UNIVERSITY OF South Carolina

INSTITUTIONAL BIOSAFETY COMMITTEE MEETING MINUTES

DATE: *October 22, 2025*
TIME: *3:00 PM*
LOCATION: *Virtual Meeting via Microsoft Teams*

The meeting for the University of South Carolina's Institutional Biosafety Committee (IBC) was called to order by the Chair, Dr. Doug Pittman, at 3:02pm.

Approved IBC minutes will be posted on the university's IBC website. This website includes meeting dates, times, locations, and guidance for the public to request to attend an IBC meeting.

MEETING ATTENDANCE

IBC Member	Member Role / Position / Department	Attendance
Doug Pittman	IBC Chair; Director, Graduate Studies in Drug Discovery & Biomedical Sciences	☑
Mark Robbins	Research Safety Bureau Chief & Senior Biosafety Officer in EH&S	☑
Shayne Barlow	Associate Vice President for Research; Director, Animal Resource Facilities	☑
Beth Krizek	Plant Expert; Professor in Biological Sciences	☑
Sujit Pujhari	Viral Vector Core Director in Pharmacology, Physiology & Neuroscience	☑
Jason Kubinak	Associate Professor in Pathology, Microbiology, and Immunology	☑
Michael Shtutman	Associate Professor in Drug Discovery & Biomedical Sciences	☑
Daping Fan	Professor in Cell Biology and Anatomy	☑
Sean Norman	Director, Molecular Microbial Ecology Lab in Environmental Health Sciences	ABSENT
Anna Blenda	Clinical Professor in Biomedical Sciences at USC SOM Greenville	☑
William Jackson	Professor/Chair in Biological, Environmental & Earth Sciences at USC Aiken	ABSENT
Ben Montgomery	Associate Professor in Natural Sciences and Division Chair at USC Upstate	☑
Amanda Moore	Community member; SC Department of Public Health	☑
Vida Mingo	Community member; Senior Lecturer of Biology at Columbia College	ABSENT
Kris Kaigler	Research Specialist staff in Pharmacology, Physiology and Neuroscience	☑

I. APPROVAL OF PREVIOUS MEETING MINUTES

IBC minutes from the meeting on August 27, 2025, were approved by committee vote.

- Votes: For = 12 / Against = 0 / Abstain = 0

II. ANNOUNCEMENTS

A. IBC CHAIR

i. The IBC Chair reminded all members present to identify any conflicts of interest as each registration is reviewed.

ii. The updated IBC Charter approved during the last IBC meeting has been posted on the IBC website.

B. RESEARCH SAFETY BUREAU CHIEF / SENIOR BIOSAFETY OFFICER

i. A new note was added to the additional information question in the IBC protocol application. This note is for protocol amendments or renewals and requests for the PI to provide a concise summary of the modifications made to the original IBC submission. This summary may be helpful to IBC reviewers, and it will be removed when the protocol amendment or renewal is approved.

ii. The NIH recently announced a Biosafety Modernization Initiative that aims to create a new framework for federal and institutional biosafety oversight that expands beyond the existing scope of the NIH Guidelines and meets the biosafety and biosecurity needs of rapidly advancing science and technology.

III. OLD BUSINESS

The new question discussed during the last IBC meeting was added to the IBC protocol form. The question is required for research that involves testing modified microorganisms on animals to verify lab personnel that administer modified microorganisms on animals received training to strictly follow the *SOP 4-1 DLAR Use of Biohazards in Animals*.

IV. PROTOCOL REVIEWS

Protocol #	1-0130-1025
Protocol Type	Renewal
PI Name	Jim Fadel
Project Title	Use of viral vectors for study of CNS neuron function

Section of NIH Guidelines	Section III-D-1 & III-D-4
Characteristics of Agent(s) or Material(s)	Lentiviruses or adeno-associated viruses (AAV) will be used to modify gene expression related to the hypothalamic neuropeptide system in rats. Additional lentiviruses will allow for expression of modified muscarinic acetylcholine receptors exclusively in orexin/hypocretin neurons. Viruses are replication-deficient, and none of the modifications will increase their pathogenicity. Recombinant DNA procedures are conducted using plasmids that are maintained and amplified in E. coli K-12 strains. AAVs will express a genetically encoded neuropeptide or acetylcholine under the synapsin promoter to allow for fluorescent monitoring of in vivo signaling. Lentiviruses and AAV vectors are stereotaxically injected into the brain of rats to increase or decrease expression of the targeted protein. Potential health hazards for HIV-1 based lentivirus infection include initial symptoms that are flu-like. The main routes of transmission include parenteral inoculation, mucous membrane contact and ingestion. The major risks are potential for generation of replication-competent lentivirus (RCL), and potential for oncogenesis. Risks are mitigated by the nature of the vector system, including deletion of replication-essential genes, rendering them replication-deficient. The lentivirus system segregates vector and packaging functions into 4 plasmids (third-generation system). All viral accessory genes not required for viral growth in vitro but required for replication and pathogenesis in vivo are deleted. Additionally, the viral envelope gene is deleted. Self-inactivating long terminal repeats are included, where 400 nucleotides in the 3' LTR are deleted. During reverse transcription of the viral RNA in cells, this deletion is transferred to the 5' LTR of the proviral DNA, abolishing production of full-length viral RNA in cells. Risks are further mitigated by containment procedures that include BL2 containment of transfected animals for at least 72 hours after lentivirus administration. Decontamination procedures will include use of 10-20% bleach or 70% ethanol. Surgical tools will be autoclaved pre- and post-surgery. While there are no known diseases associated with any AAV human serotype, insertional mutagenesis is a theoretical possibility due to the ability of AAV to integrate into the host cell genome. Main exposure routes include mucous membrane exposure, parenteral inoculation (e.g., needlesticks, animal bites), ingestion, and inhalation of aerosols.
Manipulations/Procedures & Risk Assessment	Lentiviruses are produced and packaged in the USC Viral Vector Core. Stocks are diluted in a BSC to 5.0 x 10E6 tranducing units/ul or less, aliquoted and transported with two levels of containment with a durable leak-proof secondary container to the storage freezer until ready for use. Stereotaxic injection of viral vectors into rat brain is performed under BL2 conditions in a restricted-access and dedicated surgery room. On the day of surgery an aliquot of viral vector is transferred with a durable leak proof secondary container to the surgery room. The surgeon will then inject the viral construct using a motorized stereotaxic injector pump for intracranial injections. Mucous membrane exposure is possible

	when loading the injector. Droplet exposure is possible on gloved hands when opening containers or pipetting. All personnel are required to wear safety glasses and surgical masks. Other potential exposure risks from use of microtome or razor blades with infected brain tissue during post-mortem processing of infected brain tissue. Microtome blades and razor blades will be disposed of after use in a puncture resistant biohazard sharps container. Personnel must demonstrate proficiency in all techniques before performing any tasks that could lead to potential exposure. All personnel working with virus are required to complete biosafety training, as well as extensive personal training in handling viruses, and wear eye protection, sterile gloves and lab coats. This protective clothing will be removed before leaving the surgical suite. The waste from injections/surgery will be placed in biohazard bags and autoclaved. All surfaces that the virus could possibly contaminate are cleaned with 70% ethanol. The PI will ensure the administration of viral vectors in rodents will occur under BL2 conditions, cages will be properly labeled, animals will be housed at BL2 in the animal facility for the indicated time, and lab personnel will strictly adhere to procedures for handling viral vectors (e.g., stereotactic injections) and animal waste disposal.
Source(s) and Nature of Nucleic Acid Sequences **Transgene Expression & Function of Protein**	Source of nucleic acid sequences includes rat, mice, human & *A. victoria* The nature of nucleic acids and function of proteins produced include the increase or decrease expression of orexin/hypocretin peptides and receptors, engineered/modified muscarinic acetylcholine receptor, reporter gene expression, and fluorophore activated by acetylcholine and orexin neuropeptide signaling
Host(s) & Vector(s) Used	Lentiviruses are propagated HEK 293T cells. All lentiviruses are produced and packaged in a BSC in the USC SOM Viral Vector Core.
Viral Vectors	Retrovirus / Lentivirus (3rd generation) Adeno-associated virus purchased from Viral Vector Core in Zurich
Biosafety Level(s)	BL1 (*E. coli* K-12 strains, AAV vectors since no hazardous transgenes and vectors are produced in the absence of a helper virus) BL2 (lentiviral vectors)
Work Practices	Verified proper work practices for experiments conducted at BL1 & BL2
Laboratory Facilities	Verified proper lab facilities for experiments conducted at BL1 & BL2
Training and Expertise of Research Personnel	PI provided CV/biosketch for IBC to verify PI's training and expertise. PI completed training on *NIH Guidelines* for Principal Investigators. PI indicated plans to make biosafety protocols available to lab staff and train lab staff in safe work practices and procedures for incidents. Lab personnel that will administer viral vectors in animals have received training to follow all procedures in the SOP for Biohazards in Animals.

<table>
<tr><td>IACUC Approval</td><td colspan="4"><table><tr><th>IACUC Approval Number</th><th>IACUC Approval Date</th></tr><tr><td>2706-101900-022824</td><td>2/18/2024</td></tr></table></td></tr>
<tr><td>Major Discussion Points</td><td colspan="4">PI added more details on modifications for replication deficient vectors
PI updated sections for consistency on use of 3rd generation LV vectors</td></tr>
<tr><td rowspan="2">Motion to Approve</td><td colspan="4">A motion was made to approve this protocol as is</td></tr>
<tr><td>Votes For:
12</td><td>Votes Against:
0</td><td>Abstained:
0</td><td>Conflict of Interest:
None</td></tr>
</table>

Protocol #	1-0132-1025
Protocol Type	Renewal
PI Name	Zhengqing Fu
Project Title	Investigating the roles of the plant defense hormone salicylic acid in plant-pathogen interactions
Section of NIH Guidelines	Section III-E-2, Section III-F-3, III-F-4, III-F-5 & III-F-8
Characteristics of Agent(s) or Material(s)	Lab uses type III effector DNA from plant bacterial pathogens *Pseudomonas syringae pv. tomato, Pseudomonas syringae pv. syringae, and Pseudomonas syringae pv. maculicola*. These bacteria are plant pathogens that infect *Arabidopsis thaliana*, tomato, and bean plants, but do not cause disease on animals or humans. Lab uses cDNA & genomic DNA from the Arabidopsis thaliana plants. Lab will make constructs using genes described and transform them into Arabidopsis plants.
Manipulations/Procedures & Risk Assessment	Lab focuses on plant defense hormone salicylic acid signaling in molecular interactions between plants and pathogens. Plants grown in growth rooms include Arabidopsis thaliana, Nicotiana benthamiana, and Nicotiana tabacum. The Gram-negative plant bacterial pathogen P. syringae relies on type III effectors that are delivered into plant cells to cause bacterial speck disease on its host plants. Lab may purify the type III effectors proteins. Lab will clone coding DNA of type III effectors into a vector with 6His-tag or a GST vector. Alternatively, lab can use Gateway version of these vectors with a 6His-tag or a GST tag. Vectors may be used to purify plant proteins to test in vitro interactions between these type III effectors and their plant target proteins. To find the targets of *P. syringae,* lab may clone some *Pseudomonas syringae* type III effectors into yeast-two hybrid vectors. Then lab uses

	yeast-two hybrid assays and in planta coimmunoprecipitation, and bimolecular assays to confirm interactions. To study the transcriptional activation of plant defense proteins, we have cloned some plant proteins into a vector for yeast mono-hybrid assays. Lab will make transgenic *Arabidopsis* or *Nicotiana benthamiana* plants overexpressing type III effector and plant defense proteins. Lab will clone genes into a plant expressing vector and electroporate it into an *Agrobacterium tumefaciens*. Lab uses floral-dip method to make transgenic plants. *Agrobacterium tumefaciens* strains carrying transgenes will be grown in the lab. All the residual bacterium culture will be collected carefully and autoclaved before disposal. After plants grow and have mature seeds, lab collects seeds and autoclaves all soil and plants before disposal. The *N. benthamiana* plants are usually used for transient expression of proteins. All strains used for transient expression and media containing the strains will be autoclaved before disposal. Plants and soil for growing plants will be autoclaved after experiments before disposal. The *N. tabacum* can be used to test cell death phenotype elicited by the bacterial pathogen *Pseudomonas syringae* type III effectors. All strain stocks will be kept in -80˚ freezer. Plant infection assays are only conducted in the lab (not in public areas). Bacterial cultures, media containing strains, transgenic plants, seeds, and soil will be autoclaved before disposal. To safely dispose of liquid bacterial cultures, bleach will be added to reach a final concentration of 10%, ensuring at least 30 minutes of contact time before discarding. Lab will take precautions to prevent the release of any transgenic seeds into the environment.
Source(s) and Nature of Nucleic Acid Sequences **Transgene Expression & Function of Protein**	The source of nucleic acid sequences includes Arabidopsis thaliana & Pseudomonas syringae pv. tomato DC3000 The nature of nucleic acids and function of proteins produced include a salicylic acid receptor and master regulator of salicylic acid signaling, plant immunity, type III effector, transcription factors, plant defense, proteasome subunits, mildew resistance & amino acid transporter
Host(s) & Vector(s) Used	*E. coli* strains, *Saccharomyces cerevisiae*, *Arabidopsis thaliana*, *Pseudomonas syringae pv. tomato*, *Pseudomonas syringae pv. syringae*, *Pseudomonas syringae pv. maculicola*, *Nicotiana benthamiana* & *Nicotiana tabacum*
Viral Vectors	None
Biosafety Level(s)	BL1 (*E. coli*, plants & plant pathogens)
Work Practices	Verified proper work practices for experiments conducted at BL1.
Laboratory Facilities	Verified proper lab facilities for experiments conducted at BL1.
Training and Expertise of Research Personnel	PI provided CV/biosketch for IBC to verify PI's training and expertise. PI completed training on *NIH Guidelines* for Principal Investigators.

	PI indicated plans to make biosafety protocols available to lab staff and train lab staff in safe work practices and procedures for incidents.			
Major Discussion Points	PI added to summary plans to investigate how specific effector proteins from plant pathogen *Pseudomonas syringae* suppress plant immunity PI added to characteristics summary about the DNA constructs made & transformed into *Arabidopsis* and listed both *P. syringae* strains used. PI clarified decontamination and disposal of liquid bacterial cultures.			
Motion to Approve	A motion was made to approve this protocol as is			
	Votes For: 12	Votes Against: 0	Abstained: 0	Conflict of Interest: None

Protocol #	1-0133-1025
Protocol Type	Renewal
PI Name	Douglas Pittman
Project Title	Mechanisms of homologous recombination that maintain chromosome stability
Section of NIH Guidelines	Section III-F-1, III-F-2, III-F4 & III-F-8
Characteristics of Agent(s) or Material(s)	Biological materials used are E. coli, S. cerevisiae, and established mouse and human cell lines. cDNA clones will be used for expression in yeast and in mammalian cell lines. E. coli K-12 strains will be utilized for each of the cloning and plasmid amplification procedures. Transfection of rDNA plasmids into mammalian cells (including human cells) will be performed by electroporation or lipofection methods. No gene expression or modifications will increase an agent's pathogenicity. Human and mouse genes being amplified and cloned are from plasmids already containing cDNA clones of each gene or amplified from mRNA. Genes used pose little if any risk to the researcher. Although all are known or suspected of being involved in cancer initiation or progression, using standard lab procedures, there is minimal potential for risk of cellular uptake and expression should an exposure occur.
Manipulations/Procedures & Risk Assessment	Pipette tips are the only sharps used for procedures. The pipette tips are disposed of in BL1 waste in a clear bag placed in a durable, leak-proof container. No potential for aerosols or splashes. Lab workers will be trained to avoid splashes even with the *E. coli* and yeast used in the BL1 and mammalian cells used in the BL2 lab areas. BL2 procedures will be performed in a BSC. This involves the culture of established mouse and human cell lines. Lab workers will be trained on proper PPE including gloves, lab coats, and safety glasses, as well as

	procedures for decontamination, centrifugation or long-term storage. The work outlined in this protocol will not include animals or plants.			
Source(s) and Nature of Nucleic Acid Sequences **Transgene Expression & Function of Protein**	The source of nucleic acid sequences includes mouse, human & jellyfish The nature of nucleic acids and function of proteins produced include DNA repair, paraspeckle formation, protein translation, cell cycle regulation, fluorescent fusion marker, and a tumor suppressor			
Host(s) & Vector(s) Used	Hosts – *E. coli* K12 strains and *Saccharomyces cerevisiae.* Vectors – Plasmids with bacterial drug resistance genes and pUC replication origin & yeast 2 hybrid vectors; shuttle & expression vectors			
Viral Vectors	None			
Biosafety Level(s)	BL1 (*E. coli* K-12 strains and *Saccharomyces cerevisiae* & mouse cells) BL2 (human cell lines)			
Work Practices	Verified proper work practices for experiments conducted at BL1 & BL2.			
Laboratory Facilities	Verified proper lab facilities for experiments conducted at BL1 & BL2.			
Training and Expertise of Research Personnel	PI provided CV/biosketch for IBC to verify PI's training and expertise. PI completed training on *NIH Guidelines* for Principal Investigators. PI indicated plans to make biosafety protocols available to lab staff and train lab staff in safe work practices and procedures for incidents.			
Major Discussion Points	No major discussion points on this protocol. (PI specified *E. coli* strain)			
Motion to Approve	A motion was made to approve this protocol as is			
	Votes For: 11	Votes Against: 0	Abstained: 1	Conflict of Interest: Dr. Pittman (IBC Chair) abstained from voting on this project

Protocol #	1-0135-1025
Protocol Type	New
PI Name	Ka Ho Leung
Project Title	Quantitative Subcellular Imaging Tools for Investigating Chloride Pathophysiology
Section of NIH Guidelines	Section III-D-1 & III-D-3, Section III-E, Section III-F-8
Characteristics of	Experiments involve recombinant DNA, and viral mediated gene

Agent(s) or Material(s)	expression to express mutant or fluorescent protein constructs in various mammalian cell lines for use in fluorescent imaging applications. Lentiviral vectors used are based on a third-generation, self-inactivating (SIN) lentiviral system derived from HIV-1. The generation of lentiviral particles involves co-transfection of plasmids encoding the lentiviral genome and essential packaging components into a producer cell line. All plasmids used for lentivirus production are first amplified in *E. coli* K-12 strains. *E. coli* strains will be cultured and plasmid DNA is purified. No replication-competent virus is expected. System uses split packaging across multiple plasmids and lacks accessory genes (vif, vpr, vpu, nef). All lentiviral work will be performed at BL2 containment. Lentiviral vectors have been pseudotyped with the VSV-G envelope protein, thus providing flexible application in most mammalian cells. The produced vector and titer amounts utilized for experiments for generation of fluorescent protein and target constructs will be on a relatively small scale and will provide no known hazard risks when expressed.
Manipulations/Procedures & Risk Assessment	Plasmids will be cultured in *E. coli*. Then plasmid DNA purification and analysis will be performed under BL1 containment. Viral vectors will be transfected into mammalian packaging cells by lipid-mediated delivery. Produced viral particles will be used to transduce various mammalian cell lines for use in fluorescent imaging applications at BL2 containment. BL2 containment is used for handling all virus preparations. All staff use personal protective equipment (gloves, lab coat, face shield/glasses) while handling viruses. Viral preparations are only pipetted with aerosol-resistant pipets in a biosafety cabinet. Microliter quantities are used and all surfaces contacting virus are decontaminated with 10% bleach and further disinfected with 70% ethanol. Biohazard waste will be transported in a durable, leak-proof container for autoclaving.
Source(s) and Nature of Nucleic Acid Sequences **Transgene Expression & Function of Protein**	The source of nucleic acid sequences includes human, mice, *Aequorea victoria*, *Discosoma* sp., and *Entacmaea quadricolor* The nature of nucleic acids and function of proteins produced include stimulator of interferon genes, inflammatory signaling, structural genes, protein-transporting ATPase activity, molecular chaperone, apoptotic signaling, and fluorescent proteins
Host(s) & Vector(s) Used	*E. coli* NEB Stable & DH5α (plasmid maintenance) & cells used as hosts
Viral Vectors	Retrovirus / Lentivirus (3rd generation) packaged in the lab and purchased
Biosafety Level(s)	BL1 (*E. coli* K-12 strains, mouse cells) BL2 (lentiviral vectors, human cells)
Work Practices	Verified proper work practices for experiments conducted at BL1 & BL2.
Laboratory Facilities	Verified proper lab facilities for experiments conducted at BL1 & BL2.
Training and Expertise of Research Personnel	PI provided CV/biosketch for IBC to verify PI's training and expertise.

<table>
<tr><td></td><td colspan="4">PI completed training on NIH Guidelines for Principal Investigators.
PI indicated plans to make biosafety protocols available to lab staff and train lab staff in safe work practices and procedures for incidents.</td></tr>
<tr><td>Major Discussion Points</td><td colspan="4">PI verified LV vectors do not involve high titers or hazardous transgenes</td></tr>
<tr><td rowspan="2">Motion to Approve</td><td colspan="4">A motion was made to approve this protocol, pending the installation and certification of their new Class II, Type A2 biosafety cabinet. The IBC protocol was approved after BSO verification of BSC certification.</td></tr>
<tr><td><u>Votes For:</u>
12</td><td><u>Votes Against:</u>
0</td><td><u>Abstained:</u>
0</td><td><u>Conflict of Interest:</u>
None</td></tr>
</table>

Protocol #	1-0139-1025
Protocol Type	Amendment
PI Name	Christian Johnson
Project Title	Structure and function studies of Small GTPases
Section of NIH Guidelines	Section III-D-1 & III-D-2, Section III-E-1 & III-E-3, Section III-F-1, III-F-3 & III-F-8
Characteristics of Agent(s) or Material(s)	Lab will manipulate (e.g. point-mutations, deletion, insertion) wild-type and mutant forms of the small GTPases and their regulators by using plasmid vectors in *E. coli*. These vectors will be used for cloning and the production of large quantities of recombinant protein. Lab also performs protein expression experiments in mammalian cell culture, using retroviral (ecotropic and amphotropic MMLV) and expression methods. Vectors used for constitutive expression of genes in human and mouse cell lines. These vectors will be used with another vector which contains the early region of the human cytomegalovirus enhancer-promoter fused to the MMLV long terminal repeat at the TATA box in the 5' U3 region, and which contains the gag/pol/env genes necessary for production of retrovirus when vectors are present in HEK293t cells. Enveloped single-stranded RNA gammaretrovirus produced will be used to infect mouse or human cells. The system produces helper-free retrovirus with titers of 1-5 X 10^6. The pCL system is low hazard as the packing signal and 3' LTR are deleted, rendering RNA generated from pCL-ECO self-inactivating. Recombinant AAV vectors are replication-deficient and a minimal risk to humans or the environment. The primary biosafety considerations is the payload: Cre recombinase can induce genomic recombination in cells containing loxP sites, and WGA is a trans-synaptic tracer that may affect neuronal physiology. AAV itself is low-risk, but there is the presence of a genome-modifying enzyme (Cre). Some tested genes are oncogenes.

Manipulations/Procedures & Risk Assessment	Individual experiments regarding the production of retrovirus will never involve high titers, and will be a total volume of < 5mL. Retrovirus will be made fresh for each experiment. First, HEK293t cells will be transfected with plasmids. Then media containing the virus will be extracted and placed on to the desired cells to be infected. Unused virus will be kept in sealed conical tubes in a dedicated refrigerator. Live Adeno-associated virus (AAV) will be used to infect cells at titers of 1-5 X 10^6. Media containing retrovirus, and excess virus not used in the experiment, will be sterilized outside the biosafety cabinet using bleach. Manipulation of plasmids and vectors (e.g. cloning, purification) will be done in *E. coli* K-12 strains. Mutagenesis of vectors will be done in these strains in low amounts, while production of DNA for mammalian cell culture (e.g. constitutive expression) will be done in higher amounts. Protein production will include using large bacterial cultures (< 6L). Protein inductions will proceed at varying temperatures under vigorous agitation. Cultures will then be spun down in high-speed centrifuges and sonicated to release protein. Protein will then be purified using FPLC. Exposure could occur via skin contact, ingestion or mucous membrane exposure. All cell culture and retrovirus experiments will be conducted in a certified biosafety cabinet. Work surfaces will be decontaminated after the completion of work using an appropriate disinfectant, followed by UV. Personnel will wear masks, eye protection, gloves, and lab coats always while working. Personnel must wash hands before exiting the lab. Eating and drinking is prohibited in the lab. All biological spills (e.g. bacterial, retroviral, etc.) will be decontaminated via fresh 10% bleach or 70% ethanol. Liquid biological waste will be decontaminated via 10% bleach (minimum 30 minutes contact time), while solid waste will be sterilized via autoclave in the biohazard waste bags.
Source(s) and Nature of Nucleic Acid Sequences **Transgene Expression & Function of Protein**	The source of nucleic acid sequences include human, mice & bacteria. The nature of nucleic acids and function of proteins produced include fluorescent reporters, proto-oncogenes, signaling proteins, tumor suppressors, and recombinase.
Host(s) & Vector(s) Used	*E. coli* K=12 strains. Mammalian cells & mouse-derived colon organoids.
Viral Vectors	Adeno-associated virus (AAV) Retrovirus / MMLV (ecotropic & amphotropic)
Biosafety Level(s)	BL1 (*E. coli* K-12 strains, ecotropic MMLV, AAV vectors with no hazardous transgenes and produced in the absence of a helper virus) BL2 (amphotropic MMLV, AAV vectors with oncogenes, human cells)
Work Practices	Verified proper work practices for experiments conducted at BL1 & BL2.
Laboratory Facilities	Verified proper lab facilities for experiments conducted at BL1 & BL2.
Training and Expertise of Research Personnel	PI provided CV/biosketch for IBC to verify PI's training and expertise.

	PI completed training on *NIH Guidelines* for Principal Investigators. PI indicated plans to make biosafety protocols available to lab staff and train lab staff in safe work practices and procedures for incidents.			
Major Discussion Points	PI added a description of exposure risks since known oncogenes, etc. PI verified AAV produced at USC Viral Vector Core & described use.			
Motion to Approve	A motion was made to approve this protocol as is			
	Votes For: 12	Votes Against: 0	Abstained: 0	Conflict of Interest: None

V. New Business / Additional Topics

No new business was introduced.

VI. Review of Incidents

No new incidents were reported.

VII. Inspections/Ongoing Oversight

Each PI's protocol includes a link to their last lab safety inspection report for IBC review.

The BSO completed a new lab startup for Dr. Ka Ho Leung. A lab safety inspection will be completed once the lab is set up and before personnel start conducting experiments. The BSO verified the biosafety cabinet in Dr. Leung's lab was installed and certified.

VIII. IBC Training

No IBC training was conducted.

IX. Public Comments

No public comments were received.

X. Meeting Adjournment

The IBC meeting was adjourned at 3:48pm.