

Research Involving Flying Insects

Description

Research involving flying insects warrants unique biocontainment and biosafety considerations in order to:

- Prevent inadvertent release and establishment of exotic organisms
- Avert the release of genetically-modified arthropods or harbored recombinant microorganisms
- Mitigate the risk of personnel exposure to infectious agents

As a consequence of the diverse nature of arthropod research, both the Biosafety in Microbiological and Biomedical Laboratories as well as the NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules do not clearly designate laboratory containment criteria. To address this gap, as devised largely in accordance with the American Committee of Medical Entomology Arthropod Containment Guidelines, UF has established the following arthropod containment standards applicable to research involving flying insects. It is important to note that the considerations detailed herein are not exhaustive – additional containment features and laboratory practices may be imposed by the EH&S Biological Safety Office, dictated in federal/state permits, or stipulated in affiliated EH&S/IBC Biohazard Project Registration approval(s).

[su_spoiler style="fancy" icon="chevron" title=" Arthropod Containment Levels"]

Containment Setting	ACL-1	ACL-1+	ACL-2
Infection Status	RG-1/BSL-1 agents Indigenous,	RG-1/BSL-1 agents	up to* RG-2/BSL-2 agents
Arthropod Status	wild-type	Indigenous, transgenic**	Indigenous, transgenic* exotic***

* Experiments involving organisms that can be performed at a lower containment setting must be performed in accordance with overarching containment considerations.

** Per IBC approval.

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Containment Setting	ACL-1	ACL-1+	ACL-2
Location	If possible, separated from general traffic	If possible, separated from general traffic	Separated from unrestricted general traffic

Doors	Door openings must minimize escape	Door openings must minimize escape	Entrance is preceded by double-door vestibule. Doors are interlocked by physical or procedural means.
HVAC	Per laboratory design standards. No special precautions apply.	Per laboratory design standards. No special precautions apply.	Tailored to maintain observable inward (negative) directional airflow. Single-pass airflow.
HVAC Ports	Per laboratory design standards. No special precautions apply.	HVAC must be screened**** to prevent inadvertent release.	HVAC must be screened**** to prevent inadvertent release. Drains must be screened.****
Drains	Per laboratory design standards.	Drains must be screened.****	Floor drain traps must be charged with disinfectant.
Interior Surfaces (benchtops, walls, floors, etc.)	Per laboratory design standards.	Light colored (white) to detect any escapees. Minimize opportunities for harborage.	Light colored (white) to detect any escapees. Floor impervious. Minimize opportunities for harborage.
Ceiling	Per laboratory design standards.	Contiguous or fully intact drop tile ceiling.	Contiguous or sealed, affixed (either locked or adhered) drop tile ceiling.
Plumbing/Electrical	Per laboratory design standards.	Per laboratory design standards. Minimize internal facility appurtenances (light fixtures, pipes, etc.).	Per laboratory design standards. Minimize internal facility appurtenances (light fixtures, pipes, etc.). All penetrations must be sealed.
Vacuum Systems	Per laboratory design standards.	Per laboratory design standards.	Must be protected by hydrophobic filters.

Sterilization Equipment	Per laboratory design standards.	Autoclave may be available in the facility.	Autoclave may be available in the facility. Per FDOH regulations and UF policies, inactivation of pathogen infectious to humans warrants BI testing within every 40 hours of operation. Regular PM and calibration may be required per federal/state permit stipulations.
Windows	Per laboratory design standards.	If present, must be screened.***	Not recommended. If present, must be sealed shut and resistant to breakage.
Handwashing Sink	Per laboratory design standards.	Per laboratory design standards.	Must be present in the lab.
Illumination	Per laboratory design standards and appropriate for arthropod maintenance.	Per laboratory design standards and appropriate for arthropod maintenance.	Per laboratory design standards and appropriate for arthropod maintenance. Avoid contrasting openings which may inadvertently attract escapees. Additional barriers (such as hanging curtains, blowers or additional room partitions) may be implemented to reduce risks of exposure or release.
Additional Physical Barriers	Not required.	Not required.	

*** Containment setting for exotic species will depend upon FDACS permit approval. Additionally, the infection of exotic arthropod vectors with infectious agents may warrant heightened containment considerations.

**** Mesh size must be suitable to contain the insects used in the facility (minimum of 52 mesh is stipulated for certain regulated experiments in the NIH Guidelines).

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Containment Setting	ACL-1	ACL-1+	ACL-2
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PPE	As needed, per institutional policy.	As needed, per institutional policy and in accordance with EH&S/IBC approvals.	Minimal PPE: White, hooded coverall (preferred) or white lab coat/gown. Single pair of disposable gloves. Per EH&S/IBC approval, additional PPE may be required.
Biosafety Cabinet	Not required.	Not required.	Required, with annual certification.
Arthropod Tubes/Cups/Caging	Species-appropriate containers	Escape-proof containers.	Escape-proof containers. May require secondary containment.
Glovebox (static / dead air)	Not required.	Recommended.	Required for the manipulation of viable infected insects.
Environmental Growth Chambers	Not required.	Recommended.	Required for housing infected insects. It is recommended that infected and non-infected insects are maintained in separate growth chambers.
Aspirators	Mouth aspiration is discouraged in research settings. Mechanical aspirators are recommended.	Mouth aspiration is discouraged in research settings. Mechanical aspirators are recommended.	Mechanical aspirators are required. Exceptions require EH&S/IBC approval.
Containment Setting	ACL-1	ACL-1+	ACL-2

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<u>EH&S/IBC Biohazard Project Registration</u>	N/A	Required for experiments regulated under the NIH Guidelines.	Required for experiments regulated under the NIH Guidelines, studies involving pathogens infectious to humans, as well as studies affiliated with federal/state permits pertaining to arthropod vectors or pathogens.
Standard Operating Procedures (SOPs)	SOPs must be developed to mitigate the risk of inadvertent release.	SOPs must be developed to mitigate the risk of inadvertent release.	SOPs must be developed to mitigate the risk of inadvertent release and incidental exposure.
Escaped Arthropod Monitoring	Effective arthropod trapping program is recommended.	Effective arthropod trapping program is recommended.	Effective arthropod trapping program is required.
Container Identification and Labeling	General descriptive labels.	General descriptive labels. It is recommended that the number of contained arthropods are denoted.	Descriptive labels that minimally indicate the insect species, number of contained arthropods, responsible individual, and infectious agent(s).
Medical Surveillance	Per institutional standards.	Per institutional standards.	Per institutional standards.
Reportable Events	Report spills and incidental releases to the PI.	Immediately report environmental release of transgenics or exposure events involving recombinant/synthetic nucleic acid molecules to the UF EH&S Biosafety Office: bs@ehs.ufl.edu 352-392-1591)	Immediately report environmental release of transgenics and exposure events involving recombinant/synthetic nucleic acid molecules or infectious agents to the Biosafety Office: bs@ehs.ufl.edu 352-392-1591)

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- [Biosafety in Microbiological and Biomedical Laboratories](#)
- [NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules](#)
- [Arthropod Containment Guidelines](#)

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