INSTITUTIONAL BIOSAFETY COMMITTEE
12:02 p.m.
President's Conference Room
Meeting Minutes
January 14, 2026

Members Present:
Jovanka Voyich-Kane, Microbiology & Cell Biology, chair
Amy Robison, Biosafety Officer
Alyssa Evans, Microbiology & Cell Biology
Jerod Skyberg, Microbiology & Cell Biology
Kristen Connolly, Center for Biofilm Engineering
Matt Taylor, Microbiology & Cell Biology, IACUC Chair
Kim Hilmer, Chemistry/Biochemistry
Mike Giroux, Plant Sciences & Plant Pathology
Blake Wiedenheft, Microbiology & Cell Biology
Dale Huls, Office of Sponsored Programs
Katie Rowse, Community Member

Members Absent:
Jennifer DuBois, Chemistry/Biochemistry
Josh Charles, Bozeman Fire Department, Community Member

Ex-Officio Members Present:
Tammy Lynn, Safety & Risk Management
Nicole Soll, Research Integrity & Compliance
Kirk Lubick, Research Integrity & Compliance

Ex-Officio Members Absent:
Jaspur Kolar, Bridger Occupational Health & Urgent Care

Guests:
Mark DeWald, Research Integrity & Compliance
Ryan Brickman, Safety & Risk Management

I. **Review and approval of IBC Meeting Minutes from December 10, 2025.**
The minutes were approved as written. Approved 11, Nays 0, Abstained 0

II. **Announcements from the Chair:**
Introduction of new committee members; Dale Huls with the MSU Office of Sponsored Programs and Katie Rowse as a new Community Member

III. **Protocols/Amendments/Renewals/Interim Reviews Approved since September Meeting:**

Protocol #...	Reference #	Principal Investigator	Title	Protocol Type...	Expiration Date	Renewal Date
2023-86-IBC	86	Bothner, Brian	Environmental Microbial Diversity and Arsen...	Amendment	9/30/2026	9/30/2026
2024-540 -IBC	540	Secor, Patrick	Biosafety in the Bacteriophage Pathobiology...	Amendment	10/31/2027	10/31/2027
2025-377-IBC	377	Loveday, Emma	Virus and mammalian cell studies using dro...	Amendment	2/28/2028	2/28/2028
2023-92-IBC	92	Gerlach, Robin	Development of fungal, algal and bacterial b...	Interim Review	12/31/2026	12/31/2026
2024-41-IBC	41	Kirker, Kelly	The Effect of Biofilms on Mammalian Cells	Interim Review	2/28/2027	2/28/2027
2024-483-IBC	483	Kirker, Kelly	Biofilm evaluation of explanted tissues	Interim Review	1/31/2027	1/31/2027
2025-591-IBC	591	Wiedenheft, Blake	Immune systems across domains of life	Original	12/31/2028	12/31/2028
2025-402-IBC	402	Walk, Heather	Archer Biologicals: E. coli characterization fro...	Renewal	12/31/2028	12/31/2028

Amendments
2023-86: PI change
2024-540: additional bacterial and phage species and their corresponding routes of administration in mice.
Biohazardous Agents: Salmonella enterica typhimurium
Strains: LT2, SL1344, clinical isolates **Biosafety Level:** 2
Biohazardous Agents: Klebsiella pneumoniae

Strains: LD240, clinical isolates **Biosafety Level:** 2
Biohazardous Agents: Citrobacter freundii
Strains: ST22, clinical isolates **Biosafety Level:** 2
Biohazardous Agents: Citrobacter rodentium
Strains: DBS100, ICC168, clinical isolates **Biosafety Level:** 2

Recombinant/Synthetic Nucleic Acid Molecules:
Host: E. coli, Salmonella, Citrobacter, Klebsiella (enteric bacteria)
Vector/Plasmid: pXs
Inserted Nucleic Acids/Genes of Interest: SpyCatcher-fusion
Biosafety Level: 2
Host: E. coli, Salmonella, Citrobacter, Klebsiella (enteric bacteria) and the phages that infect each bacterial host
Vector/Plasmid: pTn7xTS chromosomal insertion system
Inserted Nucleic Acids/Genes of Interest: SpyCatcher-fusion
Biosafety Level: 2
Host: Salmonella enterica and the phages that infect this bacterial host
Vector/Plasmid: pXS, pHERD, or pUCP vectors
Inserted Nucleic Acids/Genes of Interest: SpyCatcher-tagged proteins, fluorescent reporters
Biosafety Level: 2
Host: Citrobacter spp. and the phages that infect this bacterial host
Vector/Plasmid: pXS or pUCP vectors
Inserted Nucleic Acids/Genes of Interest: SpyCatcher-tagged proteins, fluorescent reporters
Biosafety Level: 2
Host: Klebsiella pneumoniae and the phages that infect this bacterial host
Vector/Plasmid: pXS, pHERD
Inserted Nucleic Acids/Genes of Interest: SpyCatcher-tagged proteins, fluorescent reporters
Biosafety Level: 2

NIH Guidelines: Section III-D.

2025-377: addition of new personnel, and virus strains
Biohazardous Agents: Influenza A
Strains: A/sanderling/Delaware/518/2021 (H5N2) (LPAI) **Biosafety Level:** 2
Biohazardous Agents: Influenza A
Strains: A/ruddy turnstone/Delaware /206/2020 (H7N3) (LPAI) **Biosafety Level:** 2

New Business
A. Review of Protocols

Originals
None

Renewals
121 Lu "System Biology to Improve Oilseed Traits"
Overview: Candidate genes that may be beneficial for fatty acid metabolism and/or oil accumulation in seed, and those that affect seed size of camelina will be identified by comparative genomics combined with transgenic studies. Recombinant DNA will be created and transformed into bacteria followed by transforming into Agobacterium via heat-shock or electroporation. Transformation of plants will be performed by Agrobacterium-mediated infiltration in a sealed vacuum chamber. Transgenic plants will be screened using selectable markers.
Risk mitigation includes: Prior to plant maturity, drains will be covered with fine-mesh screens to prevent shattered seeds escape. Harvested transgenic seeds will be stored in designated containers/cabinet in PBB. Seeds will be transported in sealed metal containers. Both greenhouse and storage cabinet will be locked to limit access. Designated lab coats will be worn while handling

transgenic plants. Transgenic plant materials and pot soil to be disposed of will be autoclaved. Liquid cultures will be decontaminated using a final concentration of 10% bleach. Experiments are limited to laboratory and greenhouse containment and will not involve field release.

Biohazardous Agents: Escherichia coli cloning
Strains: DH5alpha **Biosafety Level:** 1
Biohazardous Agents: Agrobacterium tumefaciens
Strains: GV3101 **Biosafety Level:** 1

Recombinant/Synthetic Nucleic Acid Molecules:
Host: Camelina
Vector/Plasmid: Agrobacterium/pBinGlyDsRed
Inserted Nucleic Acids/Genes of Interest: CS17g003107
Biosafety Level: 1
Host: E. coli DH5alpha
Vector/Plasmid: pCBC-DT3DT4
Inserted Nucleic Acids/Genes of Interest: GDSL gRNA
Biosafety Level: 1
Host: Camelina
Vector/Plasmid: Agrobacterium/pBinGlyRed
Inserted Nucleic Acids/Genes of Interest: MYB1
Biosafety Level: 1
Host: Camelina
Vector/Plasmid: Agrobacterium/pBinGlyRed
Inserted Nucleic Acids/Genes of Interest: PDCT gRNA
Biosafety Level: 1
Host: Camelina
Vector/Plasmid: pBinGly
Inserted Nucleic Acids/Genes of Interest: MYB61
Biosafety Level: 1

NIH Guidelines: III-E, Appendix L

Motion to return for modification and administratively approve
Approved 11, Nays 0, Abstained 0
Approved items to be addressed include:

Protocols Objectives:

- Briefly explain what Agrobacterium-mediated infiltration is.
- Clarify this sentence: "Transgenic materials to be disposed of will be autoclaved at 121C for 60 minutes". Soil should also be autoclaved since camelina shatters easily and maturing plants leave seed on soil surface.
-
- Clarify how E. coli and Agrobacterium cultures are destroyed.

- Amend third sentence in third paragraph to "Prior to plant maturity, drains will be covered with a fine mesh screen to prevent shattered seeds escape."
- Add "Camelina could cross with noxious weeds, therefore these experiments are limited to laboratory and greenhouse containment and will not involve field release, at this time."

Recombinant/Synthetic Nucleic Acid Molecules to be Used:

- Amend Biological Origin for the last row. Basta is not from camelina, it is from Streptomyces hygroscopicus

Transgenic Plant Storage Location:

- Amend Typo to 177D

11 Rynda-Apple "Influenza viruses for use in research projects in the Apple lab"
Overview: Bats are either confirmed or predicted reservoir host for many human viruses, but little is known about how their immune response and physiology contributes to virus shedding or retention. Taking advantage of our captive colony of Jamaican fruit bats (JFB) that in the wild naturally harbor H18N11 influenza A viruses we seek to understand immune and metabolic parameters contributing to virus retention and virus shedding after H18N11 infection.
Risk mitigation includes: Viruses are received from collaborators in pre-grown stocks. These reassorted viruses will not be propagated, and are used at the provided concentration, or diluted prior to use. All experiments utilizing reassorted virus will be terminal. No strains will be selected for, and all materials will be fixed or destroyed after analysis. No re-infection of animals will occur with any samples harvested from infected animals.

Biohazardous Agents: Influenza A
Strains: A/Puerto Rico/8/34-H1N1 (PR8);A/X31/H3N2 ; A/swine/Texas/4199-2/98-H3N2 (TX98), and PR8/TX98 reassortants (NS1 dm viruses). All reassortment viruses has been made by our collaborator using standard reverse genetics methods. **Biosafety Level:** 2
Biohazardous Agents: Influenza A
Strains: California 09 strain **Biosafety Level:** 2
Biohazardous Agents: Staphylococcus aureus
Strains: LAC (USA300) **Biosafety Level:** 2
Biohazardous Agents: Streptococcus pnemoniae
Strains: D39 **Biosafety Level:** 2
Biohazardous Agents: Influenza A
Strains: H18N11 strain **Biosafety Level:** 2
Biohazardous Agents: Influenza D virus
Strains: OK11 **Biosafety Level:** 2

Recombinant/Synthetic Nucleic Acid Molecules:
Host: green monkey MDCK **Vector/Plasmid:** pHW2000
Inserted Nucleic Acids/Genes of Interest: H18 and NA11 **Biosafety Level:** 1
Host: canine RIE1495 **Vector/Plasmid:** pHW2000
Inserted Nucleic Acids/Genes of Interest: H1 NA1 H3 NA2 **Biosafety Level:** 1

NIH Guidelines: III-D

Motion to return for modification and DMR upon submission.
Approved 11, Nays 0, Abstained 0
Approved items to be addressed include:

Protocol Objectives:

- Remove "sub-confluent" MDCKII cells as it is unnecessarily specific.
- Some concern on fixing tissues for potentially as little as 24 hours. Some bat tissues may be large enough that 24 hours in 10% buffered formalin may not fully fix and inactivate influenza virus within 24 hours. Extending this to 48 hours is recommended. Alternatively, provide reference/justification for the 24-hours.
- The specifics of the antibodies being used is unnecessary and should be removed.
- Provide clarity regarding influenza strains currently in use.

Biohazardous Agent Propagation:

- Now that propagating virus is removed from the protocol objectives, check no this question.

Recombinant/Synthetic Nucleic Acid Molecules

- Remove "MDCK" since two difference cell lines are used to grow the viruses.
- Add "Viruses are received from our collaborators in pre-grown stocks." even though this is stated in the Objectives, it makes this more clear.

PAPR Usage Qualification

- Completion of medical clearance is required for approval.

Biohazardous Waste

- Check the box for Pathological waste if bat carcasses are disposed of in the red biohazard bags at the ARC.

14 Merzdorf "The role of Zic1 and of its direct targets, such as aqp3b, during gastrulation and in early neural development"

Overview: The goal of our project is to learn about the mechanisms of gastrulation and neural development during embryogenesis. We study various genes, which play a role in early embryonic development, principally the zic family of transcription factors and the genes regulated by these transcription factors. When gastrulation and neurulation do not happen properly, birth defects such as anencephaly and spina bifida result. Thus, studying the roles of genes in early development adds to our basic understanding of these important embryonic processes. Recombinant DNA is used to clone genes into plasmids so that sense RNA can be synthesized for misexpression of these genes in Xenopus or zebrafish embryos.

Risk mitigation includes: PPE is worn in the lab any time that biohazardous materials are handled (e.g. bacteria, RNA, rDNA). Glass microcapillaries are used for injection into embryos, and are disposed into a dedicated container next to the microinjection apparati. If a microcapillary breaks, the contained volume is unable to exit from the microcapillary, since it contains 0.5 ul along its entire length (ca 2 inches). The contained volume adheres too tightly to the capillary walls. The volumes in the tubes (from which the microcapillaries are loaded) are so small (2.5 microliters or less) that even if an open tube were to be dropped, the solution would remain in the tubes due to adhesion to the tube walls. Thus, spills of the RNAs during the microinjection procedure are nearly impossible. None of these RNAs or rDNAs are able to alter or incorporate into nuclear DNA. Personnel will wear PPE (lab coat, gloves, glasses or goggles) when disposing of the embryos and media into bleach solution. E. coli plates are autoclaved, E. coli cultures are treated with bleach.

Biohazardous Agents: Escherichia coli cloning
Strains: DH5alpha; XL1-Blue **Biosafety Level:** 1

Recombinant/Synthetic Nucleic Acid Molecules:
Host: E. coli, Zebrafish embryos, Xenopus embryos
Vector/Plasmid: pCS2+ vector family; pBluescript vector family; pCMV-SPORT6 pGEM-T vector family; pGP-CMV pSP64 vector family; pQE-30, -31, -32 pDNR-LIB, pT7TS
Inserted Nucleic Acids/Genes of Interest: cDNA from Xenopus laevis, X. tropicalis, zebrafish, chick
Biosafety Level: 1
Host: E. coli, Zebrafish embryos, Xenopus embryos
Vector/Plasmid: pCS2+ vector family; pBluescript vector family; pCMV-SPORT6 pGEM-T vector family; pGP-CMV pSP64 vector family; pQE-30, -31, -32 pDNR-LIB, pRK5
Inserted Nucleic Acids/Genes of Interest: cDNA of aqp 2, 7, and 9, cDNA of Beclin1
Biosafety Level: 1
Host: E. coli, Zebrafish embryos, Xenopus embryos **Vector/Plasmid:** pRN3P
Inserted Nucleic Acids/Genes of Interest: GFP **Biosafety Level:** 1
Host: E. coli, Zebrafish embryos, Xenopus embryos **Vector/Plasmid:** pCS2+
Inserted Nucleic Acids/Genes of Interest: beta-galactosidase **Biosafety Level:** 1
Host: E. coli, Zebrafish embryos, Xenopus embryos
Vector/Plasmid: pBluescript vector
Inserted Nucleic Acids/Genes of Interest: m-Cherry **Biosafety Level:** 1
Host: E. coli, Zebrafish embryos, Xenopus embryos **Vector/Plasmid:** pcDNA3
Inserted Nucleic Acids/Genes of Interest: GFP, RFP, LC3 **Biosafety Level:** 1
Host: E. coli, Xenopus embryos
Vector/Plasmid: pBS-SK (Bluescript)
Inserted Nucleic Acids/Genes of Interest: Goosecoid **Biosafety Level:** 1
Host: E. coli, Xenopus embryos **Vector/Plasmid:** psp73
Inserted Nucleic Acids/Genes of Interest: Xbra **Biosafety Level:** 1

NIH Guidelines: III-D, Appendix G
Motion to return for modification and administration approval.
Approved 11, Nays 0, Abstained 0
Approved items to be addressed include:

Protocol Objectives:

- Given the PMSG is not considered recombinant nucleic acid, this language should be reserved for the IACUC protocol, not the IBC. Keep "No biological agents or nucleic acids are injected into adult frogs or fish."
- Remove the last paragraph.

Related Protocols

- BSO and PI have appointment to work on this change

Protocol Associates

- Please review personnel as it was mentioned in the meeting that a listed protocol associate has changed labs

99 Miles "Nutrition Research Laboratory Exposure Control Plan for Human Materials"
Overview: The overall objective of the research performed in the Nutrition Research Laboratory in collaboration with the Bothner lab is to investigate factors relating to health and human performance in human research participants. Human blood and stool samples are collected. Research protocols that include exercise tests generate mouthpieces and other reusable equipment that are contaminated with saliva.
Risk mitigation includes: Needles will be disposed of in a laboratory sharps container, and blood collection syringes in a laboratory biohazard container. Aliquoting of serum/plasma and stool sample processing procedures are performed in a BSC. Following homogenization, stool sample pellets are put through freeze/thaw cycles to lyse microbial cells, then inactivated in methanol prior to analysis. Saliva produced on mouth pieces is decontaminated with a hydrogen peroxide solution.

Biohazardous Agents: none
Recombinant/Synthetic Nucleic Acid Molecules: none

Motion to return for modification and DMR upon submission.
Approved 11, Nays 0, Abstained 0
Approved items to be addressed include:

Protocol Objectives:

- Add back in the types of analysis or assays to be performed. (i.e., cytokine and insulin)
- Two paragraphs state that ammonium chloride disinfectant wipes will be used to disinfect surfaces while another paragraph states that bleach will be used to disinfect surfaces and small equipment. Please clarify when and location each disinfectant will be used.
- Remove the quantity of aliquots (10 tubes for serum samples, 9 tubes for stool samples).
- Section 8.1 states that saliva swabs will be collected but it is not stated what will be done with these swabs in the protocol objectives.

Protocol Associates

- Please have protocol associates complete the Occupational Health and Medical Surveillance forms.

Laboratory Biosafety Manual

- Bothner lab manual still needs to be updated to current template and attached

429 Lemon "Developing Designer Heme Proteins with Novel Functions"
Overview: Heme proteins have proven to be a convenient platform for the development of designer proteins with novel functionalities. This is achieved by substituting the native iron porphyrin cofactor with a heme analog that possesses the desired optical, magnetic, or redox properties. The purpose of this project is to develop fluorescent proteins for biological imaging and sensing applications, as well as artificial metalloenzymes for small molecule activation. Large-scale anaerobic expression of proteins will be performed in a 12 L fermenter vessel with a maximum culture volume of 11 L.
Risk mitigation includes: The protein constructs used have been highly modified from the original

organismal sequence by directed evolution and/or other protein engineering strategies. RP523 E. coli is not pathogenic or toxigenic and does not contain any adventitious agents. This strain has an extended history of safe large-scale cultivation and protein expression. The 11 L cultures of RP523 E. coli do not pose any additional personnel or environmental risks relative to typical 1 L cultures. The recombinant proteins to be expressed by this strain are not toxic or involved in pathogenesis. The pCW vector used for these experiments is well-characterized and free from known harmful consequences. The genes cloned into the pCW vector that encode the proteins of interest do not increase the stability of the plasmid or enable the transfer of drug resistance markers to other microorganisms. These cultures are decontaminated with a final concentration of 10% bleach.

Biohazardous Agents: Escherichia coli cloning
Strains: BL21(DE3), RP523(DE3), DH10B **Biosafety Level:** 1

Recombinant/Synthetic Nucleic Acid Molecules:

Host: E. coli	**Vector/Plasmid:** pCWori
Inserted Nucleic Acids/Genes of Interest: hnox	**Biosafety Level:** 1
Host: E. coli	**Vector/Plasmid:** pCWori
Inserted Nucleic Acids/Genes of Interest: hasa	**Biosafety Level:** 1
Host: E. coli	**Vector/Plasmid:** pCWori
Inserted Nucleic Acids/Genes of Interest: hemx	**Biosafety Level:** 1
Host: E. coli	**Vector/Plasmid:** pCWori
Inserted Nucleic Acids/Genes of Interest: hnox	**Biosafety Level:** 1
Host: E. coli	**Vector/Plasmid:** pCWori
Inserted Nucleic Acids/Genes of Interest: myoglobin	**Biosafety Level:** 1
Host: E. coli	**Vector/Plasmid:** pCWori
Inserted Nucleic Acids/Genes of Interest: hnox	**Biosafety Level:** 1
Host: E. coli	**Vector/Plasmid:** pCWori
Inserted Nucleic Acids/Genes of Interest: mirfp670	**Biosafety Level:** 1
Host: E. coli	**Vector/Plasmid:** pCWori
Inserted Nucleic Acids/Genes of Interest: mirfp670nano	**Biosafety Level:** 1
Host: E. coli	**Vector/Plasmid:** pCWori
Inserted Nucleic Acids/Genes of Interest: mirfp680	**Biosafety Level:** 1
Host: E. coli	**Vector/Plasmid:** pCWori
Inserted Nucleic Acids/Genes of Interest: mirfp720	**Biosafety Level:** 1
Host: E. coli	**Vector/Plasmid:** pCWori
Inserted Nucleic Acids/Genes of Interest: mrhubarb720	**Biosafety Level:** 1
Host: E. coli	**Vector/Plasmid:** pCWori
Inserted Nucleic Acids/Genes of Interest: smurfp	**Biosafety Level:** 1
Host: E. coli	**Vector/Plasmid:** pCWori
Inserted Nucleic Acids/Genes of Interest: dmsmurfp	**Biosafety Level:** 1

NIH Guidelines: III-F, III-D, Appendix K

Motion to approve as is
Approved 11, Nays 0, Abstained 0

8 Giroux "CRISPR knockouts and gene insertions affecting yield in wheat, canola, and other crops."
Overview: Create CRISPR knockouts to enhance yield, plant height, size of head, number of seeds and drought tolerance in various cropsincluding wheat, canola, chickpea, and soybean. For this project we will design vectors to create knockout mutations in each crop. We plan to collaborate with UC Davis and with the University of Wisconsin to create the edited events and generate transgenic plants. We will perform DNA extractions and PCR on plants to determine which have gene edits and advance those plants after backcrossing to MT adapted varieties.
Risk mitigation includes: Plants will be grown to maturity in locked and controlled greenhouses; floor drains in the greenhouse will be covered during harvest to prevent loss of seeds; and will follow all

transgenic plant protocol methods. No plants will be released to the environment for the field testing unless we modify this protocol and apply and obtain a USDA APHIS permit authorizing a release.

Biohazardous Agents: none

Recombinant/Synthetic Nucleic Acid Molecules:
Host: E. coli
Vector/Plasmid: pGEM-T, pGBKT7, pGADT7
Inserted Nucleic Acids/Genes of Interest: Rht, GID1, Sunflower HB4 gene, glufosinate resistance
Biosafety Level: 1
Host: Agrobacterium **Vector/Plasmid:** JD633
Inserted Nucleic Acids/Genes of Interest: Cas9 **Biosafety Level:** 1

NIH Guidelines: NIH Guidelines Section III-F-1, III-E

Motion to approve as is
Approved 10, Nays 0, Abstained 1

Interim Reviews
None

Amendments
None

B. Unfinished Business
C. Biosafety Officer Updates
    1. Lab Self-Inspection From (3-year review)
        - Reviewed updates
            - Approved 11, Nays 0, Abstained 0
    2. Updated OSHA BBP training to reflect non-paid people
        - Training has been updated by vendor

The meeting was adjourned at 1:07 p.m.