What is an Institutional Biosafety Committee?

- **Institutional Biosafety Committees (IBCs) provide local review and oversight of nearly all forms of research utilizing recombinant DNA, they ensure that recombinant DNA research conducted at or sponsored by the institution is in compliance with the *NIH Guidelines*.**

Registration of Research with the IBC

- **A requirement of the *NIH Guidelines* is that an IBC must review and approve all research subject to the *NIH Guidelines*.**
- **Principal Investigator (PIs) are responsible for determining if their work is requires IBC review and approval because it falls under Section III-A, III-B, III-C, III-D or III-E of *the NIH Guidelines.***

Registration of Research with the IBC

- **PIs must submit a research proposal for IBC review and obtain IBC approval if the work is subject to Section III-A, III-B, III-C, III-D or III-E of the *NIH Guidelines*.**
- **IBC approval must be obtained before initiating research subject to Section III-A, III-B, III-C or III-D of the *NIH Guidelines*.**
- **PIs must determine the need for IBC review before modifying any recombinant DNA research already approved by the IBC.**

Section III - Levels of Review

- **Section III describes the levels of review necessary for certain types of recombinant DNA research.**
- **There are 6 categories of experiments under the *NIH Guidelines*. These categories reflect the risk of the research, with more stringent review required for the higher risk experiments.**
- **Experiments that are not considered to pose a risk to human health or the environment are exempt from the *NIH Guidelines* and do not require review.**

Summary of *NIH Guidelines* Levels of Review

Section of the *NIH Guidelines*	Level of review
III-A	**IBC, Recombinant DNA Advisory Committee (RAC) review, and NIH Director review and approval**
III-B	**IBC approval and NIH Office of Biotechnology Activities (OBA) review for containment determinations**
III-C	**IBC and Institutional Review Board (IRB) approval and RAC review before research participant enrollment**
III-D	**IBC approval before initiation**
III-E	**IBC notice at initiation**
III-F	**Exempt from the *NIH Guidelines*. IBC registration not required if experiment not covered by Sections III-A, III-B, or III-C**

Section III-A

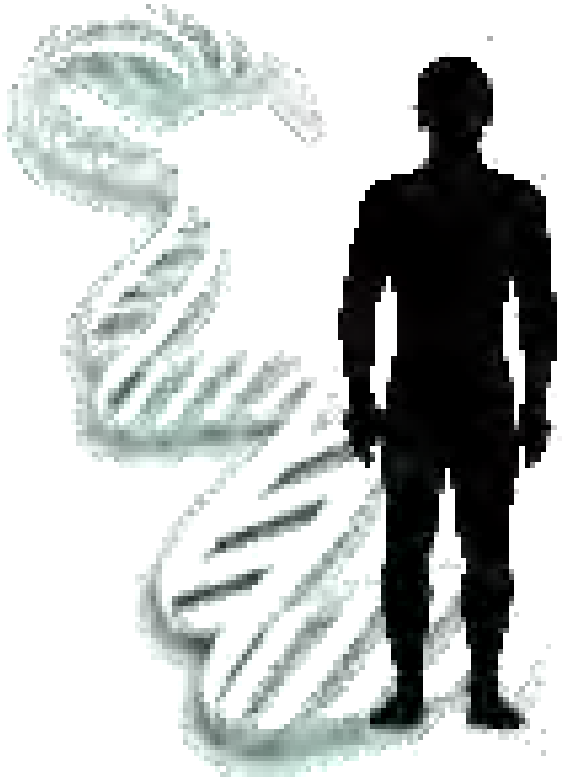
- **Section III-A covers experiments that require IBC approval, RAC review and NIH Director approval before they can begin.**
  - **These types of experiments are known as "Major Actions" and involve the deliberate transfer of a drug resistance trait to microorganisms, if such acquisition could compromise the use of the drug to control disease agents in humans, veterinary medicine, or agriculture.**

Section III-B

- **Section III-B covers experiments that require NIH/OBA review and IBC approval before initiation**
  - **Experiments involving the cloning of toxin molecules with LD50 of less than 100 nanograms per kilogram body weight**

Section III-C

- **Section III-C experiments require RAC review, IBC approval and IRB approval <u>before</u> initiation**
  - **Deliberate transfer of recombinant DNA, or DNA or RNA derived from recombinant DNA, into one or more human research participants**

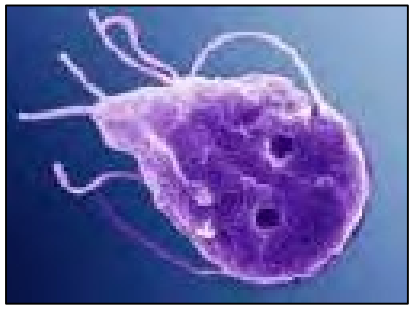
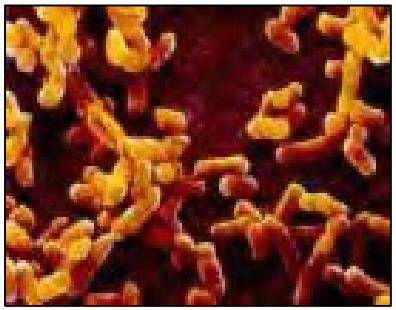
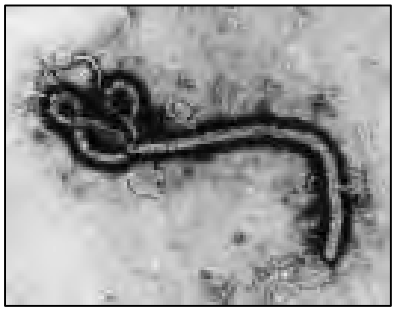
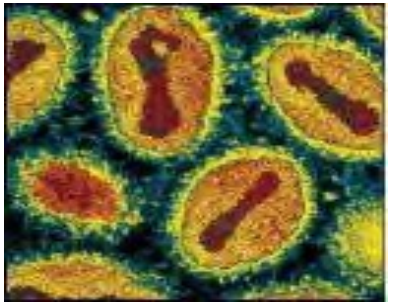


Section III-D

- **Section III-D covers experiments that require IBC approval before initiation**

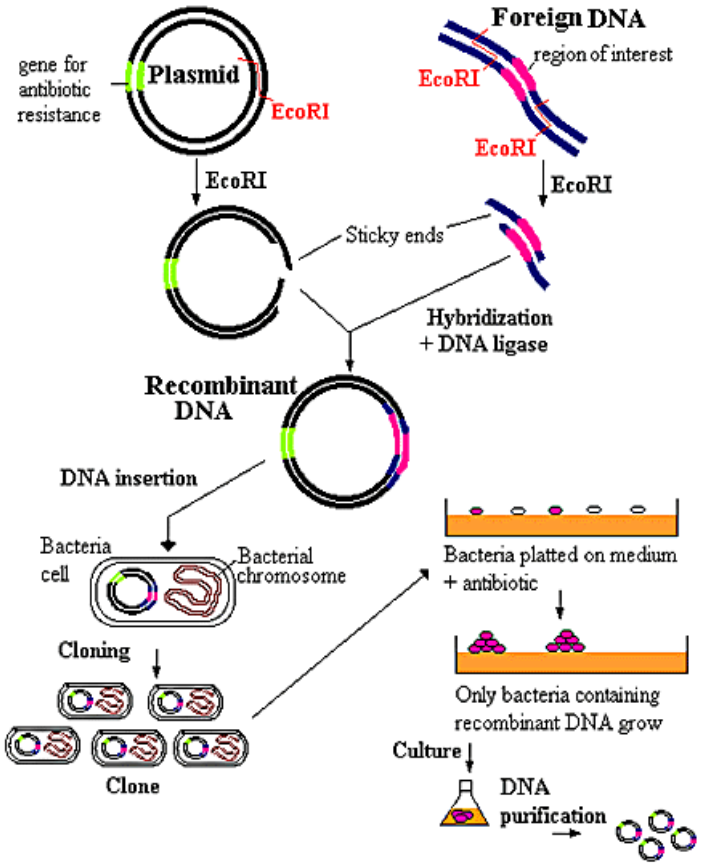
Section III-D-1

- **Experiments Using Risk Group 2, Risk Group 3, Risk Group 4, or Restricted Agents as Host-Vector Systems**

Section III-D-2

- **Experiments in which DNA from Risk Group 2, Risk Group 3, Risk Group 4, or Restricted Agents is Cloned into Nonpathogenic Prokaryotic or Lower Eukaryotic Host-Vector Systems**



Cloning into a plasmid

Section III-D-3

- **Experiments involving the use of infectious DNA or RNA viruses or defective DNA or RNA viruses in the presence of helper virus in tissue culture systems.**

Section III-D-4

- **Experiments Involving Whole Animals**
  - **Includes experiments in which:**
    - **The animal's genome has been altered by stable introduction of recombinant DNA into germline (transgenic animals)**
    - **Viable recombinant DNA-modified microorganisms are tested on whole animals**
    - **BL2 or BL2-N or higher is required**

Section III-D-5

- **Experiments Involving Whole Plants**
  - **Includes experiments in which:**

- **Plants are genetically engineered by recombinant DNA methods**
- **Plants are used with recombinant DNA-modified insects**
- **Generally BL2-P through BL4-P, depending on risk.**

Section III-D-6

- **Experiments involving more than 10L of culture**

See Appendix K of the *NIH Guidelines*

Section III-E

- **Section III-E describes a class of experiments which require registration with the IBC at the time of initiation.**
- **All experiments not included in III-A through III-D or III-F fall under III-E.**
- **The IBC still reviews and approves these experiments but this review does not need to occur before the experiment commences.**

Section III-E (continued)

- **III-E-1: Experiments Involving the Formation of Recombinant DNA Molecules Containing No More than Two-Thirds of the Genome of any Eukaryotic Virus.**

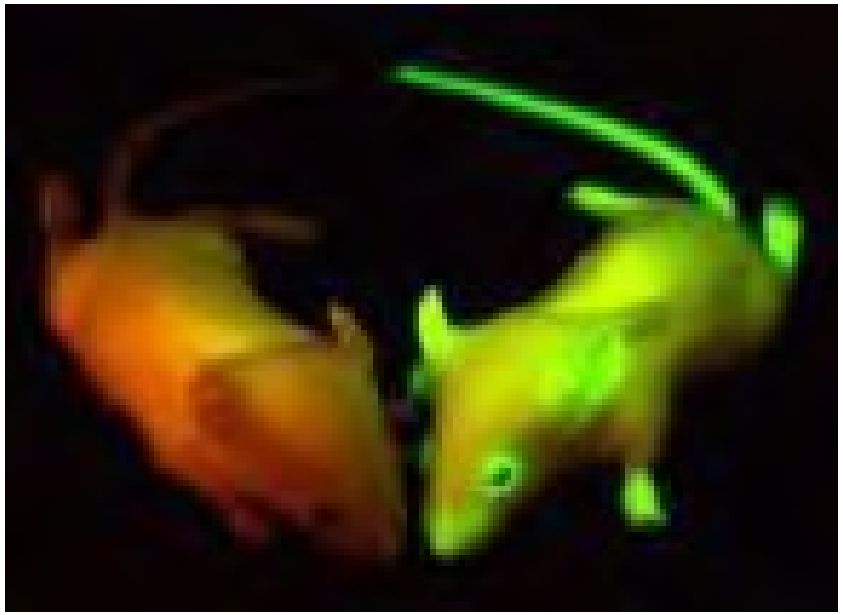
- **Such molecules may be propagated and maintained in tissue culture using BL1 containment. For such experiments it must be demonstrated that the cells lack helper virus for the specific Families of the defective viruses being used.**

Section III-E (continued)

- **III-E-2: Covers experiments involving whole plants, and/or experiments involving recombinant DNA-modified organisms associated with plants, except those that fall under Section III-A, III-B, III-D or III-F.**

Section III-E (continued)

- **Section III-E-3 covers experiments involving the generation of transgenic rodents**
  - **Rodent's genome has been altered by stable introduction of recombinant DNA into germline**
  - **BL1 containment is appropriate**



Section III-F

- **Section III-F describes experiments that are exempt from the *NIH Guidelines*. Registration with the IBC is not required (unless required by institutional policy)**

Section III-F (continued)

- **The following recombinant DNA molecules are exempt from the *NIH Guidelines*:**
  - **III-F-1 – Those that are not in organisms or viruses.**
  - **III-F-2 – Those that consist entirely of DNA segments from a single nonchromosomal or viral DNA source, though one or more of the segments may be a synthetic equivalent.**

Section III-F (continued)

- **Exempt from the *NIH Guidelines*:**
  - **III-F-3 – Those that consist entirely of DNA from a prokaryotic host including its indigenous plasmids or viruses when propagated only in that host, or when transferred to another host by well established physiological means.**

Section III-F (continued)

- **Exempt from the *NIH Guidelines*:**
  - **III-F-4 – Those 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 a closely related strain of the same species).**
  - **III-F-5 – Those that consist entirely of DNA segments from different species that exchange DNA known physiological processes.**

Section III-F (continued)

- **Exempt from the *NIH Guidelines*:**
  - **III-F-6 – Those that do not present a significant risk to health or the environment, as determined by the NIH director, with the advice of the RAC, and following appropriate notice and opportunity for public comment – See Appendix C of the *NIH Guidelines* for other classes of experiments which are exempt from the *NIH Guidelines.***

Appendix C-I

- **Recombinant DNA in Tissue Culture**
  - **Recombinant DNA molecules containing less than one-half of any eukaryotic viral genome that are propagated and maintained in cells in tissue culture are exempt.**

Appendix C-II

- **Experiments which use *Escherichia coli* K-12 host-vector systems are exempt from the *NIH Guidelines* provided that:**
  - **the *Escherichia coli* host does not contain conjugation proficient plasmids or generalized transducing phages; or**
  - **lambda or lambdoid or Ff bacteriophages or non-conjugative plasmids**

Appendix C-III

- **Experiments involving *Saccharomyces cerevisiae* and *Saccharomyces uvarum* host-vector systems are exempt from the *NIH Guidelines*.**

Appendix C-IV

- **Any asporogenic *Bacillus subtilis* or asporogenic *Bacillus licheniformis* strain which does not revert to a spore-former with a frequency greater than 10^{-7} may be used for cloning DNA and is exempt from the *NIH Guidelines***

Appendix C-V

- **Recombinant DNA molecules derived entirely from extrachromosomal elements of the organisms listed, propagated and maintained in organisms listed are exempt from the *NIH Guidelines*.**

Appendix C-VI

- **The purchase or transfer of rodents for experiments that require BL-1 containment**
  - **Note: Further manipulations of these animals are not necessarily exempt from the *NIH Guidelines***

Section IV

- **Section IV of the *NIH Guidelines* outlines the roles and responsibilities of the:**
  - **Institution**
  - **Institutional Biosafety Committee (IBC)**
  - **Biological Safety Officer (BSO)**
  - **Principal Investigator (PI)**
  - **NIH**

What Should I Ask About?

- **Do you have the information you need?**
  - **Scale of work**
  - **Replication competent virus testing**
  - **Location of work**
  - **Knowledge/training/experience of personnel**
  - ***Details*** **of vector system (not 'adenovirus vector')**
  - ***Details*** **of the gene product and its action**
  - ***Details*** **of the work to be done**

Reducing Risk

- **The usual**
  - **Containment (engineering controls)**
  - **Work practices**
  - **PPE**
- **Lower risk agent**
  - **Is that vector necessary, or convenient?**
  - **Latest generation vectors**
- **Can the experiment be changed to be done more safely, yet still answer the question?**

Beware of Assumptions

The investigators at my institution are using:

A. The most advanced and safety-engineered generation of viral vector available
B. Something the post-doc down the hall gave me
C. The one that Invitrogen sells
D. What we've always used
E. All of the above