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A Knotty Problem: Topoisomerases and DNA Topology

Description: Topoisomerases are a class of proteins which alter the 3D structure of DNA. Due to their role in replication and chromosomal segregation, they are important chemotherapy targets. For example, topoisomerases are responsible for relaxing DNA ahead of the replication fork. Without this topological simplification, DNA replication and cell division fail. In this journal club, we will provide an overview of the impact of topoisomerases on DNA topology, covering publications ranging from the application of single-molecule magnetic tweezers to cell-based assays of topo poisons, a class of chemotherapy agents. Students will be expected to read the week's publication ahead of time, actively participate in group discussions and present a paper with a group of fellow students.

Co-leaders: Ryan M Harrison, NHLBI; Tamara Litwin, NHLBI

Dates/Time/Location: Thursdays 5, 12, 19, 26 July 2012. 10:30am-12pm, Building 50, 3rd floor library (3328).

Refreshments will be provided.

Autism Epidemic? Understanding the Disorder and How It Is Counted.

Description: The journal club will facilitate a discussion of the research used to generate the recent prevalence estimates for autism spectrum disorders. The focus of the meetings will include an overview of the clinical manifestation, developmental considerations, and differential diagnosis in children with autism spectrum disorders; and how each of these factors impacts the calculation of prevalence rates. The accuracy of the reporting of the data in the popular media, and its impact on research and policy will also be addressed.

Co-Leaders: Cristan Farmer, PhD, Lauren Swineford, PhD and Lisa Joseph, PhD

Dates/Time/Location: Tuesdays, 7/3, 7/11, 7/18 & 7/25; at 1pm; Building 10, Room 4N230

Computational Modeling in Molecular Biophysics

Description: Computer models and simulations provide powerful tools to complement and interpret experimental data on proteins and other biomolecules as they fold, bind to one another or perform catalytic reactions. By building models that accurately capture the physics of these molecular functions, one gains detailed mechanistic insight that often exceeds any resolution available experimentally and generates testable hypotheses about the structure and dynamics of these biomolecules. This journal club will cover recent publications on molecular models of protein dynamics in solution and in biological membranes at varying scales of atomic detail. We will discuss the details and approximations of the physical models, the methods used to extract dynamic and thermodynamic properties from the simulations, and discuss the quality and presentation of the published research.

Co-leaders: Margaret Johnson, PhD, NIDDK; Ville Kaila, PhD, NIDDK

Dates/Time/Location: Wednesdays July 11, July 18, July 25, Aug 1; 2:30PM; Bldg 5, Room 127

Endocytosis and Trafficking of Plasma Membrane Proteins

Description: Regulation of the lipid and protein composition of the plasma membrane is a complex and dynamic process in which the addition of secretory pathway derived materials must be precisely balanced with membrane removal and entry in to endocytic pathways. Plasma membrane cargoes internalized via endocytosis can be targeted for lysosomal degradation or trafficked back to the plasma membrane. With slight modifications in endocytic trafficking cells can quickly change their plasma membrane compositions in response to environmental, as well as intracellular, cues to accomplish dramatic changes in proliferation, metabolism, survival, and signaling. This journal club will review recent publications investigating differences in the mechanisms of endocytic uptake and sorting of plasma membrane proteins.

Co-leaders: Chad Williamson, PhD, NHLBI; Juliane Caviston, PhD, NHLBI; Lymarie Maldonado-Baez, PhD, NHLBI

Date/Time/Location: Tuesdays; July 3, July 10, July 17, July 24; 2:30-3:30pm; Building 50, 2nd floor library

Epigenetics and Cancer

Description: Epi –(Greek: over, above)-genetics as a field of science has exploded in the last two decades. Our understanding of genome has moved from long strings of DNA to a complex three-dimensional structure, where genes are differentially packaged and often re-organized on developmental, environmental and cellular cues. In the proposed journal club, we will discuss recent advances in epigenetics and how the knowledge is used as an important tool to fight cancer.

Co-leaders: Joshua J. Waterfall, PhD and Anand Ranjan, PhD

Dates/Time/location: Wednesday, July 11, 18, 25 and Aug 1; 2-4pm; Bldg. 37 room 6107

EXECUTIVE BOULEVARD: Cancer Epidemiology: Etiology, Prevention, and Policy

Description: Epidemiology examines distribution of health and disease, identifies factors that influence or determine the distribution, evaluates screening and preventive measures, and guides health policy. Topics selected for the journal club sessions will draw from recent newsworthy events. Each session will review the press coverage received by the journal club article chosen and the empirical evidence provided by the journal club article. Participants will learn about key methods and general approaches used in epidemiology as well as how to critically evaluate scientific publications.

Names of Co-leaders: Sarah Daugherty, PhD, MPH (NCI, DCEG, OEED), Brandy Heckman-Stoddard, PhD, MPH (NCI, DCP, BGCR), Hannah Yang, PhD, ScM (NCI, DCEG, HREB)

Dates/Time/Location: Monday July 9; Tuesday July 17, July 24, July 31; 2:30 pm - 3:30 pm; 6120 Executive Blvd (EPS), Room 511

FREDERICK: Can Mice Help Us Cure Cancer?

Description: Mice are used widely by researchers to help gain insights into improving the diagnosis and treatment of cancer. In this journal club, we will introduce participants to some of the diverse types of mouse models that are used in cancer research. We will discuss the strengths and weaknesses of these models in terms of their applicability to human cancer. Current trends in advanced mouse modeling techniques will also be addressed.

Names of Co-leaders: Sunny Jansen, PhD and Amit Adhikari PhD

Dates/Time/Location: Mondays July 9, 16, 23 and 30; 2:00-3:30pm; Building 549 Conference Room A, Frederick National Lab for Cancer Research, Frederick MD

Note: Food will be provided!

From the Wet Lab to the Wet Bar

Description: This journal club will provide an overview of contemporary addictions research, including a discussion of the current issues facing the field and the major laboratory methods used to better understand addictive processes. These methods include: imaging techniques (fMRI, MRI, PET); alcohol self-administration; and laboratory paradigms for inducing craving. A major emphasis of the club will be how to understand and apply these findings to real-world challenges in the field of addictions research. The focus will be on alcohol research, but other drugs of abuse may be covered as well.

Co-Leaders: Bethany Stangl, Ph.D., Laura Kwako, Ph.D.

Dates/Time/Location: Thursdays, July 5th, 12th, 19th, and 26th; 10 to 11am; Building 10/CRC, Room 7C401

Global Health Journal Club

Description: ‘What is Global Health? Scientists, students, and activists discuss the interdisciplinary nature of global health and explore the philosophical underbelly of problems in public health and science research’- The Global Health Journal

Using the Global Health Journal as a resource and starting point, we hope to broaden our understanding of global health issues, science, health delivery initiatives, the funding models and the players involved. Reading (and visual-audio) material will be sent a week prior to the meeting and through Google Documents, we will document thoughts and discussion points for the meeting. On the last journal club session, we hope to bring in a speaker from the NIH, involved in global health initiatives, who can provide us with further insight.

Our aim is to scratch the surface of global health (data analysis and conclusions made), promote engagement (through writing), suggest resources (online, conferences, funding bodies), and to understand the role and future of scientists in the global health arena.

Co-Leaders: Jameela Khan, PhD and Paul Southworth, PhD

Dates, times, locations: Thursdays (July 12th, 19th, 26th and August 2nd); 4-5 pm; Building 10, Hatfield Room, 2-3750

How Cells Stay in Shape: The Maintenance of Organelle Shape and Size

Description: How the shapes and sizes of different living cells and intracellular organelles are maintained is a fundamental question in the field of cell biology. Maintenance of the shapes and sizes of different cellular features is crucial for cellular function. This journal club will attempt to address some of the mechanisms by which cellular morphology is preserved. Participants will also become acquainted with different techniques used in biochemistry, cell and molecular biology.

Co-leaders: Sujoy Lahiri, PhD, NIDDK; Alison Walters, PhD, NIDDK.

Dates/Time/Location: Monday; July 2, July 16, July 23, July 30; 4:00 PM.; Building 8, First floor, Room 122.

How Does the Brain Understand Odors? -The Structure and Function of the Olfactory System

Description: Most animals, including humans, have five main senses, hearing, sight, touch, smell, and taste. Which do you think is the most important? Chances are you would put sight on top. If you were able to ask a mouse or a fly, however, they would probably disagree. Many animals actually depend heavily on their sense of smell to do the really important things in life: finding food and mates, avoiding predators, communicating with other members of the species, and generally interacting with the outside world.

How do animals become aware of the thousands of chemicals floating around the world, and use knowledge of these chemicals to guide their behavior? This is the question that neuroscientists studying the sense of smell (the olfactory system) are interested in answering. And in the last 20 years, we have made some real progress.

In this journal club, we will discuss the fundamental principles governing the organization of the olfactory system, which is remarkably similar in animals as seemingly different as mice and flies. We will then discuss what this organization means in terms of representing odor information. During the sessions we will also talk about some of the most commonly used techniques in neuroscience research, including making transgenic animals and performing electrophysiological recording.

By the end of the journal club, students will have a general idea of how the olfactory system is organized both structurally and functionally. More importantly, they will have had exposure to the kind of critical reading and thinking that is central to scientific discovery.

Co-leaders: Ning Cheng (NINDS) and Samuel Reiter (NICHD)

Dates/Time/Location: Mondays July 2nd, 9th, 16th, and 23rd; 3:00-4:30 pm; Bldg. 35, room 3AB 1000.

Immune-Based Therapies for Type 1 Diabetes

Description: Type 1 diabetes is a highly prevalent autoimmune disease. It occurs due to aberrant self-specific T cell activation and subsequent destruction of insulin-producing beta cells in the pancreas. Several immune cell types are involved in this process, including macrophages, dendritic cells, B cells, and both CD4+ and CD8+ T cells. Several markers of propensity to develop type 1 diabetes are known, with the most researched being autoantibodies against beta cell proteins. Historically and currently, much of the research on immune therapies for autoimmune diseases like type 1 diabetes has focused on limiting T cell stimulation. However, several new areas targeting other immune cell types have recently been explored. In this journal club we will discuss how to read scientific literature and discuss current ideas and techniques surrounding immune-based therapies for autoimmune diseases.

Co-leaders: Jeffrey Price and Nicole Beauchamp, NIDDK

Dates/Time/Location: Tuesdays July 3rd, 10th, 17th, and 24th; 3 pm; Bldg 10, room 6-5961

***“In sickness and in health, until death do us part”*: How Does Programmed Cell Death Shape Our Bodies and What Happens When It Goes Wrong?**

Description: Apoptosis or programmed cell death, is a gene-directed mechanism required during both embryonic development and adulthood organ homeostasis. For example, apoptosis is necessary for separating the fingers in the developing limb as well as for maintaining cell numbers and organ size through our lifetime. Dysregulation of the signal-cascade pathways that trigger apoptosis contributes to the development of disease. By analyzing key peer-reviewed articles, this journal club will introduce you to the molecular mechanisms of apoptosis leading to both normal and pathological outcomes. Furthermore, it will provide you with the basic tools of how to read and critically interpret primary scientific literature, while learning about hypothesis generation and experimental approaches.

Co-leaders: Rocio Benabentos, PhD, NIDCR; Vanesa Sanchez, PhD, NCI

Dates/Time/Location:

First meeting: Tuesday, July 3rd, 2012 at 4:00 pm. Building 37, Room 2041

Following meeting days: Tuesdays: July 10, July 27 and July 24. Building 37, Room 2041, Time TBD (any time from 4:00 pm to 6:00 pm)

MicroRNAs and Human Diseases

Description: MicroRNAs were discovered two decades ago, but it is only recently that microRNAs were highlighted as key regulators of many biological functions. MicroRNAs are small single-stranded, non-coding RNAs that have found to be conserved throughout evolution. This journal club will aim to introduce the field of miRNA and miRNA research. We will discuss microRNA biogenesis, function and discuss the role microRNAs play in human diseases. Participants will learn about methodology pertaining to miRNA research and how to critically evaluate scientific publications.

Co-leaders: Christine Happel, PhD, NCI; Phileppe Kieffer-Kwon, PhD, NCI

Dates/Time/Location: Fridays July 6, 13, 20 and 27th held 1-2 pm in building 10 conference rm. 3-1608

Mystery of Metastasis

Description: Metastasis is the major cause of death among cancer patients. It consists of a multistep process in which cancer cells dissociate from the primary tumor and propagate through lymphatic or circulatory (blood) systems. Metastatic cells then spread to distant organs forming a new tumor mass, also known as metastatic lesion. This journal club will give an overview of the metastatic process and the major differences between several types of cancer metastasis. Moreover, recent publications on the therapeutic strategy will be discussed. Members will discover the approaches used to study this mysterious disease and learn how to critically evaluate scientific publications.

Co-Leaders: Natascia Marino, PhD; Tiffany Reed, DVM

Dates/Time/Location: Wednesdays: July 11, 18, 25 August 1; **4 pm**; Building 37 / Room: vestibule 2.1 (Second Floor by main Elevators)

Network Analysis and Its Application in Neuroscience

Description: Complex network is one of the powerful tools to understand the myriad of interactions occurring in neural systems at various scales, ranging from genes to neurons to cortical areas across the brain. It has been successfully used to both uncover fundamental principles governing neuronal systems and help making better diagnosis for various neurologic and psychiatric disorders. This journal club is intended for students who are interested in learning the concept of complex network and how to apply the network analysis to study neuronal systems. We will cover a number of key publications that laid down the foundation for complex network analysis and also discuss the research directions that are currently most active. An emphasis will be put on simplifying the mathematics and making the important ideas accessible to students with a non-computational background. Participants will acquire skills to critically read network analysis papers and develop ideas how to relate this field to their own research interest.

Co-leaders: Shan Yu, PhD and Ning Liu, PhD

Dates/Time/Location: Fridays July 6, 13, 20, 27; 12:00 p.m. – 1:00 p.m.; Bldg. 35, 3A conference room (3AB1000)

Neural Basis of Disease and Treatments

Description: Examine recent developments in the understanding of the biological basis of several neurological conditions and their treatments. Some potential topics include Alzheimer's, prion disease, Schizophrenia, Parkinson's, or others based on student interests.

Co-leaders: Surjeet Mastwal, PhD, NIMH; Vania Cao, NIMH

Dates/Time/Location: Fridays; July 13th, July 20th, July 27th, August 3rd; 3:30-5pm; Building 35, Room 2CD900

Recent Developments in Anxiety Disorders Research

Description: Among the most prevalent of all psychiatric disorders, anxiety disorders are common and highly impairing. This journal club will examine some of the recent data on the epidemiology and neurobiology of anxiety disorders. Members will learn about the prevalence and public health impact of anxiety disorders as well neurobiological models of anxiety. Over the course of the journal club, members will practice discussing scientific topics and gain experience critically analyzing scientific literature.

Co-leaders: Mary Burstein, Ph.D., NIMH; Anja Schmitz, Ph.D., NIMH

Dates/Time/Location: Tuesdays; July 3rd, July 10th, July 17th; July 24th; Building 35, Room 1AB1000, 1:00-2:00pm

Regulation of Gene Expression in Development and Disease

Description: Our body is made up of approximately one hundred trillion cells, and each cell contains a complete set of genes required to make any organ. However in each particular cell, only small set of genes is activated. Therefore, one of the greatest mysteries of nature is how an organism defines which genes work to make a lung or a heart and why those genes don't work to generate skin.

During our journal club, we will discuss mechanisms that cells utilize to gain information from the genome and regulate expression of the genes. Through analyzing the logic of experiments design, we will learn how contemporary molecular genetics works. Moreover, using critical thinking skills, we will try to determine if the authors really prove their theory.

Journal club participants will be involved in informal discussions with the main goal of finding answers to most of questions. Debating is always welcome: Thought thrives on conflict and creative thinking!

See you soon!!!

Co-leaders: Ji-Hyun Oum, PhD, NIDDK; Ivan Krivega, PhD, NIDDK.

Dates/Time/Location: Wednesdays; July 11, July 18, July 25, August 1; 10:00 - 11:00 am; Building 50, Room 3229

Snapshot of a Deadly Virus

Description: HIV (human immunodeficiency virus) targets and destroys the immune system, which results in susceptibility to many other pathogens and certain cancers. Over the last three decades, HIV has killed over 25 million people worldwide while 34 million are currently living with this incurable infection. This journal club will discuss recent publications on HIV pathogenesis and attempts to develop a vaccine. We will discuss the methods used to study HIV and critically evaluate scientific publications.

Co-leaders: Natalie Leach, PhD, NIAID; Gabriel Parra-Gonzalez, PhD, NIAID.

Dates/Time/location: Thursdays: July 5, 12, 19 and Aug 2; 12-1:30 pm; Building 50-Room 6227

Specialized Functions of CD4 Helper T cells

Description: The adaptive immune system is composed of dedicated classes of lymphocytes that work together to mount an effective response. CD4 helper T cells differentiate into one of several subsets that each have a unique and important function. In this journal club, we will discuss the specialized function and physiological relevance of CD4 helper T cells with a specific focus on the role of the more recently identified subsets including T regulatory cells, Th17 cells, and T follicular helper cells. Participants of this journal club will learn how to read a scientific paper, the methods of the most widely used techniques in studying the immune system, and the function of CD4 T helper cells within the larger context of the adaptive immune system.

Co-leaders: Rachel Gottschalk and Amanda Poholek

Dates/Time/Location: Tuesdays July 3rd, 10th, 17th, and 31st; 4pm; Building 10 room 6N210

Studying Emotion and Cognition in Animals

Description: This journal club will highlight recent findings on cognition and emotion, focusing mainly on anxiety and depression, which today are considered to be two of the leading causes of disability worldwide, according to the World Health Organization. Selected (or suggested) articles will examine how cognition and emotion can be studied in animals, such as rodents, in terms of behavior related to these disorders, neuro-anatomical regions involved in these states, and how these findings relate to human well-being and the treatment of mental disorders. Discussions will highlight skills needed to critically evaluate a scientific article and finding, different methods for testing cognitive and emotional behaviors in rodents, and interpretations of these behaviors.

Co-leaders: Rose-Marie Karlsson, PhD, NIMH; Lucas Glover, NIMH

Dates/Time/Location: July 5th, 12th, 19th, 26th; 3:00-4:00 PM; Building 35, Room 3CD-900

The Role of Regulatory Small RNAs (sRNAs) in Bacterial Virulence

Description: The past decade has witnessed an explosion in the investigation of regulatory small RNAs (sRNA). Both computational and experimental approaches have confirmed, or predicted, the presence of these biomolecules in all the domains of life. In particular, in bacteria, the genome-wide identification and characterization of the structure and function of sRNAs has occurred at an unprecedented rate. Since the first genome-wide screens for sRNAs in the non-pathogenic bacterium *Escherichia coli*, scores of sRNAs have been identified in pathogenic bacteria. Moreover, many of these sRNAs have been implicated in the virulence of bacteria as phylogenetically distant as *Staphylococcus aureus* and *Salmonella Typhimurium*.

This module is designed to introduce students to the structural and functional diversity of sRNAs and how they coordinate ancestral biological processes with recently acquired virulent traits in bacterial pathogens. It is not expected that students focus on the minutiae of the topic at hand but understand the similarities and differences in the mode of sRNA-mediated regulation between different pathogens and recognize the importance as well as the limitations of correlative and causative studies. In parallel with this, students will learn of the different experimental and computational approaches that can be utilized to predict and confirm the presence of sRNAs. Additionally, students will not only learn to read and comprehend primary literature but also to critically evaluate what they read and design subsequent experiments to confirm, extend, or disprove the authors' conclusions. Students, in pairs, will be expected to present a primary article in the form of a powerpoint presentation. Four articles will be provided

to each pair of students and the students will select one, or two, for presenting during the allotted journal club schedule.

Co-leaders: Shantanu Bhatt, PhD, Yue Hao, PhD

Dates/Time/Location: Fridays, July 7, 13, 20 and 27; 2:30-4:30; Bldg. 32T, Conference Room A @ 2:30-4:30 pm

The Short End of the Stick: A Look at Health Disparities in America

Description: “Minorities get sick sooner, have more severe illness and die sooner than Whites” according to health disparities experts. Health disparities (HD) are significant differences between one population and another regarding rate of disease incidence, prevalence, morbidity, and mortality. Join this journal club to attend four interactive sessions centered around one health disparity topic (*i.e.* HIV in African-Americans). Session one will provide an introduction and background into HD and the topic of interest. During session two, participants will engage in a discussion of a journal article based on this particular HD topic. In session three, an expert in HIV research will lead an interactive seminar. In session four, a community professional working directly with individuals impacted by HIV will provide insights into working with the affected population.

Co-Leaders: Shauna Clark, PhD and Philip Ryan, PhD

Dates/Time/Location: Thursday July 12, 19, 26 and August 2; 2:30 pm; Location TBD

Translating Hardcore Science into Plain Language

Description: A big problem scientists have is translating technical information into plain language that the Public can understand. This journal club will review 2-4 scientific papers in an attempt to translate them into basic English. We will practice explaining concepts, methods and data to a wide variety of audiences. This journal club is designed to be fun and interactive. Try to arrive early for the first meeting to give yourself time to find the room. Refreshments will be provided.

Co-leaders: Drs. Dalya Lateef and Umesh Wankhade

Dates/Time/Location: Mondays July 9, 16, 23, 30; 1:30 pm-to 2:30 pm; Building 10/CRC, 7W-5675 (7th floor, west laboratories, room 5675).

Unlocking the Mysteries of Alzheimer's Using Model Organisms

Description: Alzheimer's disease is a debilitating disease which affects 27 million people worldwide. It is a form of dementia that is characterized by a decline in normal mental function, such as memory, ability to communicate, focus, or reason. Currently, there is no cure or treatment that ameliorates the progression of the disease. However, researchers have recently developed animal models of Alzheimer's disease in an attempt to understand the progression of the disease at the molecular level and to aid in drug development. This journal club will examine several animal models of Alzheimer's disease, and will evaluate the potential advantages and drawbacks of using these model systems to study this disease.

Co-leaders: Jacqueline Goeres and Aimee Jaramillo-Lambert

Dates/Time/Location: Thursdays; July 5th, 12, 19, 26 from 2:00-3:30pm in Building 8, Rm 122 (1st floor)