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**June 2012 COGR Meeting Thursday Afternoon Dual Use Presentation - Thomann**

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***DUKE UNIVERSITY INSTITUTIONAL  
BIOSAFETY COMMITTEE (IBC):***

***Review/Oversight of DURC***

COUNCIL ON GOVERNMENTAL RELATIONS

JUNE 7, 2012

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# Acknowledgements

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  - Co-Chair of IBC
  - PI for our Regional Biocontainment Laboratory
- ◎ Debra Hunt, Dr.P.H., CBSP
  - Director, Biological Safety Division
  - Biological Safety Officer

# UNDERLYING PREMISE

- Good People Doing Good Things

*Therefore*

- Misuse is Not an Interest or Consideration

*Therefore*

- Awareness should be Increased when  
Appropriate

*Most Importantly*

- Balance in Supporting Good Science  
Must be Maintained

# DUKE INSTITUTIONAL BIOSAFETY COMMITTEE (IBC) ROLES

- ◉ Official Roles in IBC Policy and Procedures Document
  - Ensure that all recombinant DNA (rDNA) research at Duke is compliant with NIH Guidelines
  - Ensure that all Select Agent research at Duke is compliant with federal, state, and local requirements.
- ◉ Other Services Provided
  - Provide advice and expertise, upon request, to support Duke safety office, employee health, animal program, etc.
  - Review all research at Duke using Risk Group 3 microbes.
  - Review research with dual use potential as a part of protocol review, and upon request.

# BACKGROUND

- Duke IBC Became Aware/Involved with Dual Use in 2003
- Southeast Regional Center of Excellence for Emerging Infections and Biodefense (SERCEB) Participated in Duke IBC Meeting
- Duke has Participated in the National Debate
- Duke Began Developing an Awareness Plan/Process in 2005

# AWARENESS PLAN

- ⦿ Plan Focused on:
  - ⦿ Educating the IBC
    - ⦿ IBC members trained in 2006 using the SERCEB training module
  - ⦿ Increasing awareness among investigators
- ⦿ Did not Limit the Scope to Select Agents
  - ⦿ Included all rDNA research
  - ⦿ Included other BSL3 research considered by IBC

# AWARENESS PLAN

- ◎ Focus is not Restricted to the “Directly Misapplied to Pose a Threat” Definition
  - That is an unlikely status
  - Our plan considers incremental or sequential threat or risk
    - Relates to the evolution of research and discovery
  - Intended to induce a proactive thought process in researchers



# DURC TRAINING RESOURCE

- ◎ Southeast Regional Center of Excellence for Emerging Infections and Biodefense (SERCEB)
  - The Dual Use Dilemma in Biological Research
  - <http://www.serceb.org/dualuse.htm>
- ◎ Required for IBC and Targeted PIs

# SERCEB DUAL USE TRAINING

## Learning Objectives

- Describe the Dual Use Dilemma in Bioscience Research;
- Identify and Analyze Potential Ethical, Legal and Policy Problems which may Arise in the Biosciences; and
- Develop Strategies to Respond to and Resolve Dual Use Scenarios.

# AWARENESS STATEMENT ON DUKE'S RECOMBINANT DNA REGISTRATION FORM

In reviewing registrations, the Duke IBC considers "dual use" potential, namely the potential for research projects with a beneficial purpose to provide knowledge, products or technologies that could be directly misapplied to pose a threat to public health and safety, agricultural crops and other plants, animals, the environment, or material. For a full discussion of this topic, consult [NSABB web site](#). Consider whether your research is reasonably anticipated to do any of the following based on current understanding:

- Enhance the harmful consequences of a biological agent or toxin.
- Disrupt immunity or the effectiveness of an immunization without clinical and/or agricultural justification.
- Confer to a biological agent or toxin, resistance to clinically and/or agriculturally useful prophylactic or therapeutic interventions against that agent or toxin or facilitate their ability to evade detection methodologies.
- Increase the stability, transmissibility, or the ability to disseminate a biological agent or toxin.
- Alter the host range or tropism of a biological agent or toxin.
- Enhance the susceptibility of a host population to the pathogenic consequences of an agent or toxin.
- Generate a novel pathogenic agent or toxin or reconstitute an eradicated or extinct biological agent.
- Provide other knowledge, products or technologies that could be directly misapplied to pose a threat to public health and safety, agricultural crops and other plants, animals, the environment, or material.

Comment on aspects of your research, if any, with potential for dual use:

# DUKE CASE 1: VIRULENCE FACTORS IN UROPATHOGENIC *E. COLI* (2006)

- ⦿ **Proposal:** Express potential virulence genes in uropathogenic *E. coli* to determine their effect in an animal model
- ⦿ **Goal:** Understand host-pathogen relationships. Develop vaccine or therapeutic for urinary tract infections
- ⦿ **Risk:** Enhance harmful consequences of agent.
- ⦿ rDNA registration addressed biosafety but not dual use
- ⦿ **Outcome:**
  - PI took dual use training
  - PI amended registration to discuss how potentially hyper-virulent *E. coli* would be recognized and handled

# DUKE CASE 2: TETANUS LIGHT CHAIN (2007)

- **Proposal:** Use retroviral vector (replication-deficient, three plasmids, VSV-G envelope) to express light chain of tetanus toxin in specific neurons in an animal model
- **Goal:** Determine the downstream effects of blocking transmission from these neurons
- **Risk:** Increase transmissibility of toxin
- PI addressed biosafety issues but not dual use
- Duke IBC raised dual-use concerns as part of its review of the rDNA registration
- **Outcome:** PI modified proposal to use a marker gene in place of the light chain of tetanus toxin.

# DUKE CASE 3: DENGUE IN *DROSOPHILA* (2007)

- **Proposal:** Adapt dengue virus to grow in *Drosophila* cell culture
- **Goal:** Study cell/ virus interactions using *Drosophila* genetic tools
- **Risk:** Alter host range of agent
- After grant approval, NIAID program officer raised dual use concern and requested review by Duke IBC
- **Duke IBC review:** (1) Serial passage is old technology. (2) Attenuation is expected result. (3) *Drosophila* not a dengue vector.
- **Duke IBC conclusion:** No meaningful dual-use potential
- **Risk management:** PI and lab staff completed on-line training in dual use
- **Outcome:** NIH awarded the funding. Research proceeded without modification.

# GOVERNMENT POLICY FOR OVERSIGHT

## *Institutional Responsibilities*

- ◎ Collaborate with Federal Agencies to:
  - Assess the risks for “covered” agents or toxins
  - Develop a risk mitigation plan
    - Consider incorporating risk mitigation into the grant for proposed research
    - Consider modifying the grant/contract for currently funded DURC projects
    - Adopt the appropriate risk mitigation measure(s) define in the Policy



# DUKE'S STATUS RELATED TO GOVERNMENT POLICY

- Currently Assessing Risks for Covered Agents and More
- Proactively Addressing Mitigation Planning for *Duke* Identified Research
- However, We are Not Working at the “Proposal/Granting Level”

# SCALING-UP?

- ⦿ Duke has Moved Beyond the Proposed Scope of the Government Policy
  - ⦿ All rDNA and high-risk BSL3 research
- ⦿ Synthetic Biology
  - ⦿ Big challenge/dilemma
  - ⦿ Expands the scope significantly
    - ⦿ Identification/capture would be challenging

# CONCLUSIONS

- IBCs can Review and Manage Dual Use Potential in the Absence of Formal Regulation or a Consensus Definition
- Investigators are Not Fully Ready to Self-Identify or Manage Dual Use Research
  - However, awareness and training can improve that performance

# CONCLUSIONS

- ① Time and Effort Required by PI and IBC are Modest and Manageable
- ① Management Strategies are Already Available at Many Levels of Potential Dual Use Review
- ① Benefit of Dual Use Review is Plausible but Unproven