

2014 Summer Journal Club Descriptions

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Advances in the Use of Pluripotent Stem Cells in Regenerative Medicine

Description: Pluripotent stem cells, cells which have the ability to indefinitely expand and differentiate into any of the cells found in the human body, have the potential to revolutionize the way we investigate and treat many diseases that currently burden our society. In this club, we will focus on two main areas of stem cell usage in regenerative medicine: 1) How can stem cells be used to model disease in vitro and 2) How can stem cells be used as therapeutic agents in vivo? Critical questions to be addressed include: what is the current state of the field, what are the ethical and technical hurdles currently hindering approval in the clinic, what diseases and organ systems are best suited for these therapies, and what are the underlying assumptions and limitations with these tools. Additionally, we will cover key approaches and strategies to reading scientific literature effectively and efficiently. We are open to students of all backgrounds and expertise and are always open to feedback and ideas, so the focus areas and questions are open to change based on the collective interests of the group.

Co-leaders: Trey Gieseck, BS, NIAID; and Robert Thompson, MS, NIAID

Dates/Time/Location: Thursday (June 26, July 3, July 10, July 17, July 24 and July 31); 2:00 pm – 3:00 pm; BLDG 15-I Living Room

Directions: BLDG 15-I (house) is located northwest of BLDG-31 at 12 North Drive. Please just come in the front door and turn to your right into the living room.

Alcohol and Early Life Stress: A Complex Relationship

Description: This journal club will explore the complex relationship between early life stress and later alcohol use disorders. A substantial body of literature has documented relationships between the two, with multiple mediating pathways. We will supplement the current literature with discussion of data obtained in our current lab. This journal club is ideal for anyone interested in how environments shape later behavior; addiction; and psychiatric disorders.

Co-leaders: Laura Kwako, PhD, NIAAA; and Bethany Stangl, PhD, NIAAA

Dates/Time/Location: Wednesday (July 2, July 9, July 16, July 23); 1:00 pm-2:00 pm; CRC FAES Classroom 7

Directions: This room is located in the Clinical Research Center. Follow the signs near the FAES lounge (near Masur Auditorium) for the FAES classrooms. We will be meeting in classroom 7.

Antibodies and Vaccination

Description: Vaccination has been a great accomplishment of modern science, with the eradication of smallpox and the potential for eradication of polio, measles, mumps and rubella. Antibodies are one key component of modern vaccines and vaccine development. Ever wondered how vaccines work and how they are developed? Want to learn more about how antibodies mediate immunity? Come learn more about these amazing molecules! Join the "Antibodies and Vaccination" Journal Club this summer.

Co-leaders: April Killikelly, PhD, NIAID-VRC; and Kaitlyn Morabito, BS, NIAID-VRC

Dates/Time/Location: Thursday (June 26th, July 3, July 10, July 17, July 24 and July 31): 4:00 pm- 5:00 pm; Building 40, Room 1207

Directions: This is the smaller conference room on the first floor of Building 40

Antibody Therapy of Cancer

Description: The use of monoclonal antibodies (mAbs) for cancer therapy has achieved considerable success in recent years. In this journal club, we will introduce the basic ideas of monoclonal antibody and human anticancer immune system in the first meeting, and discuss several major antibody-based cancer therapies in the next three meetings, including monoclonal antibody, antibody drug conjugate and T cell therapy with chimeric antigen receptors. Students will form groups and each group will present a paper in one of the 2nd, 3rd and 4th meetings. Every student will join the discussion.

Co-leaders: Yifan Zhang, PhD, NCI; and Mingqian Feng, PhD, NCI

Dates/Time/Location: Friday (June 27, July 11 and July 25) and Thursday (July 10); 1:15 pm- 2:15 pm; Building 37, Room 5111

Cancer Immunotherapies

Description: The immune system has evolved to help protect us from infectious diseases such as bacteria and viruses. Interestingly, our immune systems also play a role in protecting us from developing cancer. Scientists have recently begun to harness the power of the immune system to successfully develop new cancer treatments. In this journal club, we will discuss the science behind "Cancer Immunotherapy" and learn how we can manipulate the immune system to fight cancer. Topics such as basic immunology, the role of the immune system during cancer development, and how we can genetically engineer immune cells to target cancer, will be covered.

Co-leaders: Amber Giles, PhD, NCI-CCR; Adrienne Long, BS, NCI-CCR; and Meera Murgai, PhD, NCI-CCR

Dates/Time/Location: Tuesday (June 24, July 1, July 8, July 15, July 22 and July 29); 2:45 pm -3:45 pm; Building 10, 2W-3961

Directions: From the Clinical Center North entrance, walk to the West wing labs, then, walk to the end of the wing (through total of three doors) and take the elevator up to the 2nd floor. Stairs are also located around the side of the elevator. We will post signs to help guide Interns to the room for the first meeting.

Cancer Immunotherapy

Description: This journal club will focus on the use of immunotherapy to treat cancer. Science Magazine declared cancer immunotherapy as the 2013 Breakthrough of the Year, focusing on chimeric antigen receptors and immune checkpoint blockade. While these discoveries are indeed impressive, they are in no way an exhaustive list of promising cancer immunotherapies. At the crossroads of immunology and cancer biology, we find an incredible diversity of cellular and molecular therapeutic approaches. Please join us in our exploration of this fascinating field.

Co-leaders: Martin Skarzynski, MS, NHLBI; and Shashankkumar Patel, MS, NCI

Dates/Time/Location: Tuesday (June 24, July 8, July 15, July 22 and July 29); 5:30 pm- 6:30 pm; Building 10/CRC, Room 2-3330 East

Directions: From the Clinical Center Main lobby (North entrance to building 10) take elevators to 2nd floor. Go down the nearby East corridor, you will go through a total of three doors heading straight and the room will be on your left.

Cell Biology of Membranes

Description: All living cells have a selective permeable barrier known as membranes. A biological membrane defines the boundary of a cell or an organelle within a cell. These membranes consist of lipids and proteins that are involved in various functions including transport of metabolites, cell signaling, protein trafficking etc. The composition of a membrane defines the cellular organelle and is crucial for its function. Disturbing the membrane composition affects the shape and size of an organelle in turn affecting its cellular functions. Number of human diseases have been linked to function of a cellular membrane thus underlining the importance of studying membranes. Bakers yeast is a commonly used model system to study membrane biology. In this journal club we will discuss research articles that describe commonly used techniques in yeast cell biology to study membrane functions and answer interesting questions such as: 1. How lipids move from one membrane to another? 2. How membrane proteins move in a cell? 3. How proteins and lipids shape the membranes?

Co-leaders: Amit Joshi, PhD, NIDDK; and Alexandre Toulmay, PhD, NIDDK

Dates/Time/Location: Thursday (June 26, July 10, July 17 and July 24); 2:00 pm- 3:00 pm; Building 8, Room 302

Choosing One's Own Fate: Reprogramming and Differentiation of Stem Cells for Human Health

Description: Merely six years after Dr. Shinya Yamanaka described how mature cells could be reprogrammed to immature stem cells (iPSCs), he was awarded the Nobel Prize in Medicine and Physiology for his groundbreaking discovery. The fast pace of discovery and innovation in the stem cell field has led to a vast accumulation of papers in recent years that tackle difficult questions. How do stem cells become beating heart cells, or neurons that transmit electrical signals? This journal club will cover recent publications related to reprogramming and differentiation of a variety of stem cells. Cell types studied will include: embryonic stem cells, cancer stem cells, mesenchymal stem cells and induced pluripotent stem cells. Members will learn techniques of stem cell culture, clinical applications of stem cell therapy and immune responses induced by stem cell transplantation.

Co-leaders: Sisi Liu, BS, NICHD; and Kailan Sierra-Davidson, BS, NIAID

Dates/Time/Location: Tuesday (July 1, July 8, July 15, July 22 and July 29); 3:00 pm- 4:00 pm; Building 10, Room B1C206

Directions: From the South lobby of Bldg 10, go down the right corridor and go through the metal doors. Look for a bookstore/coffee shop on your right and a sign from the ceiling that says 'FAES Academic Center'. Take a right down the hallway, through the double-doors; then take the steps down to the lower level.

Controlling the Brain With Light – Optogenetics Methods and Application!

Description: Want to know how one can control behavior by shining light at specific regions of the brain? Optogenetics is a technique using light-sensitive ion channels to control neural activity through the exposure to different colored lasers and LEDs. This journal club is designed to familiarize members with the methodology of optogenetic manipulation of neural activity and behavior. Behaviors can be controlled by specific brain regions, and often, specific cell types. The brain is a complicated organ with very complicated networks that influence how we behave. To understand each complicated circuitry, it's important to use a tool that can isolate neural systems one at a time, so we can tease apart the roles of each cell types in a brain region, and to unveil how brain regions "talk" to each other. This journal club aims to discuss the current applications of this powerful technique, starting out with method reviews to ensure journal club

members understand the basics of optogenetics. We will select a range of papers to demonstrate the wide application of optogenetics, as well as discuss potential pitfalls.

Co-leaders: Chia Li, PhD, NIDDK; Kimberly LeBlanc, PhD, NIDDK; and Danielle Friend, PhD, NIDDK

Dates/Time/Location: Wednesday (June 25, July 2, July 16, July 23 and July 30); 4:00 pm- 5:00 pm; Building 10, Room 6-3961

Directions: This room is located at the very end of the west laboratory in building 10. We plan to meet the journal club members at the atrium on the first meeting (6/25) at 3:50 pm and direct them to the meeting room to avoid confusion.

Endocrinology and Metabolic Disorders

Description: The metabolic syndrome (MetS) represents a combination of cardiovascular risk determinants such as obesity, insulin resistance and lipid abnormalities such as hypertriglyceridemia, increased free fatty acids, low high-density-cholesterol and hypertension. As a multiple component condition, it imparts a doubling of relative risk for atherosclerotic cardiovascular disease. In this Journal Club we will identify the Endocrine Diseases that can present with components of Metabolic Syndrome and the pertinent literature data will be discussed thoroughly.

Co-leaders: Paraskevi Xekouki, MD, PhD, NICHD; Eva Szarek, PhD, NICHD; and Edra London, PhD, NICHD

Dates/Time/Location: Wednesday (July 2, July 9, July 16, July 23, and July 30); 11:00 am -12:00 pm; Building 10, Hatfield 2-3330

Exploring the World of Big Data With Computational Genomics

Description: With the completion of the Human Genome Project more than 10 years ago, a whole field, genomics, was born. As the drop in the cost of sequencing has outpaced the drop in the cost of computer storage, researchers have been left with huge troves of data from experiments in all different kinds of genomics. This journal club is intended to provide an overview of our current understanding of a wide array of human 'omics' fields, with an emphasis on the need for, and use of, computational methods. Bench and computational tools and methods required for generating and analyzing these kind of high-throughput studies will be discussed as relevant to the topic of the week. Examples of topics to be covered include human metagenomics, epigenomics, and transcriptomics, among others.

Co-leaders: Allyson Byrd, BS, NHGRI/NIAID; and Brenna LaBarre, BS, NHGRI

Dates/Time/Location: Wednesday (June 25, July 2, July 9, July 16, July 23 and July 30); 10:00 am -11:00 am; Building 4, Room 414

Directions: Fourth floor of Building 4, left from the stairs or elevator

Fundamentals in Cellular and Molecular Immunology

Description: The purpose of this journal club is multifold. The main focus of the class will be to teach students how to critically read and evaluate primary scientific literature. However, the other purpose of the class is to expose students to the seminal research responsible for the foundation of key principles and concepts that have resulted in our understanding of how the immune system functions. We also aim to use this journal club to highlight new and exciting techniques used on the cutting edge of immunological research. Areas that will be covered are: innate immunity, adaptive immunity (B cells and T cell biology), immune cell interactions, and the immune system in cancer and infection. Each week, students will receive a review on the assigned topic as supplemental reading, as well as the paper we will discuss in depth during our weekly meeting. We would like everyone to actively engage in productive discussions on the assigned paper each week and so to promote conversation, no formal presentations will be required.

Co-leaders: Senta Kapnick, MS, NHGRI; Zach Kraus, PhD, NHGRI; and Mike Askenase, BS, NIAID

Dates/Time/Location: Monday (June 23, June 30, July 7, July 14, July 21 and July 28); 4:30 pm- 5:30 pm; Building 49, Room 4A46

Directions: Building 49 is located on Convent Dr on the west side of campus. Students will need to show their NIH (or visitor) IDs to the guard and call our lab to be allowed upstairs. The meeting room is on the fourth floor, behind the glass brick structure (hard to miss) when you come off of the elevator. Once we have a final list of participating students, we will get them approved as official building visitors so they will not have to call the lab each week. There are white boards and AV equipment available for our use in the meeting room.

Gene Expression: New Trends and Discoveries

Description: Though every cell in an organism contains an identical genetic code, the genome is expressed in different ways in different cell types and in different stages of an organism's development. Understanding the basis of this time and tissue-specific transcriptional control is a long-standing goal in biology. Recent studies have focused on genome-wide experiments to uncover novel mechanisms of gene regulation. These studies have enriched our knowledge of regulatory elements such as enhancers and chromatin modifications as well as revealing surprising data regarding non-coding

RNAs. This journal club aims to discuss these recent findings and put them in the context of development and disease. We will also discuss the tools and methods used in these studies. Additionally, members will practice their skills at critically evaluating scientific publications.

Co-leaders: Claude Warzecha, PhD, NICHD; and Megan Sampley, PhD, NICHD

Dates/Time/Location: Monday (June 23, June 30, July 14, July 21 and July 28); 1:30 pm- 2:30 pm; Building 6B, Room 4B-429

Directions: Enter the main doors on the north side of building 6B. Take the elevator to the fourth floor. Room 4B-429 will be around the left corner.

Genetic Aberrations in Cancer

Description: Cancer is a disease of accumulations in genetic mutations (and other structural alterations). Genetic mutations occur when the DNA sequence of a gene is altered, changing the expression, structure, or function of the protein it encodes. Two main types of these genetic mutations are somatic and inherited germline mutations. Most genetic mutations which contribute to a cell's transformation to cancer are somatic mutations, or mutations that occur in a cell which is not used in the creation of offspring. Inherited germline mutations are mutations that come from one or both parents and these innate genetic variants not only contribute to age of onset but to severity, survival and sensitivity to treatment of cancer. Understanding the roles of germline and somatic variants in carcinogenesis has been greatly accelerated by the advent of next-generation sequencing technologies, opening up possibilities towards personalized cancer treatment. In this journal club, we hope to better your understanding of genetic mutations and their roles in cancer initiation and progression. We will highlight a few well-known cancer genes (both somatic and inherited), which act as drivers to cancer. Lastly, we will touch upon recent advancements in cancer genomics and their contribution to cancer diagnosis and therapy.

Co-leaders: Tara Burke, PhD, NICHD; and Jiyeon Choi, PhD, NCI

Dates/Time/Location: Thursday (June 26, July 10, July 17, July 24, July 31); 4:00 pm- 5:30; Building 31A, Room 2A-48

Directions: Building 31A is easily accessible by NIH campus shuttle. Room 2A-48 is located on the second floor of building 31A, at the end of the hall.

Genetics and Molecular Mechanisms of Blood Disorders

Description: This journal club will be a brief introduction to hematology. We will discuss papers on blood disorders affecting erythrocytes, leukocytes, platelets, and the process

of hematopoiesis. We will discuss genetics and molecular mechanisms of these blood cells and the methods used to study their function. Our goal is to teach you how to dissect a paper and get the most out of it. This six-week session will be broken-down as follows: week 1 is an overview of hematopoiesis and article organization; during weeks 2-5 we'll present example papers highlighting a topic in hematological disease; by week 6 you'll be ready to present your own articles! Each session will be discussion-based, and participation will be rewarded with snacks. Please come and learn about blood!

Co-leaders: Elisabeth Heuston, PhD, NHGRI; and Kelly O'Brien, PhD, NHGRI

Dates/Time/Location: Tuesday (June 24, July 22, and July 29), Thursday (July 10), Wednesday (July 16); 4:00 pm- 5:00 pm, Building 49, Room 1A51

Directions: The Bldg 49 conference room is located adjacent to the lobby. Card access is not required for entry to the conference room.

Genome-Wide Approaches to Study Cancer

Description: We will discuss how the genome-wide techniques are advancing the cancer research. We will review techniques such as RNA sequencing (RNA-Seq), chromatin immunoprecipitation followed by deep-sequencing (ChIP-Seq), exome and whole genome sequencing. Through out the meetings, we will discuss how these techniques work and cover some of their applications in furthering the field of cancer biology.

Co-leaders: Robert Faryabi, PhD, NCI; and Jacqueline Barlow, PhD, NCI

Dates/Time/Location: Thursday (July 10, July 17, July 24 and July 31); 12:00 pm -1:00 pm; Building 37, Room 1109

Directions: Bldg. 37 is located next to the South Drive entrance to the Bethesda campus from Old Georgetown Road. Room 1109 is located in the northwest corner of the building on the first floor.

TWINBROOK II: Haematopoietic Cell-Mediated Regulation of Innate and Adaptive Immunity in Human and Mouse Disease Models.

Description: The Journal club will review and discuss papers focusing on the various mechanisms by which immune cells, like macrophages, dendritic cells, B- and T-cells and NK-cells, regulate the antigen presentation and immune responses after recognition of foreign insults, such as pathogens, cancer cells and dead cells. The Journal club format involves a short ppt presentation (~30-40 min) covering key experimental results and/or techniques shown in the selected paper followed by an informal discussion.

Co-leaders: Oliver Voss, PhD, NIAID; and Louis Thomas, PhD, NIAID

Dates/Time/Location: Wednesday (July 2, July 9, July 16, July 23 and July 30); 3:00 pm - 4:00 pm; Room 201F

Directions: Twinbrook II, NIAID, NIH 12441 Parklawn Drive, Rockville, 20852, Room 201F

How the Brain Works: Insights From Flies and Fish

Description: Given the recent announcement of a new Presidential focus, Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative, now is one of the most exciting times for neuroscience research. This journal club will highlight what can be gained from studies of the nervous system in both invertebrates and non-mammalian vertebrates and some of the tools that have been developed to undertake these studies. We will specifically explore what studies of model systems, including the fruit fly and the zebrafish, can teach us about neuronal control of behavior. To promote critical thinking, we will read both scientific research articles and contrast them with major news media pieces that highlight some of the major findings. We will also discuss how these studies might contribute to the future of brain connectivity mapping and to understanding how aberrant brain development leads to neurological and behavioral deficits in humans.

Co-leaders: Sadie Bergeron, PhD, NICHD; and Eric Horstick, PhD, NICHD

Dates/Time/Location: Monday (June 30, July 14, July 21, and July 28); 3:30 pm- 4:30 pm; Building 6B, Room 4B-429, 4th floor library

Human viruses: Scientific Advances Behind Science Daily Headlines

Description: We will discuss recent scientific breakthroughs in human virology, including articles on HIV, Ebola, Dengue, HCV and others. These viruses have a significant impact on public health, as well as our daily life. The selected papers have been published in top rated scientific journals and describe structural and functional insights, essential for drug and vaccine development. The goal is to guide the students through the paper and help them critically evaluate methods and results. The selected publications had broad impact and were highlighted in media, such as Science daily. We will also discuss the media reports, which are often helpful to understand the scientific problem in a broader context and reveal potential future applications. Students will be encouraged to evaluate and discuss how the research article was presented in the media in order to distinguish between immediate conclusions of the paper and long term research goals.

Co-leaders: Anastasia Aksyuk, PhD, NIAMS; and Altaira Dearborn, PhD, NIAMS

Dates/Time/Location: Wednesday (July 2, July 9, July 16, July 23 and July 30); 3:00 pm - 4:00 pm; Building 50, Room 1327

Directions: Building 50, pass the elevators, turn right, the room is on the left side of that corridor

Immunity: The Double-Edged Sword

Description: The purpose of this journal club is to reinforce the mission of NIAID by emphasizing basic and clinical scientific papers in the areas of infectious, immunological and allergic diseases as well as cancer. Selected articles will focus on animal models of disease that highlight multiple aspects of innate and adaptive immunity. Topics of discussion will include the role of various cell types and their development and function during the course of an immune response. Upon completion of this journal club, students should gain a better understanding of the intricate network that regulates the immune system.

Co-leaders: Sadiye Rieder, PhD, NIAID; Maria Lopez-Ocasio, PhD, NIAID; and Michael Holt, PhD, NIAID

Dates/Time/Location: Wednesday (July 2, July 9, July 16, July 23 and July 30); 10:00 am – 11:00 am; Building 10, Room 11S235

Directions: Bldg 10 (south side). Take elevators outside of Masur Auditorium to the 11th floor. 11S235 is located across the hallway from the elevators.

FREDERICK: Immunotherapy at the Cutting Edge

Description: Have you even thought of treating a disease by manipulating our immune system? In fact, immunotherapy is emerging as a novel and effective strategy for treating malignancy and chronic infection. Our immune system already has a highly evolved and regulated arsenal of cellular and humoral factors that can detect and eradicate pathogens and infected/malignant cells. Our increasing understanding of the basic signaling and immune-modulating functions of the immune system's individual components has allowed us to design more targeted, more effective immune-based therapies that overcome the immune evasion of diseases that are not currently curable. In this journal club, we will discuss recent, pivotal publications on basic immunological findings, and then look at how these new insights led to design of immune therapy that was tested in a pre-clinical or clinical setting.

Co-leaders: Sinnie Ng, PhD, CCR NCI-Frederick; and Dennis Watson, MD, CCR NCI-Frederick

Dates/Time/Location: Tuesday (June 24) and Wednesday (July 2, July 9, July 16, July 23 and July 30); 3:00 pm – 4:00 pm; Building 549, Cafe Room

Intracellular Trafficking: The Pathways That Regulate

Description: We aim to discuss the intracellular pathways that regulate such fundamental cellular processes as endocytosis, Golgi transport, protein degradation and exocytosis. We will discuss the fidelity of these pathways, which ultimately defines all cellular compartments, and their diverse functions. Emphasis will be on visualization of intracellular mechanisms using techniques like live cell imaging, confocal- and electron microscopy.

Co-leaders: Anna Sundborger, PhD, NIDDK; and Jeanne Morin-Leisk, PhD, NIDDK

Dates/Time/Location: Thursday (July 3, July 10, July 17, July 24, and July 31); 4:00 pm- 5:00 pm; Building 8, 1st floor library

Directions: First room to the left when entering building 8 through the entrance facing building 5.

Introduction to Molecular and Developmental Biology Techniques

Description: There are a broad range of techniques that can be used in Molecular and Developmental Biology, ranging from very simple techniques such as genetic screening to more in-depth procedures like cell lineage tracing. The purpose of this Journal Club is to provide some basic tools and knowledge of the most common techniques in the field of developmental biology, and how to use them in any particular case. Obviously, we cannot give you the magical tools to obtain a Nobel Prize, but we can give you some tricks in the interesting world of the developmental biology that will make your start in the laboratory a little bit easier. During the Journal Club, we will talk about different techniques involved in in vivo and in vitro gene and protein detection, genetic manipulations (i.e. gain and loss of function) and many more. We will explain the basic steps for these techniques and also present real life examples so that you can accurately understand the utility of each of them. We expect that at the end of the Journal Club you can identify each technique and know when and how to use them, as well as identify the most important points to consider when you step into a molecular or developmental laboratory.

Co-leaders: Ellen Flannery, PhD, NINDS; and Aloa Lamarca Dams, PhD, NINDS

Dates/Time/Location: Monday (June 30, July 7, July 14, and July 28) and Thursday (July 24); 3:00 pm- 4:00 pm; Building 35, Room 3AB1000

Keeping Your Microbiome Happy Keeps You Happy: Modulation of the Microbiome to Promote Health

Description: Humans live together with a very complex community of microorganisms, a majority of which reside in the gut. These organisms have long been known to play a role in digestion, immune system development, and protection against pathogens. Through the recent advancement of sequencing techniques, we have begun to recognize that these microorganisms play a much larger role in human health and disease than previously thought. There is now evidence that the microbiome may influence a number of diseases including colon cancer, diabetes, autoimmune disease, atherosclerosis, and autism. Interventions that modulate the microbiome, such as the use of prebiotics and probiotics, show promise in preventing and treating these diseases. In this journal club, we will discuss recent papers that address the complex relationship between humans and our microbiome, focusing on the role of the microbiome in human diseases and modulation of the microbiome to prevent and treat these diseases.

Co-leaders: Marlena Wilson, PhD, NIDDK; and Jessica Pierce, PhD, NIDDK

Dates/Time/Location: Thursday (June 26, July 10, July 17, July 24, and July 31); 2:30 pm - 3:30 pm; Building 5, Room 127 (1st Floor Conference Room)

Learning How the Brain Sees and Smells: Introduction to Sensory Neuroscience and Techniques

Description: The journal club will introduce students to brain mechanisms involved in the processing of sensory (e.g. olfaction, vision) experiences that help us to interact with the environment. In addition, journal club readings will allow us to discuss modern research techniques that are used to study how the brain processes and transmits sensory information. Specific techniques may include fMRI, electrophysiology, and optogenetics. We look forward to learning alongside you and discussing about how the brain works over the course of the summer, and we hope you'll join us!

Co-leaders: Heysol Bermudez, BA, NINDS; and Kara Fulton, BS, NINDS

Dates/Time/Location: Tuesday (June 24, July 1, July 8, July 22 and July 29); 12:00 pm – 1:00 pm; PNR Building 35, Room 3E402

Localized mRNA Translation in Neurons

Description: Localized translation of mRNA in neurons is required for a variety of neuronal functions such as synaptic plasticity, axonal elongation and path finding, retrograde signaling, axonal regeneration and neurotransmitter synthesis. In this journal club, we will introduce the concept of local mRNA translation, describe the molecular

mechanisms by which mRNA is transported, localized and translated in specific compartments of the neuron, and discuss how local translation is regulated. Finally, we will explore the role of local mRNA translation in specific neurobiological phenomena. The aim of this journal club is to give students an overview of an exciting field that has substantially developed in the last decades. By the end of our sessions, students will have gained an understanding of the significance of localized mRNA translation in the proper development and function of the nervous system, as well as knowledge of the various techniques and model systems used to explore the role of localized protein synthesis in the neuronal cell.

Co-leaders: Noreen Gervasi, MD, PhD, NIMH; and Amar Kar, PhD, NIMH

Dates/Time/Location: Thursday (June 26, July 3, July 10, July 17, July 24 and July 31); 3:00 pm – 4:00 pm; Building 35, Room GE 402

Metabolic Regulation of Epigenetics

Description: Epigenetic changes such as histone modifications, chromatin remodeling, DNA methylation, and modulation of microRNA pathways are known to dramatically impact gene expression and, therefore, cellular function. A growing body of evidence indicates that primary metabolites have direct effects on the epigenome. This indicates that metabolism may play a pivotal role in determining heritable epigenetic changes which may impact not only future metabolism, but such pathologies as metabolic syndrome, diabetes, and cancer. This journal club will explore the interplay of epigenetics and metabolism, the effects of such interactions on gene expression, and the potential implications for human health.

Co-leaders: Quira Zeidan, PhD, NICHD; and Laura Marler, BS, NICHD

Dates/Time/Location: Wednesday (June 25, July 2, July 9, July 16, July 23 and July 30); 10:30 am – 12:00 pm; Building 6, Room 220

Modeling Processes in Cell Signaling

Description: Cell signaling systems are complex, involving coupling of diverse physical phenomena. For example, in morphogenesis, proteins are secreted from cells, diffuse, bind with receptors on other cells, are taken up by endocytosis, and then interpreted, leading to changes in gene expression. Models are useful both for understanding individual processes and for synthesizing knowledge of these processes in a signaling cascade. In this journal club, we will discuss papers that use modeling to address different processes involved in cell signaling, including diffusion and endocytosis, with applications in cell proliferation, morphogenesis, and motility. Members can expect to learn about in interpreting and evaluating theoretical modeling papers even if unfamiliar with physics or mathematical modeling.

Co-leaders: Anand Banerjee, PhD, NICHD; and Alex Szatmary, PhD, NICHD

Dates/Time/Location: Thursday (June 26, July 3, July 10, July 17, July 24, and July 31); 2:00 pm – 3:00 pm; Building 9, Room 1S-112

Mouse Models for Human Disease

Description: This journal club will meet weekly to discuss papers that describe the generation of transgenic mouse models to study human disease. Each week we will focus on a different type of transgenic animals. Specifically, knock outs, knock-in, BAC transgenes, gene trap alleles, conditional alleles, reporter strains and the use of TALENs and Crisprs for direct genome editing. One to two papers will be presented weekly.

Co-leaders: Meghan Drummond, PhD, NIDCD; and Elyssa Monzack, PhD, NIDCD

Dates/Time/Location: Thursday (June 26, July 10, July 17, July 24, and July 31) and Tuesday (July 1); 4:00 pm – 5:00 pm, Building 35A, Room GG607

Directions: This room is located near the south entrance of the building on the ground floor.

SHADY GROVE: Bridging to Current Trends in Cancer Epidemiology

Description: Cancer epidemiology spans many disciplines within one field from health behaviors and eating habits to genetics and circulating blood proteins. We will discuss the current trends in cancer epidemiology including but not limited to large consortia efforts (pooled analyses), big data "omics", global/international health, and large descriptive cancer trends and how they tie into our understanding of cancer etiology and disease overall. The key objectives of the journal club are to: learn to critically analyze key methods and approaches used in epidemiology by reviewing manuscripts, assess the future direction of research, and gain presentation skills.

Co-leaders: Christopher Kim, PhD, NCI-DCEG; and Kristin Guertin, PhD, NCI-DCEG

Dates/Time/Location: Wednesday (July 2, July 9, July 16, July 23 and July 30); 10:00 am – 11:00 am; National Cancer Institute Shady Grove Campus, Building 9609, Room 7E030

Directions: When entering the Shady Grove building (9609), enter the east tower (right at the fork) and take the elevators to the 7th floor. From the elevators, turn towards the kitchen (glass) take a left and an immediate right opposite the water fountains.

Neuromuscular Disorders and Animal Models

Description: The use of animal models in medical research has greatly contributed to our understanding of mechanisms of diseases. In this series of Journal Club meetings we will cover the basics of animal model research, discussing briefly the methods and the principles. In addition, we will discuss current applications of animal models, with a particular focus on the neuromuscular diseases.

Co-leaders: Eleonora Guadagnin, MS, NINDS; and Jachinta Rooney, PhD, NINDS

Dates/Time/Location: Thursday (June 26, July 3, July 10, and July 17); 12:30 pm - 1:30 pm; Building 35, Yellow SkyBox

Directions: The Yellow SkyBox is located on the second floor of the Porter Neuroscience Research Building - Phase II (The new section of building 35), right outside of the elevators.

Nobel Laureate Biophysicists: From Crystallography to the Green Fluorescent Protein

Description: While there is not a Nobel Prize category for biophysics, numerous Nobel Prizes have been given for research that developed or relied on biophysical techniques. This journal club will examine a few of these groundbreaking biophysical studies. We will discuss landmark crystallography research, the development of nuclear magnetic resonance as a biophysical technique, the green fluorescent protein, and this year's Chemistry Nobel Prize in computational modeling of biological systems. The goal of our meetings will be to improve proficiency in understanding and evaluating scientific publications while developing an introductory understanding of the techniques used in the Nobel Prize winning research and why the work was important. As time and interest allows, we will discuss the biographies of the Nobel Laureates.

Co-leaders: Katherine Truex, PhD, NIDDK; and Emily Dunkelberger, PhD, NIDDK

Dates/Time/Location: Wednesday (June 25, July 2, July 9, July 16 and July 23); 2:30 pm- 3:30 pm; Building 5, Room 127

Directions: Room 127 is the conference room on the first floor, in the center of Building 5. It is off the main foyer to the right if you come in the main entrance (near the copy machine).

Protein Trafficking in the Last 40 Years: Milestones and Breakthroughs

Description: Over the course of the last forty years there has been tremendous progress in the field of protein trafficking. Due to the multidisciplinary nature of the topic there have been various technological developments that have allowed three nobel prizes to be awarded over the last forty years, with the most recent announced last year. In this journal club we will take a look back through the classic papers that define the field and see what makes these studies unique from both a scientific and technical standpoint. There will be five meetings following the progress chronologically, from the early work in the 70s towards modern developments. Attendees will be asked to read the assigned papers in advanced critically to allow discussion on the day.

Co-leaders: David Gershlick, PhD, NICHD; and Robin Chen, PhD, NICHD

Dates/Time/Location: Tuesday (June 24, July 1, July 8, July 15 and July 22); 2:00 pm-3:00 pm; Building 35A, Room 2F107

Directions: Porter Neuroscience Research Center, Level 2. As leaving main lift, bare right, and head straight forwards towards the 'Break Room' 2F102. Once there, follow the corridor round and you should see 2F107 on your left.

Recycling Cellular Thrash: A Closer Look to Autophagy Phenomenon

Description: Autophagy is a process that occurs under various stress conditions by forming double membrane containers. These containers target and collect the cellular trash. Then, they start to fuse with the lysosomes, the digestion centers of the cells, to degrade the trash into building blocks—amino acids. The amino acids can then be used both for the construction of new proteins needed by the cell and in the production of ATP, which is the source of energy for the cell. The reactive nature of autophagy gives rise to its participation in a wide array of physiologic and pathologic pathways such as cancer, neurodegenerative diseases, myopathies, immune deficiencies, and premature aging. This journal club will cover recent publications with a special emphasis on basics of autophagy and its implications in certain diseases. The members of this club will learn about the basics of cellular machinery and basic cellular and molecular biology techniques.

Co-leaders: Ali Vural, PhD, NIAID; and Ilhan Akan, PhD, NIDDK

Dates/Time/Location: Thursday (July 3); 1:00 pm -2:00 pm; Thursday (July 10, July 24, and July 31); 11:00 am - 12:00 pm; Building10, Room 11N230

Directions: Enter Building 10 from South Entrance. Take the main elevators to 11th Floor. Room 11N230 is on the right corner of Corridor C/Clinic entrance.

Retina and Retinal Degeneration, Age-related Macular Degeneration

Description: The aim of this journal club is to understand retina structure, retina cells, and age-related macular degeneration (AMD) features, mainly using one of AMD mouse models, Aryl hydrocarbon receptor (*Ahr*)^{-/-} mouse. Human AMD is a complex, multifactorial disease characterized by progressive degeneration of photoreceptors and retinal pigment epithelium (RPE) with or without choroidal neovascularization (CNV). In developed countries, AMD is the leading cause of irreversible vision loss in elderly individuals. Although the etiology of AMD remains largely unknown, several mouse models exist. Recently, another research group and my data indicated that *Ahr* deletion causes AMD features in mouse eyes. AHR is a well-known nuclear receptor (NR) with its ligands, environmental contaminants such as 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD), but edible dietary indole-3-carbinol (I3C) from plant is one of AHR ligands as well. We will see mainly the phenotypes from two kinds of *Ahr* deleted eyes, which are generated in different strategies, but we will compare them with other AMD mouse models. However, our aim is to understand human AMD, and you will see a variety of methodological approaches to understand eye diseases. Finally, all through this summer journal club period, we will consider what we can do to protect our eyes.

Co-leaders: Soo-Young Kim, PhD, NEI

Dates/Time/Location: Thursday (July 3, July 10, July 24, and July 31); 12:00 pm -1:00 pm; Bld 6A, Room B1A11

Retroelements: Friends or Foes?

Description: Retroelements are virtually in every genome. HIV is one of the most infamous retrovirus, but did you know that it represents only one example of the retroelements shaping the human genome? The retroviruses and retrotransposons impact in many ways their host genomes, for bad or good. This Journal club will cover recent publications that will explain how retroviruses and retrotransposons have helped rewiring of host regulatory networks. Members will learn about methods and protocols for studying retrotransposons along with how to read scientific publications. Members will also learn recent works in the application of transposons and endogenous retroviruses in gene therapy.

Co-leaders: Parmit Singh, PhD, NICHD; and Caroline Esnault, PhD, NICHD

Dates/Time/Location: Wednesday (June 25, July 2, July 9, July 16, July 23 and July 30); 2:00 pm -3:00 pm, Building 18T/32, Lecture hall A

Directions: This building is near the Natcher building which 45 (diagonally opposite).

TWINBROOK: The Role of Evolution in Biomedicine

Description: The primary goal of this journal club is to provide practice reading and interpreting primary scientific literature in a semi-structured yet casual, discussion-based manner. A second goal of this journal club is to enlighten students on the critical role of evolutionary science in understanding and combating various aspects of medicine and disease.

Co-leaders: Tory Williams, PhD, NIAAA; and Van Lu, PhD, NIAAA

Dates/Time/Location: Wednesday (July 2, July 9, July 16, and July 23); 2:00 pm – 3:00 pm; Building 5625 Fishers (Twinbrook), Terrace Level Conference Room (TS-46)

Directions: Enter the Twinbrook building in Rockville, MD located at 5625 Fishers Lane. Take the elevator or stairs down to the terrace (bottom) level. Proceed to the south-east end of the building and at the end of the hallway you will find the conference room TS-46. If traveling to this location from Bethesda or elsewhere, it is recommended that you take the Metro to the Twinbrook station and walk east along Fishers Lane until you reach building 5625.

Science in the News: Actual Data vs Media's Perspective

Description: Real science or media hype? Students will get to choose from a variety of scientific journal articles in which the findings have caught media attention and hit the newsstands. We will discuss the actual data in the primary scientific journal articles and compare how it was described by the media. What is the actual data? How true is the journalists' description to the real data? Through these discussions, students will learn how to critically read scientific literature and be exposed to research from some of the world's top scientists.

Co-leaders: Bernice Lo, PhD, NIAID; and Sonia Majri, MS, NIAID

Dates/Time/Location: Tuesday (June 24, July 1, July 8, July 15, July 22, and July 29); 5:30 pm- 6:30 pm; Building 10; Room 11D17

Directions: In building 10, take the D wing elevators up to the 11th floor. Do not take main elevators since there is no connection to the D wing from main elevator.

The Creativity of Pathogenic Viruses and the Scientists Who Study Them

Description: Pathogenic viruses have a remarkably rich and surprising set of solutions to evade the immune system and replicate. Disconcertingly, viruses are believed to outnumber all other biological entities by ten-to-one and have the ability to rapidly

evolve. In this journal club, we will focus on recent breakthroughs concerning the life cycle of pathogenic viruses and novel ways researchers are trying to stop them. We will explore the state-of-the-art methods used in virology and cover aspects of cell biology, molecular biology, biochemistry, and structural biology.

Co-leaders: Stephen Dollery, PhD, NIAID-LVD; and Jennifer Seedorff, PhD, NIAID-LVD

Dates/Time/Location: Thursday (June 26, July 3, July 10, July 17, July 24, and July 31); 12:00 pm -1:00 pm; Building 15F1, OTD conference room

Directions: A map will be sent directly via email.

Tracing the Lineage of Adrenal Cortical Cells

Description: Most hormone disorders of the adrenal cortex occur in the context of overgrowth or underdevelopment of the adrenal gland. At embryonic stages, the fetal adrenal cortex already has the ability to synthesize and secrete steroid hormones that are critical for fetal development. These functional fetal cortical cells then undergo regression and are replaced by continuously renewing adult-like cortical cells after birth. The continuously renewing adult cortical cells grow from the outermost layer of the adrenal, whereas fetal cortical cells stay in the inner portion of the cortex. In this 4-weeks journal club, we will discuss how did scientists use lineage-tracing and genetic labelling technologies to find out the origin of cells in the adrenal cortex. In the first class, we will have a brief introduction of the adrenal gland development. We will also talk about how to use online databases to search scientific papers, tack their citations, get alert/reports of new publications in the field of interest. Attendees will from 3 groups. Each week (from Week 2 to 4) we will have one group to lead the discussion of one selected paper in the filed of adrenal gland development.

Co-leaders: Chen-Che Jeff Huang, DVM, PhD, NIDDK; and Yulong Fu, PhD, NIDDK

Dates/Time/Location: Thursday (July 3, July 10, July 17, and July 24); 1:30 pm-2:30 pm; Building 10, Room 8D17

Directions: Go to the west side of Building 10 first, then use elevators in this side to the 8th floor (you may only enter the west side of Building 10 from the 1st floor or B1).

TWINBROOK III: Exploring the Molecular Biology of Malaria

Description: This journal club will explore the molecular biology of the most widespread and lethal malaria parasite, Plasmodium falciparum. Relevant journal articles will be used to address different aspects of the multi-host, multi-stage parasite life cycle, with particular emphasis placed on how discoveries in the lab can positively impact those suffering from disease.

Co-leaders: Aaron Neal, BS, NIAID; and Becky Miller, PhD, NIAID

Dates/Time/Location: Monday (July 7, July 14, July 21 and July 28); 1:00 pm - 2:00 pm; Twinbrook III, Room 3e-016

Understanding Functional Dynamics of T Cells and Implications for Immunotherapy in Cancer and Chronic Infection

Description: The major aims of this journal club are 1) to examine the similarities and differences between responding tumor-reactive and chronic viral-specific T cells and 2) to discuss treatment strategies that have been developed to overcome immunological barriers encountered by T cells in the tumor microenvironment and chronic infection. A special emphasis will be placed on understanding the regulation of T cell activation and differentiation and the immunological context in which T cells acquire either functional cytotoxicity and memory or distinct states of dysfunction such as anergy and exhaustion. In addition, we will investigate immunotherapeutic strategies that have successfully transitioned from pre-clinical models to clinical patient trials, in particular recombinant vaccines and checkpoint inhibitors, and discuss the ways in which these treatment modalities can be combined with traditional therapies, namely radiation and chemotherapy in cancer patients and anti-retroviral therapy in HIV/AIDS patients.

Co-leaders: Peter Kim, PhD, NCI/CCR; and Renee Donahue, PhD, NCI/CCR

Dates/Time/Location: Wednesday (July 9, July 16, July 23, and July 30); 2:00 pm - 3:00 pm; Building 10, Room 8B03

Where do Babies Come From? Cell Biology and Genetics of Gametes and Fertilization

Description: Maintenance of sexually reproducing species, including humans, requires successful fertilization with two quality gametes. This journal club will discuss what is required for this process and what happens when something goes wrong. Topics may include: maintenance of chromosome number and integrity in sperm and eggs, the germline stem cell niche, activation of germ cells and fertilization, and in vitro fertilization as well as diseases that affect these processes.

Co-leaders: Aimee Jaramillo-Lambert, PhD, NIDDK; and Amy Fabritius, PhD, NIDDK

Dates/Time/Location: Tuesday (June 24, July 8, July 15, and July 22); 2:00 pm – 3:00 pm; Building 8, Room 302

Why Do We Drink? How Genes, the Brain and the Environment Explain Our Drinking Behavior, From Happy Hour to Alcoholism

Description: Humans have consumed alcohol for thousands of years. Yet, we still don't have answers to many basic questions about drinking. Why do some people become addicted, but not others? How does alcohol affect our brains? This journal club will explore recent scientific articles addressing these questions. The focus will be exploring academic articles and showing you how to engage them, identify their strengths and weaknesses, and transform results into ideas that can help you develop your own studies. You will have opportunities to discuss and raise questions of your own. And, of course, we want to have fun.

Co-leaders: Joshua Gowin, PhD, NIAAA; and Jia Yan, M.S., PhD, NIAAA

Dates/Time/Location: Monday (June 30, July 7, July 14, July 21 and July 28); 2:00 pm-3:00 pm; Building 10-CRC, FAES Academic Center, Room B1C204, Classroom 8

You Are What You Eat and What Your Grandmother Ate: Dietary Effects on Gene Expression and Disease

Description: There is increasing evidence that factors in our external environment can alter patterns of gene expression to allow for appropriate physiological responses. These changes are made in part by the chemical modification of both DNA and the proteins bound to it. Interestingly, not only do these changes affect us as individuals directly, but they can also be passed on to our offspring. This process is referred to as transgenerational epigenetic inheritance, and can be influenced by diet, toxins and stress. Our journal club will delve into the mechanisms by which this epigenetic information is transmitted, with a specific focus on nutritional supply. We will also discuss how disease states can manifest as a result of alterations in diet, highlighting both historical examples in the human and the experimental work that has been done in model systems.

Co-leaders: Lara Abramowitz, PhD, NIDDK; and Katryn Harwood, PhD, NIDDK

Dates/Time/Location: Thursday (June 26, July 10, July 17 and July 24); 12:00 pm-1:00 pm; Building 8, Room 127

Directions: Bldg 8. 1st floor main conference room.