Global Initiative of Academic Networks (GIAN)

How Next Generation Sequencing (NGS) Untying the Knots in Viral Pathogenesis

Overview

The term 'Virus' itself can cause panic among communities. There are limited information and resources available to differentiate and distinguish viral infections from other illnesses. Still, India categorizing in developing countries where lots of viral outbreaks and associated diseases spread every year. At present, India's economy is growing at fast pace and the developmental works are going on various levels. This industrialization is leading to a migration of people from villages to small cities and small cities to metro cities making the population density go up. These large populations are suffering from the lack of proper space and time for sanitation, balance diet or a balance life. All these factors ultimately weaken our society's health and as being over-populous country, we are attempting to attract lots of viral pathogens in our daily routine. Studies were conducted to understand and solve this pathetic scenario, however the gaps between available information, knowledge and facilities are much higher compared to the required one or western countries.

Therefore, as a researcher this is our basic duty to spread awareness and teach other researchers about the details of these viral pathogens and associated diseases. Internationally, lots of research groups working on next generation sequencing (NGS) to understand the mechanism associated with pathogens. These NGS tools along with other techniques are very helpful to unravel the viral replication. Studies of viral replication are extremely important for the control and manipulation of viral pathogens. However, this mechanism is tedious to find correct information. Therefore, we need a specific approach by which we can understand and utilize our expertise to investigate potential health-hazardous viruses.

This course will be of a great benefit to students and researchers for the development of new methodology in virus replication. Furthermore, potent therapeutics and vaccine candidates would be targeted with the help of this course.

Modules	**Schedule dates: October 23- November 1, 2017** Lectures: Morning 10 AM to noon Tutorials: Afternoon 3 PM to 5 PM Number of participants for the course will be limited to fifty.
You Should Attend If…	▪ Attend If you are a student, researcher or scientist in the discipline of biological science ▪ You are a clinician/ paramedical staff ▪ You are a university/ college teacher who is using term virus during their professional work.
Fees	The participation fees for taking the course is as follows: • Academic Institutions/Hospital: Rs 1,000/per participant.

	• Participants from industry: Rs 3,000/ per participant • The above fee includes all instructional course materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr., free internet facilityand refreshments. • The participants will be provided with accommodation on payment basis.

Faculty

The FACULTY

SCV

HCJ

Dr. Subhash C Verma is Associate Professor at Department of Molecular Microbiology and Immunology at University of Nevada, reno, USA. Dr. Verma laboratory is interested in understanding the mechanism of Kaposi sarcoma associated Herpesvirus (KSHV) genome replication during reactivation as well as during de-novo infection of human cells. KSHV also referred, as Human Herpesvirus 8 (HHV8) is tightly linked to various human malignancies including Primary Effusion Lymphomas (PELs), Kaposi's sarcoma (KS) and Multicentric Castleman's Disease (MCDs) and cause tumors predominantly in immune compromised individuals including HIV+ and patients receiving immune suppressive therapies to prevent graft rejection. KSHV induced tumors are one of the major causes of morbidity and mortality of HIV/AIDS patients.

The major research interests are defining the genetic and epigenetic factors involved in regulating viral DNA replication during latent as well as lytic phases of the viral life cycles. We use a novel, Single Molecule Analysis of the Replication DNA (SMARD), approach to localize the replication initiation (ori) and termination sites on the viral genome. We are using next generation sequencing (RNA-seq and ChIP-seq) to delineate the changes in chromatin structure required for replication initiation. Additionally, we are using various other biochemical and recombinant approaches to establish the role of viral genes in replication and persistence of the viral genome.

Dr. Hem Chandra Jha is Assistant Professor at Centre for Biosciences and Biomedical Engineering at IIT Indore. Dr. Jha lab is working on the interface of Medicine, Biology and Engineering. This interdisciplinary approach towards existing problems in viral, bacterial infection related cancers, brain diseases and pathogens problems in routine life.

Schedule	Lectures (Morning session)		Tutorials (Afternoon session)	
Oct 23, 2017	L1 (SCV)	What is virus, classification of virus	T1 (HCJ)	Evolution of viruses, how virus evolution is different than other primitive micro-organism, how it survives during adverse era on earth?
	L2 (SCV)	Life cycle of viruses, various phases in virus life cycle and their importance.		
Oct 24, 2017	L3 (SCV)	Host targeted by viruses, what are the host those infected through virus, why virus specifically infected several species not others?	T2 (HCJ)	How viruses infect us; Why India has more viral associated infection than western countries?
	L4 (SCV)	Virus driven diseases. Classification of viral diseases based on bio-safety levels		
Oct 25, 2017	L5 (SCV)	About DNA viruses, types of virus, structure of virus, specific characteristics of virus.	T3 (HCJ)	How host immunity is important to keep us healthy, how virus targets our immune system?
	L6 (SCV)	About RNA viruses, types of virus, structure of virus, specific characteristics of virus.		
Oct 26, 2017	L7 (SCV)	What is replication, importance of viral replication in disease progression.	T4 (HCJ)	What are the pre-symptoms of viral infection?
	L8 (SCV)	Importance of viral antigens, how viral antigens manipulates host machinery.		
Oct 27, 2017	L9 (SCV)	Mechanisms of Viral replication.	T5 (SCV)	Why viruses are always harmful?
	L10 (SCV)	Techniques used for the studies of viral replications.		
Oct 28, 2017	L11 (SCV)	What is next generation sequencing (NGS)? Why this is important in modern biology?	T6 (HCJ)	How to cross check new virus generation? Study the evolution of viruses on earth
	L12 (SCV)	How NGS helps in the study of disease mechanism?		
Oct 29, 2017	L13 (SCV)	Importance of NGS in viral replication study	T7 (SCV)	How to analyze big data through NGS?
	L14 (SCV)	Importance of RNA-Seq through NGS and how it different than Micro arrays studies		
Oct 30, 2017	L15 (SCV)	Importance of ChIP-Seq through NGS and how it different than ChIP	T8 (SCV)	Tools to interpret the NGS data.
	L16 (SCV)	How Methyl-Seq study is enhancing our understanding in virus mediated cancer progression		
Oct 31, 2017	L17 (SCV)	Future direction in viral replication study.	T9 (HCJ)	What are differences among RNA-Seq, ChIP-Seq and Methyl-Seq?
	L18 (SCV)	How to invent and characterizes new virus in unknown samples?		
Nov 1, 2017	Date of Examination November 1, 2017 Last day: Exam (2 hrs), Evaluation and discussion (2 hrs), Validation and closing ceremony (2 hrs).			

Course Coordinator

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http://www.iiti.ac.in/GIAN/