

ASU FACT SHEET

The Use of Transgenic Insects in Research and Teaching

The use of transgenic or genetically modified insects, including fruit flies, bees, ants and butterflies, in research is governed by the NIH [Guidelines for Research Involving Recombinant and Synthetic Nucleic Acid Molecules](#) (NIH Guidelines). The NIH Guidelines detail procedures and practices for the containment and safe conduct of various forms of recombinant DNA research, including research involving genetically modified or transgenic insects. All researchers at ASU must comply with the NIH Guidelines even if their individual projects are not funded by NIH.

At ASU, the [Institutional Biosafety Committee](#) (IBC) oversees all research utilizing recombinant and synthetic nucleic acid molecules, as well as genetically modified organisms. The IBC reviews and approves recombinant and synthetic nucleic acid molecule research for compliance with the NIH Guidelines, ASU policies, and best laboratory practices. The ASU IBC reviews the handling of all recombinant and synthetic nucleic acid molecule research, even if it is exempt from the NIH Guidelines, so that ASU, acting through the IBC, can ensure that all recombinant and synthetic nucleic acid molecule research is appropriately reviewed and classified. ASU also requires the review of teaching activities by the IBC.

Principal Investigators (PIs) are responsible for compliance with the NIH Guidelines during the conduct of research with recombinant and synthetic nucleic acid molecules, including genetically modified or transgenic insects. PIs must submit a disclosure to the IBC for review and approval before beginning work with these materials. Additionally, while conducting research subject to the NIH Guidelines, the PI must notify the IBC before modifying recombinant and synthetic nucleic acid molecule research already approved and report any problems pertaining to the operation of containment practices and procedures, violations of the NIH Guidelines, or any significant research-related accidents and illnesses.

Description of specific practices under the NIH Guidelines

- The **purchase or transfer** of transgenic insects is not exempt from the NIH Guidelines. However, the purchase or transfer of transgenic rodents at BSL-1 containment is exempt from the NIH Guidelines.
- The **creation, generation, breeding and propagation** of transgenic insects are covered under Section III-D-4 of the NIH Guidelines. These activities are not exempt from the NIH Guidelines and must be reviewed by the IBC.
- Section III-D-5-e describes experiments involving genetically modified **insects in conjunction with whole plants** which may have the potential for detrimental impact to agriculture or ecosystems. Section III-E-2-b-(5) describes experiments involving genetically modified insects in conjunction with whole plants which have no recognized potential for detrimental impact to ecosystems or agriculture.
- Per Section III-F-4 of the NIH Guidelines, experiments may be exempt when they involve **recombinant or synthetic acid molecules that are entirely from a eukaryotic host** (such as an insect), including its mitochondria or plasmids, when propagated only in that host or a closely related strain of the same species. However, at ASU, this research must also be submitted to the IBC for review.
- If you are manipulating insects that have mutations or genetic modifications that are the result of **natural variation, chemical mutagenesis or radiation exposure**, and that have not had any molecular manipulation, these may not need to be reviewed by the IBC. Please contact Biosafety & Biosecurity to discuss the details of your research.
- **Knock-out** (gene silencing, gene ablation, etc.) **organisms** may be exempt from IBC review if the method used to generate the knock-out does not leave any “new” genetic material or any markers behind in the genome after the procedure. If the recombinant or synthetic nucleic acid molecules that are used to create the knock-out are permanently inserted into the genome or if an *Escherichia coli* (*E. coli*) system is

used to create the knock-out, the experiment must be reviewed by the IBC. Please contact Biosafety & Biosecurity to clarify your research.

- If there is any **genetic marker from another source** (not your insect) such as GFP, or if the genetic material is put into *E. coli* to amplify it, this research is subject to review by the IBC. Also, research or teaching activities involving the insertion of sequence elements which are engineered and did not originate in an organism or insertion of genes from another species that does not naturally exchange with your research species, must be reviewed by the IBC.
- Recombinant and synthetic nucleic acid molecule **modifications to the somatic cells** of non-transgenic insects may also be subject to the NIH Guidelines and review by the IBC.

If you have any questions about whether your research with genetically modified insects is subject to review by the ASU IBC, please Biosafety & Biosecurity.

A final note: A [permit](#) from the USDA is required for work with plant or animal pathogens and insects considered plant pests. An APHIS permit is required for the importation, movement or environmental release of genetically modified insects. Appropriate containment or confinement of the transformed organism is required whether the organism is released, imported or moved interstate.