

## Classification Guide for rDNA research under the NIH Guidelines

The complete *NIH Guidelines* are available [HERE](#).

It is a requirement under the *NIH Guidelines for Research Involving Recombinant DNA Molecules* (NIH Guidelines) that the Principal Investigator determine the classification of their research.

Please check below to determine the appropriate NIH category that accurately describes your experiment.

### CLASS III-A: Major Actions Under the NIH Guidelines

Experiments Considered as Major Actions Under the NIH Guidelines require submission to the NIH for NIH / RAC Review. The NIH will determine the level of containment at the time of approval. This process is initiated by first submitting to Institutional Biosafety Committee (IBC).

#### Yes

- III-A-1-a Deliberate transfer of a drug resistance trait to microorganisms that are not known to acquire it naturally, if such acquisition could compromise the use of the drug to control disease agents in human or veterinary medicine or agriculture.

### CLASS III-B

Experiments that require NIH / Office of Biotechnology Activities (OBA) and IBC approval before the initiation of the experiment.

#### Yes

- III-B-1 Deliberate formation of recombinant DNA containing genes for the biosynthesis of toxin molecules lethal at an LD50 of less than 100 nanograms per kilogram body weight (e.g., microbial toxins such as tetanus toxin).

### CLASS III-C

Experiments that Require Institutional Biosafety Committee and Institutional Review Board Approvals and RAC Review Before Research Participant Enrollment.

#### Yes

- III-C-1 Experiments Involving the Deliberate Transfer of Recombinant DNA, or DNA or RNA Derived from Recombinant DNA, into One or More Human Research Participants

### CLASS III-D

Experiments that require IBC approval before initiation of experiments.

#### Yes

- III-D-1 Experiments using human or animal pathogens (Risk Group 2, Risk Group 3, Risk Group 4, or restricted agents) as host-vector systems.
- III-D-1a Experiments involving the introduction of recombinant DNA into Risk Group 2 agents carried out at biosafety level 2 containment.
- III-D-1b Experiments involving the introduction of recombinant DNA into Risk Group 3 agents carried out at biosafety level 3 containment.
- III-D-1c Experiments involving the introduction of recombinant DNA into Risk Group 4 agents carried out at biosafety level 4 containment.
- III-D-1d Containment conditions for experiments involving the introduction of recombinant DNA into restricted agents shall be set on a case by case basis following NIH/ORDA review. A US Department of Agriculture permit is required for work with animal or plant pathogens.

**Yes**

- III-D-2 Experiments in which DNA from human or animal pathogens (Risk Group 2, Risk Group 3, Risk Group 4, or restricted agents) is cloned in nonpathogenic prokaryotic or lower eukaryotic host-vector systems.
- III-D-2a Experiments in which DNA from Risk Group 2 or Risk Group 3 Agents is transferred into nonpathogenic prokaryotes or lower eukaryotes carried out at biosafety level 2 containment.
- III-D-2b Containment conditions for experiments in which DNA from restricted agents is transferred into nonpathogenic prokaryotes or lower eukaryotes shall be determined by NIH/OBA following a case-by-case review.
- III-D-3 Experiments involving the use of infectious animal or plant DNA or RNA viruses in the presence helper virus in tissue culture systems.
- III-D-3a Experiments involving the use of infectious Risk Group 2 animal viruses in the presence of helper virus performed at biosafety level 2 containment.
- III-D-3b Experiments involving the use of infectious Risk Group 3 animal viruses or defective Class 3 animal viruses in the presence of helper virus carried out at the biosafety level 3 containment.
- III-D-3c Experiments involving the use of infectious Risk Group 4 animal viruses or defective Class 4 animal viruses in the presence of helper virus carried out at the biosafety level 4 containment.
- III-D-3d Experiments involving the use of infectious or defective restricted poxviruses in the presence of helper virus shall be determined on a case by case basis following NIH/OBA review.
- III-D-3e Experiments involving the use of infectious animal or plant viruses or defective animal or plant viruses in the presence of helper virus not covered by the above sections carried out at the biosafety level 1 containment.
- III-D-4 Experiments involving whole animals in which the animal's genome has been altered by stable introduction of recombinant DNA, or RNA derived therefrom, into the germ-line (transgenic animals) and experiments involving viable recombinant DNA-modified microorganisms tested on whole animals.
- III-D-4a Recombinant DNA, or DNA or RNA molecules derived therefrom, from any source except for greater than two-thirds of eukaryotic viral genome transferred to any non-human vertebrate or any invertebrate organism and propagated under conditions of physical containment comparable to BL1 or BL1-N and appropriate to the organism under study.
- III-D-4b Experiments involving recombinant DNA, or DNA or RNA derived therefrom, involving whole animals, including transgenic animals, and not covered by Sections III-D-1 or III-D-4a, carried out at the appropriate containment determined by the IBC.
- III-D-4c Exceptions under Section III-D-4, Experiments Involving Whole Animals
- III-D-4c-1 Experiments involving the generation of transgenic rodents that require BL1 containment are described under Section III-E-3, Experiments Involving Transgenic Rodents
- III-D-4c-2 The purchase or transfer of transgenic rodents is exempt from the NIH Guidelines under Section III-F, Exempt Experiments (see Appendix C-VI, The Purchase or Transfer of Transgenic Rodents)
- III-D-5 Experiments to genetically engineer plants by recombinant DNA methods, to use such plants for other experimental purposes,(e.g., response to stress), to propagate such plants, or to use plants together with microorganisms or insects containing recombinant DNA, conducted under the containment conditions described in Sections III-D-5a through III-D-5e.

- III-D-5a BL3-P (plants) or BL2-P + biological containment is recommended for experiments involving most exotic infectious agents with recognized potential for serious detrimental impact on managed or natural ecosystems when recombinant DNA techniques are associated with whole plants.

**Yes**

- III-D-5b BL3-P or BL2-P + biological containment is recommended for experiments involving plants containing cloned genomes of readily transmissible exotic infectious agents with recognized potential for serious detrimental effects on managed or natural ecosystems in which there exists the possibility of reconstituting complete and functional genome of the infectious agent by genomic complementation *in planta*.
- III-D-5c BL4-P containment is recommended for experiments with a small number of readily transmissible exotic infectious agents, such as the soybean rust fungus (*Phakospora pachyrhizi*) and maize streak or other viruses in the presence of their specific arthropod vectors, that have the potential of being serious pathogens of major U.S. crops.
- III-D-5d BL3-P containment is recommended for experiments involving sequences encoding potent vertebrate toxins introduced into plants or associated organisms.
- III-D-5e BL3-P or BL2-P + biological containment is recommended for experiments with microbial pathogens of insects or small animals associated with plants if the recombinant DNA-modified organism has a recognized potential for serious detrimental impact on managed or natural ecosystems.
- III-D-6 Experiments involving more than 10 liters of culture. The appropriate containment will be decided by the IBC. Where appropriate, Appendix K, Physical Containment for Large Scale Uses of Organisms Containing Recombinant DNA Molecules, shall be used. Appendix K describes containment conditions Good Large Scale Practice through BL3-Large Scale.

### **CLASS III-E**

Experiments require IBC approval before initiation of experiments at NC State University

**Yes**

- III-E -1 Experiments involving the formation of recombinant DNA molecules containing no more than two-thirds of the genome of any eukaryotic virus
- III-E-2 Experiments involving whole plants which are not covered under any other section of the Guidelines.
- III-E-2a BL1-P is recommended for all experiments with recombinant DNA-containing plants and plant-associated microorganisms not covered in Section III-E-2-b or other sections of the *NIH Guidelines*. Examples of such experiments are those involving recombinant DNA-modified plants that are not noxious weeds or that cannot interbreed with noxious weeds in the immediate geographic area, and experiments involving whole plants and recombinant DNA-modified non-exotic (see Section V-W) microorganisms that have no recognized potential for rapid and widespread dissemination or for serious detrimental impact on managed or natural ecosystems (e.g., ***Rhizobium spp.*** and ***Agrobacterium spp.***).
- III-E-2b(1) Plants modified by recombinant DNA that are noxious weeds or can interbreed with noxious weeds in the immediate geographic area.
- III-E-2b(2) Plants in which the introduced DNA represents the complete genome of a non-exotic infectious agent (see Section V-W).

- III-E-2b(3) Plants associated with recombinant DNA-modified non-exotic microorganisms that have a recognized potential for serious detrimental impact on managed or natural ecosystems (see Section V-W).

**Yes**

- III-E-2b(4) Plants associated with recombinant DNA-modified exotic microorganisms that have no recognized potential for serious detrimental impact on natural ecosystems (see Section V-W).
- III-E-2b(5) Experiments with recombinant DNA-modified arthropods or small animals associated with plants, or with arthropods or small animals with recombinant DNA-modified microorganisms associated with them if the recombinant DNA-modified microorganisms have no recognized potential for serious detrimental impact on managed or natural ecosystems (see Section V-W).
- III-E-3 Experiments Involving Transgenic Rodents (This section covers experiments involving the generation of rodents in which the animal's genome has been altered by stable introduction of recombinant DNA, or DNA derived therefrom, into the germ-line (transgenic rodents). Only experiments that require BL1 containment are covered under this section; experiments that require BL2, BL3, or BL4 containment are covered under Section III-D-4, Experiments Involving Whole Animals.

**CLASS III-F**

Experiments exempt from the *NIH Guidelines* and do not require IBC approval before initiation of experiments at NC State University

**Yes**

- III-F-1 Recombinant DNA molecules that are not in organisms or viruses.
- III-F-2 Recombinant DNA molecules that consist entirely of DNA segments from a single non-chromosomal or viral DNA source though one or more of the segments may be a synthetic equivalent.
- III-F-3 Recombinant DNA molecules that consist entirely of DNA 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 cell by well established physiological means.
- III-F-4 Recombinant DNA molecules that consist entirely of DNA from a eukaryotic host including its chloroplasts, mitochondria, or plasmids (but excluding viruses) when propagated only in that host (or closely related strain of the same species).
- III-F-5 Recombinant DNA molecules 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.
- III-F-6 Recombinant DNA molecules which do not present a significant risk to health or the environment, as determined by the NIH.