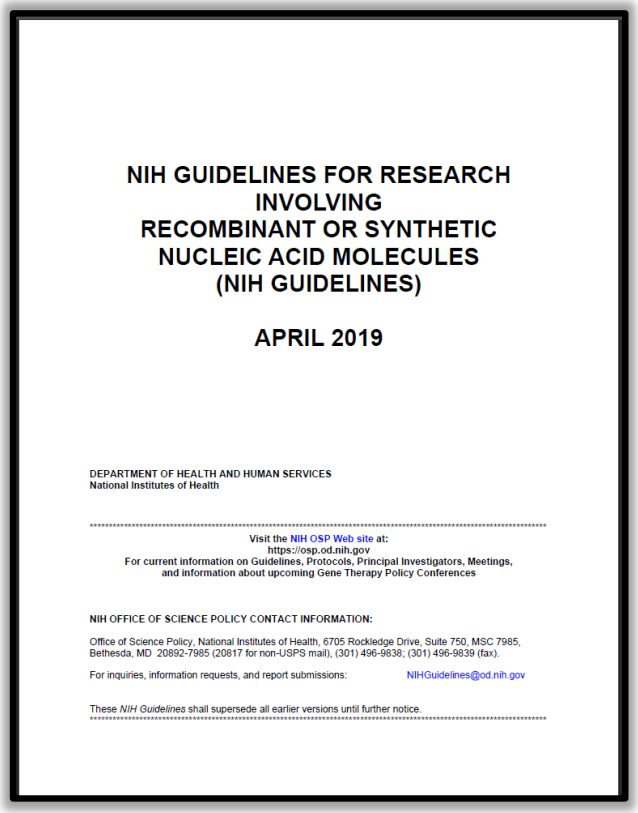
Overview:
NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules
and
Biosafety in Microbiological and Biomedical Laboratories (BMBL)

NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules



NIH GUIDELINES FOR RESEARCH INVOLVING RECOMBINANT OR SYNTHETIC NUCLEIC ACID MOLECULES (NIH GUIDELINES)

APRIL 2019

DEPARTMENT OF HEALTH AND HUMAN SERVICES
National Institutes of Health

Visit the NIH OSP Web site at:
https://osp.od.nih.gov
For current information on Guidelines, Protocols, Principal Investigators, Meetings, and information about upcoming Gene Therapy Policy Conferences

NIH OFFICE OF SCIENCE POLICY CONTACT INFORMATION:

Office of Science Policy, National Institutes of Health, 6705 Rockledge Drive, Suite 750, MSC 7985, Bethesda, MD 20892-7985 (20817 for non-USPS mail), (301) 496-9838; (301) 496-9839 (fax).

For inquiries, information requests, and report submissions: NIHGuidelines@od.nih.gov

These *NIH Guidelines* shall supersede all earlier versions until further notice.

- **Evolving, scientifically-responsive document**
  - **Multiple revisions since 1976**
  - **Latest version – April 2019**

https://osp.od.nih.gov/wp-content/uploads/2019_NIH_Guidelines.htm

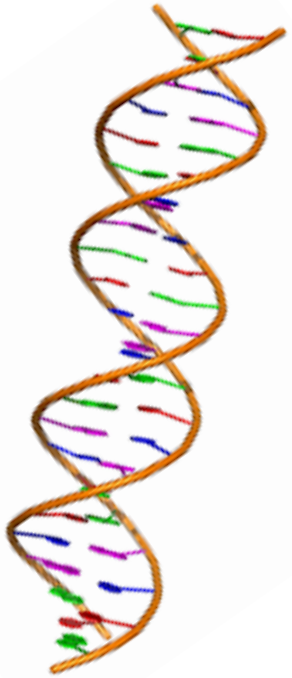
NIH Guidelines - Scope

- **Specifies practices for constructing and handling:**

  (i) recombinant nucleic acid molecules,

  (ii) synthetic nucleic acid molecules, including those that are chemically or otherwise modified but can base pair with naturally occurring nucleic acid molecules, and

  (iii) cells, organisms and viruses containing such molecules



The *NIH Guidelines* - Applicability

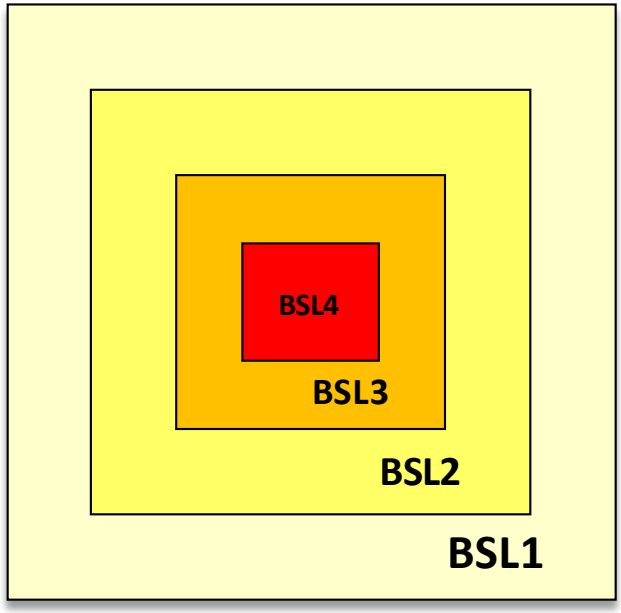
- **Research with recombinant or synthetic (or both) nucleic acid molecules that is**
  - **Conducted at or sponsored by an institution that receives <u>any</u> support for recombinant or synthetic nucleic acid research from NIH**
- **Other Federal agencies and some private funders of research also make adherence to the *NIH Guidelines* a term and condition of their funding**
- **A number of institutions also voluntarily adhere to the requirements of the *NIH Guidelines***
- **Specifically addresses <u>contained</u> research**

Institutional Biosafety Committees

- **Established under the *NIH Guidelines* specifically for the review of research involving recombinant or synthetic nucleic acid molecules**
  - **Potential risk to environment and public health**
  - **Biological Containment levels per *NIH Guidelines***
  - **Adequacy of facilities, SOPs,**
  - **Research personnel training**

NIH Guidelines – Containment

- **Physical (Appendix G)**
  - **Work Practices**
  - **Safety Equipment**
  - **Facilities**
- **Biological (Appendix I)**
  - **Survival**
  - **Transmission**



NIH Guidelines Section III - Levels of Review

Level of review	Example of types of research covered	Relevant section(s) of the *NIH Guidelines*
IBC and NIH Director review and approval	Experiments that compromise the control of disease agents in medicine through deliberate transfer of a drug resistance trait	III-A
IBC approval and NIH review for containment determinations	Experiment involving the cloning of toxin molecules with LD50 of less than 100 nanograms per kilogram of body weight	III-B
IBC and IRB approval and NIH review before research participant enrollment	Experiments involving the deliberate transfer of recombinant or synthetic nucleic acid molecules into a human research participant	III-C
IBC approval before initiation	Creating stable germline alterations of an animal's genome, or testing viable recombinant or synthetically modified microorganisms on whole animals, where BL-2 containment or greater is necessary	III-D
IBC notice at initiation	Creating stable germline alterations of rodents by introduction of recombinant or synthetic nucleic acid molecules when these experiments require only BL-1 containment	III-E
Exempt from the *NIH Guidelines*. IBC registration not required if experiment not covered by Sections III-A, III-B, or III-C	Purchase or transfer of transgenic rodents	III-F

Key Sections:

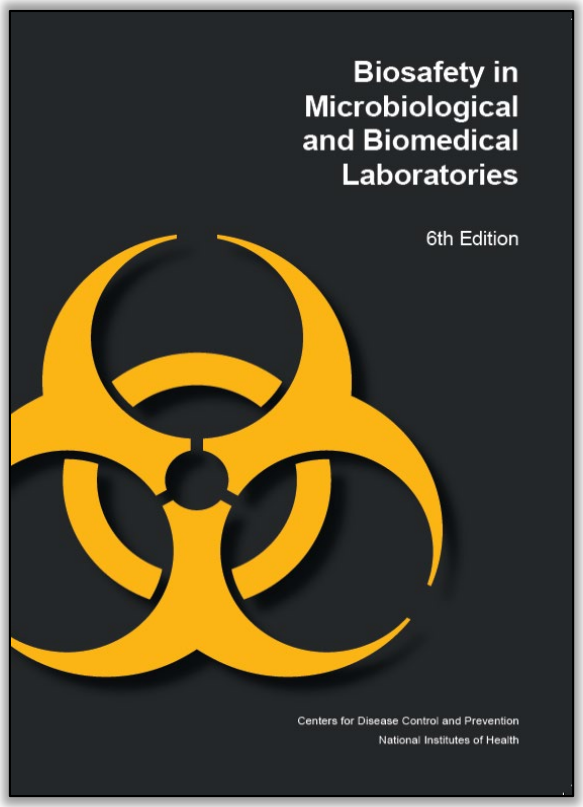
Section III-D-4: Experiments Involving Whole Animals

- **Experiments Require IBC Approval <u>Before</u> Initiation**
  - **Includes experiments in which:**
    - **The animal's genome has been altered by stable introduction of recombinant or synthetic nucleic acids into germline (transgenic animals)**
    - **Viable recombinant or synthetic nucleic acid molecule-modified microorganisms are tested on whole animals**

Key Sections: Section III-E-3

- **Experiments Involving the Generation of Transgenic Rodents**
  - **Experiments in which:**
    - **Rodent's genome has been altered by stable introduction of recombinant or synthetic nucleic acid molecules into germline**
    - **BL1 containment is appropriate**

Biosafety in Microbiological and Biomedical Laboratories (BMBL)



- **Applicability**
  - **Code of practice and an authoritative reference.**
  - **The preamble to the BMBL specifically states its purpose is to articulate "*best practices … … and is <u>not</u> intended as a regulatory document*".**

BMBL - Key Sections

- **Section II – Biological Risk Assessment**
  Approaches to assessing risks and selecting appropriate safeguards.
- **Section IV – Laboratory Biosafety Level Criteria**
  Requirements for biosafety levels including facility design criteria, safety equipment and work practices for physical containment and prevention of exposure and/or releases.
- **Section V - Vivarium Facilities for Animal Research**
- **Agent Summary Statements**
  Identify the primary agent and procedure hazards for specific pathogens and recommend precautions for their control
- **Agricultural Pathogen Biosafety**
- **Arthropod Containment Guidelines**
  Incorporated by reference