such personnel plan to bring Select Agents with them or conduct work with Select Agents during their work at MSU, please contact the ORCBS well in advance of the visitor's arrival.
- As the result of the bioterrorism events of 2001 and 2002, federal legislation (USA Patriot Act) has been passed that restricts specific groups of people from handling or accessing Select Agents. Therefore, anyone who plans to work with these materials may be asked to complete an affidavit (see Page 4) to verify that he/she is not a restricted person in addition to registering with the CDC via the ORCBS.

<b>RESTRICTED MATERIALS UNDER CDC'S SELECT AGENTS REGULATIONS</b>	
<p><b>Viruses</b>                      Crimean-Congo haemorrhagic fever virus                      Eastern Equine Encephalitis virus                      Ebola viruses                      Equine Morbillivirus                      Lassa fever virus                      Marburg virus                      Rift Valley fever virus                      South American Haemorrhagic fever viruses (Junin, Machupo, Sabia, Flexal, Guanarito)                      Tick-borne encephalitis complex viruses                      Variola major virus (Smallpox virus)                      Venezuelan Equine Encephalitis virus                      Viruses causing hantavirus pulmonary syndrome                      Yellow fever virus</p> <p><i>Exemptions:</i> Vaccine strains of viral agents (Junin Virus strain candid #1, Rift Valley fever virus strain MP-12, Venezuelan Equine encephalitis virus strain TC-83, Yellow fever virus strain 17-D) are exempt.</p> <p><b>Bacteria</b>  <i>Bacillus anthracis</i>  <i>Brucella abortus</i>, <i>B. melitensis</i>, <i>B. suis</i>  <i>Burkholderia (Pseudomonas) mallei</i>  <i>Burkholderia (Pseudomonas) pseudomallei</i>  <i>Clostridium botulinum</i>  <i>Francisella tularensis</i>  <i>Yersinia pestis</i></p> <p><i>Exemptions:</i> Vaccine strains as described in Title 9 CFR, Part 78.1 are exempt.</p>	<p><b>Rickettsiae</b>  <i>Coxiella burnetii</i>  <i>Rickettsia prowazekii</i>  <i>Rickettsia rickettsii</i></p> <p><b>Fungi</b>  <i>Coccidioides immitis</i></p> <p><b>Toxins</b>                      Abrin                      Aflatoxins                      Botulinum toxins  <i>Clostridium perfringens</i> epsilon toxin                      Conotoxins                      Diacetoxyscirpenol                      Ricin                      Saxitoxin                      Shigatoxin                      Staphylococcal enterotoxins                      Tetrodotoxin                      T-2 toxin</p> <p><i>Exemptions:</i> Toxins for medical use, inactivated for use as vaccines, or toxin preparations for biomedical research use at an LD50 for vertebrates of more than 100 nanograms per kilogram body weight are exempt. National standard toxins required for biologic potency testing as described in 9 CFR Part 113 are exempt.</p>
<p><b>Recombinant organisms/molecules</b></p> <ol style="list-style-type: none"> <li>1. Genetically modified microorganisms or genetic elements from organisms listed above, shown to produce or encode for a factor associated with a disease.</li> <li>2. Genetically modified microorganisms or genetic elements that contain nucleic acid sequences coding for any of the toxins listed above, or their toxic subunits.</li> </ol> <p><b>Other restrictions</b>                      The deliberate transfer of a drug resistance trait to microorganisms listed above that are not known to acquire the trait naturally is prohibited by NIH "Guidelines for Research Involving Recombinant DNA Molecules", if such acquisition could compromise the use of the drug to control these disease agents in humans or veterinary medicine.</p>	

Below is an example of a "restricted person" affidavit from another institution. MSU Legal Counsel is currently reviewing this form and regulatory requirements to develop MSU's policies in this regard.

**Appendix C  
Patriot Act Restricted Person Affidavit**

The USA Patriot Act signed into federal law October 26, 2001, provides for restrictions on persons who may access 'Select Agents' as defined by Section 72.6 of Title 42, Code of Federal Regulations. The USA Patriot Act provides a very specific definition of 'restricted person'. In order to meet the requirements of the Act, the University is applying a two-part process. One part of the process will be the completion of this affidavit by all persons who may have or need access to areas where a 'select agent' may be used on University property. You must complete and return this affidavit to the University Department of Public Safety (DPS). A second part is a background security check to be performed by DPS. All records from the background check as well as this affidavit will be maintained in confidentiality by DPS and will only be released as appropriate to meet the requirements of the Act or subsequent rules that may be promulgated.

I, \_\_\_\_\_, do hereby affirm that I

*(print full name)*

*understand the need to restrict access to 'select agents' for security purposes, and that any of the following items checked in the affirmative will be followed up during a personal interview.*

- *I am \_\_\_/am not \_\_\_ under indictment in any state or country for a crime punishable by imprisonment for a term exceeding 1 year.*
- *I have \_\_\_/have not \_\_\_ been convicted in any court in any state or country of a crime punishable by imprisonment for a term exceeding 1 year.*
- *I am \_\_\_/am not \_\_\_ a fugitive from justice in any state or country.*
- *I am \_\_\_/am not \_\_\_ an unlawful user of any controlled substance (as defined in section 102 of the Controlled Substances Act - see attached definition).*
- *I am \_\_\_/am not \_\_\_ an alien\* illegally or unlawfully in the United States.*
- *I have \_\_\_/have not \_\_\_ been adjudicated by a court as a mental defective or been committed to any mental institution.*
- *I am \_\_\_/am not \_\_\_ an alien\* (other than an alien lawfully admitted for permanent residence) who is a national of a country as to which the Secretary of State has made a determination that such country has repeatedly provided support for acts of international terrorism. (The list of countries is currently Iran, Iraq, Libya, Cuba, North Korea, Syria, and Sudan.)*
- *I have \_\_\_/have not \_\_\_ been discharged from the Armed Services of the United States under dishonorable conditions.*

*\* Alien is defined as any person who is not a citizen or a national of the United States.*

I certify that the above information is complete and accurate to the best of my knowledge and that the University is relying on this information to comply with federal law. Misrepresentations could result in discipline, up to and including discharge from my University position.

\_\_\_\_\_  
*(sign)*

\_\_\_\_\_  
*(date)*

**Return completed affidavit to the Director, University of Michigan Department of Public Safety.**

## Other Regulatory Considerations



There are a number of regulations and guidelines that apply to research involving the use of biological materials. Awareness of and compliance with these policies is essential for not only the safety of research personnel, but also for the ability to receive funds and materials necessary to conduct the research.

### 1. Human Blood & Human-Derived Materials (including cells)

Any employee that will be working with human blood or other potentially infectious body fluids, unfixed tissue/organs other than intact skin, cell or tissue cultures, organ cultures, culture medium or other solutions that may contain bloodborne pathogens, or blood from experimental animals infected with bloodborne pathogens, must be included in MSU's Bloodborne Pathogens (BBP) Exposure Control Program. This program requires attending an initial training class that is held at the ORCBS and completing annual bloodborne pathogens refresher training. Initial training must be completed at the time of initial assignment to tasks where potential occupational exposure to bloodborne pathogens or exposure to materials potentially containing BBPs may occur.

Employees included in the BBP Exposure Control Program must also be offered hepatitis B vaccination at no cost within ten days of assignment to their duties that put them at risk of exposure to potentially infectious materials.

For more information on the BBP requirements, contact Patti Pawski, Biosafety Industrial Hygienist at 432-8044 or e-mail at [pawski@msu.edu](mailto:pawski@msu.edu).

#### Impact of non-compliance:

- Increased risk of occupationally-acquired infections,
- Possible citation under Michigan Occupational, Safety & Health Administration (MIOSHA) Bloodborne Infectious Diseases standard,
- May impact ability to purchase biological materials (ATCC, etc.),
- May cause delays in project approval by institutional review committees (AUCAUC, UCRIHS, IBC).

## 2. Recombinant DNA

All work involving recombinant DNA molecules at MSU is subject to the NIH "Guidelines for Research Involving Recombinant DNA Molecules". These guidelines address the safe conduct of research that involves construction and handling of recombinant DNA molecules and organisms containing them. (Recombinant DNA molecules are defined as either 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 molecules that result from the replication of those previously described.)

Included in the NIH Guidelines is a requirement for the institution to establish an Institutional Biosafety Committee (IBC) with authority to approve or disapprove proposed recombinant DNA research using the NIH Guidelines as a minimum standard. In addition, the Principal Investigator has unique responsibilities including filing a written recombinant DNA registration document with the IBC.

The most recent edition of the NIH Guidelines can be found online in the biosafety section of the ORCBS website (<http://www.orcbs.msu.edu>). An online copy of the registration form will be available at the same location after May 1st, 2002. Until that time, copies of the registration form are available upon request. Please contact Robin Mecklem, Biosafety Officer at 355-1283 or email at [mecklem@msu.edu](mailto:mecklem@msu.edu) for further information.

### Impact of non-compliance:

- Increased risk of releasing genetically-modified materials which could be hazardous to lab personnel and the environment at large,
- May cause delays in receiving funds from granting agencies,
- May cause delays in project approval by institutional review committees (AUCAUC, UCRIHS, IBC),
- May result in loss of NIH funds for MSU.

## 3. Infectious Agents

All work involving the use of infectious agents should be conducted in accordance with the MSU Biosafety Manual. This manual is based on CDC's *Biosafety in Microbiological and Biomedical Laboratories* (BMBL), which outlines containment requirements (i.e. biosafety levels) for the safe use of infectious agents in both laboratory and animal research.

When research involves the use of cultures or samples that contain microorganisms that are potentially infectious to humans, biosafety level 2 (BSL-2) practices and facilities are required as a minimum. In order to assist the researcher with meeting BSL-2 requirements, the ORCBS offers a biosafety training course intended for all research personnel conducting work at this level. Additionally, the ORCBS Biosafety Staff will conduct a BSL-2 inspection to further aid the researcher in achieving BSL-2 requirements.

### Impact of non-compliance:

- Increased risk of occupationally-acquired infections associated with research,
- May cause delays in project approval by institutional review committees (AUCAUC, UCRIHS, IBC),
- May impact ability to purchase or receive certain biological materials.

#### **4. Infectious Substance Shipping**

Any time an item is transported by air, it is subject to International Air Transportation Association (IATA) regulations. This includes multi-modal courier shipments (i.e. items offered for shipment by FedEx or Airborne Express). If the item is defined as a "Dangerous Good" by IATA, there will be further requirements for proper packaging, labeling, and documentation. Accordingly, the regulations require that the employer provide training to those acting as the shipper in these situations. Anyone acting as a shipper is responsible for completing training as outlined in the Dangerous Goods regulations.

There are 9 classes of Dangerous Goods. Class 6 includes "infectious substances".

IATA defines infectious substances in the following way:

"Infectious substances are defined as substances known to contain or reasonably expected to contain pathogens. Pathogens are microorganisms (including bacteria, viruses, rickettsia, parasites, fungi) or recombinant microorganisms (hybrid or mutant) that are known or reasonably expected to cause infectious disease in humans or animals".

To further clarify "known or reasonably expected to cause infectious diseases in humans or animals", this generally means cultures or samples that contain or are expected to contain a Risk Group 2 or higher pathogen. Please refer to the MSU Biosafety Manual Appendix D for current microorganism risk group tables. Generally speaking, microorganisms that are handled at BSL-2 are often classified as Risk Group 2.

Another situation calls for infectious substance classification. If a party is sending a sample to another lab for testing for the presence of a pathogen, the IATA regulations require that the sample be sent as an infectious substance.

Genetically-modified organisms (GMOs) are not considered to be infectious substances unless they are just that- infectious. If a GMO is not infectious but is capable of altering animals, plants or microbiological substances in a manner that is not normally the result of natural reproduction, it must be classified as a Class 9 Dangerous Good.

The ORCBS offers training for campus personnel who plan to ship infectious substances as well as consultation at the time of shipping.

#### **Impact of non-compliance:**

- Increased risk of material release during the shipping process,
- May result in refusal or return of packages during the shipping process. This could be critical if materials are temperature-sensitive.
- May result in fines from the Federal Aviation Administration (FAA).

#### **When in doubt, PLEASE ASK!**

For more information on infectious substance shipping requirements, please contact Robin Mecklem at 355-1283 or email at [mecklem@msu.edu](mailto:mecklem@msu.edu).