INSTITUTIONAL BIOSAFETY COMMITTEE (IBC)

Meeting Minutes

June 23, 2025, 1:00 PM, Zoom

List of 2025 IBC Members (redacted except for Chair information)

- Adams, Dave
  - IBC Chair and Biosafety Officer.
  - Professor Emeritus, Biology and Biotechnology
  - Contact Information: IBC-Chair@wpi.edu
- xx (Community Member)
- xx (EHS Safety Technician)
- xx (Institutional Member, Professor BB)
- xx (Community Member)

Members Present (redacted except for committee role information)

Adams (Chair and BSO), xx (EHS), xx (External), xx (External) (quorum of ≥ 3 met)

IBC Lab Declaration Form Reviews

- At this **June IBC meeting**, the committee **reviewed and approved** the following IBC Declaration Forms and Control Plans:
  - Bioengineering Institute (BEI), Biomanufacturing Education and Training Center (BETC), Biomedical Engineering (BME): **20 forms**
  - Chemistry and Biochemistry (CBC): **14 forms**
  - Civil and Environmental Engineering (CEE) and Chemical Engineering (ChE): **14 forms**
  - Massachusetts Academy, Mechanical Engineering (ME), Physics (PH), PracticePoint (PP): **10 forms**

Special Discussion Points

- **Discussion of the toxin Phomoxanthone-A (PXA) and the declaration of other non-select agent toxins:**
  - The committee discussed a PI's previously declared chemical toxin: Phomoxanthone-A (PXA).
  - PXA is a naturally occurring molecule, originally isolated from *Phomopsis* fungi. It has powerful anti-cancer and anti-malarial properties (potential toxin), but its mechanism of action is unknown.
  - Its current SDS safety form indicates it is non-toxic, but the PI's own 2022 paper indicates it blocks mitochondrial ATP-synthase, so it might be mildly toxic.
  - For novel molecules like PXA, the expertise of the researcher is often relied on for safety information and the PI can produce their own SDS forms based on their own knowledge. In this case, the PI found no other evidence this past year that PXA is a potent toxin, so the committee accepted the original SDS safety form data for now.
  - With respect to **which types of non-select agent toxins should be declared to IBC's**, a WPI IBC committee member found the following information:
    - From the University of Minnesota:
    - https://research.umn.edu/units/obao/institutional-biosafety-committee/application-sections/biological-toxins
    - Toxins requiring IBC approval are those with a high acute toxicity (i.e., a mammalian LD_{50} of ≤100 µg/kg body weight) or those with significant potential for serious subacute or chronic toxicity (e.g., carcinogenicity).
    - From Montana State University:
    - https://www.montana.edu/ric/biosafety/policies/biological-toxin.html

        - This university provided a list of specific toxins they want to oversee along with their LD_{50}'s. The toxin names on this list are well known in the toxin field, not just some experimental manipulation that alters a cell's metabolism or that might "harm" a cell.
    - The committee decided to include this information on the declaration forms in the non-select agent toxin area to provide WPI PI's some examples of the types of toxins that require declaration to the IBC.

- **Classification of shRNA work in *C. elegans* affecting lipid metabolism:**
    - The committee discussed the classification of a new experiment by a PI to alter lipid metabolism in *C. elegans* using shRNA plasmids to knock down expression of enzymes that participate in lipid metabolism. WT *C. elegans* strain N2 was fed with *E. coli* strain HT-115 transformed with shRNA plasmids elo-5, elo-3, or ctg-3, which alter lipid metabolism.
    - The committee saw **no reason to boost these experiments beyond the usual BSL-1** that is typical for lower eukaryote cloning work (NIH Guidelines III-D-II-a), because the expression of the shRNA plasmids in RG-1 *E. coli* was under the control of a Lac promoter that is **not active in human cells**, and there were **no obvious boosting modifiers** (such as increasing the RG agents virulence, overcoming the RG's host immunity, developing RG drug resistance, decreasing RG detection, increasing RG transmission, changing RG tissue tropism, increasing RG host susceptibility, or increasing RG survival in the environment) (NIH Guidelines II-A-3).

- **Classification of experiments with lenti-plasmids and mCherry-Ago-2:**
    - The committee discussed a new experiment with commercially obtained lenti vectors encoding mCherry-tagged Ago-2. Ago-2 functions in cellular RNAi, and the m-Cherry is used to follow its cellular location via fluorescence. The lenti-vectors were used to express mCherry-Ago-2 in rat PC-12 cells.
    - The lenti-plasmid system is a second-generation system that has several important safety features:
        - The lenti-genes are separated onto three separate plasmids that lack recombination sequences (the plasmids lack homology to each other), so the plasmids are not likely to recombine to make an intact virus.
        - The genes lack any HIV pathogenic genes (vpr, vif, vpu, env, and tat), and no lab at WPI works with WT HIV that in theory could provide the missing pathogenic genes.
        - The genes contain mutated LTR sequences that produce **replication-incompetent particles** when mixed with helper plasmid. The helper plasmid experiments are the ones especially boosted here because they produce the particles (as with other WPI PI's).
    - The vendor recommends working at BSL-2 with the entire system.
    - The committee decided to **boost the work to BSL-2+ because**:
        - The promoters used (CMV and EF-1α) are **active in human cells**, and
        - The **lenti-vectors integrate in the host genome** (which could potentially inactive a key host gene).
    - The PI's BSL-2+ conditions are listed on the form.

- **Potential prion presence in human cadaver experiments:**
    - The committee discussed whether WPI PI's working with human cadavers should be required to use special cleaning conditions that have been shown to inactivate prions present in tissues or on instruments.
    - The committee identified several articles that discussed prion inactivation. Conditions that completely inactivated prions in tissues or on instruments included: 2% SDS in 1% Acetic Acid at 65°C for 2 hours, or 4% SDS in 1% Acetic Acid at 65°C for 30 minutes (Peretz et al. 2006).
    - WPI's cadavers are procured from reliable donor programs that use **medical and social history pre-screens**. The medical screens are negative for major human pathogens, and the social history screens preclude working with cadavers that have died from prion diseases or from an unknown neurological condition (that could include prions).
    - The committee decided that using reliable vendors that **perform medical and social history pre-screening is best practice for cadaver work**, and there is limited risk to the researchers who **already work with BSL-2 precautions** (and assume the cadavers might be contaminated). Due to the high chemical risk of working with hot acetic acid solutions, the **committee decided to not require its use for the cadaver experiments.**

Requirements for Conducting IBC Business

- According to the *NIH Guidelines* (which the City of Worcester requires WPI to follow), each IBC committee decides their own rules for conducting business.
- WPI's IBC agreed in a previous meeting to follow the recommendation of Michelle Johnson-Lancaster (Director of NIH's Office of Science Policy who oversees all IBCs) to **have a minimum of the following members** present to conduct business:
    - Committee Chair and Biosafety Officer
    - At least one community member
    - Scientific expertise to discuss the items at hand
    - Simple quorum (our IBC has **5 members**, so a **quorum is ≥3 members**)

Plan for 2025 Form Reviews

- **Information Gathering and Initial Chair Review:**
    - The IBC Chair obtains the following information in advance of contacting bio-related PI's and enters it on the form:
        - **Courses Taught:** Makes a list of the courses taught by each bio-related PI for that year and notes whether the course has a lab component.
        - **Papers Published:** Performs a web search for papers published by each bio-related PI since the last IBC meeting, and determines whether any biological agents were used in the paper.
        - **IACUC Protocols:** Performs a search of WPI's IACUC folders (the IBC Chair is also a member of IACUC) to determine which bio-related PI's have approved or expired IACUC protocols for working with vertebrates. IACUC and the IBC share responsibility for experiments in which biological agents are used in vertebrates.
    - The Chair lists the new information on the declaration form (in a different colored font to allow easy identification by the committee members).
    - The Chair contacts each PI to show them the information obtained for their lab and to obtain any new information they need to declare.
    - The Chair helps the PI add that information to the form.
    - The Chair briefly summarizes the new information at the beginning of each form, and also in a **summary file** to be presented at the IBC meetings to initiate discussion.
    - When the Chair is done with the initial information gathering, he places his initials at the end of the filename (so the committee members know that file is ready for a review), places the files on the IBC share-drive, and notifies committee members they are ready for review.
- **Committee Member Reviews:**
    - Committee members review the forms (or the Chair's summary file).
    - Members email any comments directly to the Chair to ensure they are seen (the files themselves may be in view-only mode).
    - The Chair summarizes the member comments in the summary file for committee discussion.
- **Meeting Discussions:**
    - During the IBC meetings, the IBC Chair uses the summary file to discuss new information, new questions from committee members, or important information from last year.
    - In some cases, further research is required to answer a question, so the committee formulates a plan to obtain that information from the PI or from published articles.
    - The Chair adds any new information to the forms.
- **Minutes:**
    - The Chair lists which forms were reviewed and briefly summarizes the major discussion items.

- The Chair **adjourned** the meeting at 2:00 PM.