

Containment Level Flowchart

Applying for a Registration Document from the Institutional Biosafety Committee (IBC) to use Recombinant DNA and / or Infectious Agents

The key element of information that an investigator must determine and provide to the IBC in the application process, is the level of containment required for the proposed activity.

If you are going to use recombinant DNA (rDNA), finding the appropriate section of the NIH Guidelines can be a challenge. We hope the information in this module will help you

Flow chart to determine Risk Level and Section of NIH Guidelines

The NIH Guidelines can be accessed online at http://www4.od.nih.gov/oba/rac/guidelines_02/NIH_Guidelines_Apr_02.htm

To determine which section of the Guidelines apply, you should ask the four following questions:

- Is rDNA to be put in an organism?
- What is the nature of the gene(s) to be cloned?
- What is the nature of the host and vector to be used?
- Does the experiment involve cultures of more than 10 liters?

1. Do you intend to put recombinant DNA into another organism - bacteria or other cells (i.e., clone it)?

YES

Continue to the next question

NO—I am only using PCR or an oligonucleotide synthesizer to make DNA
The experiment is exempt. Section (III-F-1)

NOTE: Even “exempt experiments” should be performed under BL-1 containment conditions.

2. What is the nature of the DNA to be cloned?

It produces a TOXIN molecule that is lethal for vertebrates at an LD50 of less than 100 ng/kg body weight
This is a Section III-B experiment which requires direct NIH/ORDA approval

If it is from RISK GROUP 2, 3, 4, or restricted agent
It will fall under Section III-D-2, or Section III-F(continue to host/vector slides)

NONE OF THE ABOVE - continue for additional information

3. What is (are) the host(s) / vector(s)?

IF ALL HOSTS TO BE USED ARE:

- Non-pathogenic laboratory strains of E. coli K-12

OR

- Laboratory strains of Saccharomyces cerevisiae

OR

- Cultured cell lines (not expressing viral genes)

The experiment may be exempt (III-F-6), IF it does NOT involve cloning genes from Risk Group 2, 3, 4, OR restricted agents, OR viral genes.

It may also be exempt if all components of the rDNA molecule come from the same species (III-F-3 or -4), or from species that naturally exchange DNA (III-F-5).

3. What is (are) the host(s) / vector(s)?

IF A HOST OR VECTOR IS: a Risk Group 2, 3, 4, or Restricted Agent
Section III-D-1 applies

An INFECTIOUS VIRUS is being used as a vector OR a DEFECTIVE VIRUS is being used in the presence of a helper virus or helper cells (e.g., 293 cells)
Section III-D-3 applies

3. What is (are) the host(s) / vector(s)?

ANIMALS are to be used — either transgenic animals OR animals as hosts to test viable rDNA-modified microorganisms

Section III-D-4 applies; ** the box on the IBC form indicating use of animals must be checked
and an IACUC form must be completed if vertebrate animals are to be used

Section III-D-4-a: introduction of DNA other than two-thirds of eukaryotic viral genome into a non-human animal

- Section III-D-4-b: includes introduction of larger viral segments; does not include RG 2, 3, 4 or restricted agents
- Section III-D-4-c: exceptions for transgenic rodents (see III-E-3)

3. What is (are) the host(s) / vector(s)?

IF PLANTS are to be used — transgenic plants

OR

plants to be used to test rDNA-modified microorganisms or insects

III-D-5 applies: if experiments will employ exotic infectious agents that may have serious detrimental impact on managed or natural ecosystems

III-E-2-a applies: for r-DNA modified plants that are not noxious weeds or for experiments with plants and rDNA-modified non-exotic microorganisms

(Continued on next slide)

3. What is (are) the host(s) / vector(s)?

IF PLANTS are to be used — transgenic plants

OR

plants to be used to test rDNA-modified microorganisms or insects

III-E-2-b applies for

- (1) rDNA-modified noxious weeds;
- (2) plants modified by entire genomes of non-exotic infectious agents;
- (3) plants associated with rDNA- modified nonexotic microorganisms with a potential for detrimental effects;
- (4) plants associated with rDNA modified exotic microorganisms;
- (5) experiments with rDNA- modified arthropods or small animals or modified microorganisms associated with arthropods or small animals

4. Does the experiment involve cultures of more than 10 liters?

YES

Section III-D-6 should be consulted

Remember that the complete NIH Guidelines can be accessed online at http://www4.od.nih.gov/oba/rac/guidelines_02/NIH_Guidelines_Apr_02.htm.

If you have difficulty determining the Section of the Guidelines that apply to your proposed rDNA activity, contact the University Research Compliance Office or a member of the IBC for assistance