

Vaccines for Human and Animal Viral Pathogens

Course code: 171012H03; Date: July 02 to 07, 2018; Venue: IIT Indore

Overview

We know a lot about what is responsible for infections, and how it happens. But can we prevent them? The platform for this concept (vaccine) arose from the empirical observation nearly two-and-a-half centuries ago by a cattle breeder in England that local dairymaids were immune to smallpox because of prior exposure to cowpox. This observation led to the basic principle of vaccination that inoculation with a less harmful agent (cowpox) can protect a far more dangerous agent of similar type (smallpox). The use of vaccines to prevent viral and bacterial diseases has been one of the major success stories of the modern medicine. With the world witnessing emerging and re-emerging pathogens constantly, a clear understanding of the basic principles of the pathogen interaction with the host immune system, determining the immunological responses that are protective to the host, identifying the pathogen targets for designing efficacious vaccines, developing various methods and approaches for generating and delivering vaccines are important. This course is designed to provide an overall understanding of how viruses interact with the host and how the host's immune system generates a protective response to counter the pathogen. The focus will be on human viral pathogens such as Influenza, Rabies, Polio, Ebola, HIV, Zika, Poxviruses, etc., for examining new strategies for vaccine design and development based on genetic engineering of viral vectors as well as bioinformatics analysis of potential targets for vaccine development. The course will also address various ethical, legal and commercial issues related to vaccine development and its administration.

Modules	10 hours of Lectures and 4 hours Tutorials: July 02 to July 07, 2018 Number of participants for the course will be limited to 50
You Should Attend If	<ul style="list-style-type: none">• You are a MSc/PhD student in any Biological science discipline• You are a research scientist/ Post-doc Candidate/ Research Associate related fields• You are corporate Professional working in the research wing of any Private or Public organizations.• You work in an industry related to vaccine development disease control, etc.• You are epidemiologist, medical professional dealing with human infectious disease.
Fees	Oversea Research Private Industry Rs. 5,000 Academic Institutions/ Faculty: Rs. 3,000 Students & Research Scholars: Rs. 1,500 Above fees include all instructional materials, lunch, and snacks, registration kits, etc. The participants will be provided with accommodation on payment basis subject to availability of rooms.
Registration Process	All prospective participants need to do web registration for the course on GIAN (http://www.gian.iitkgp.ac.in/GREGN/Index) Account Holder Name IIT Indore Project and Consultancy A/c Bank Name Canara Bank Branch Name: Indore Navlakha Account Number 1476101027440 IFSC Code; CNRB0001476 MICR Code: 452015003

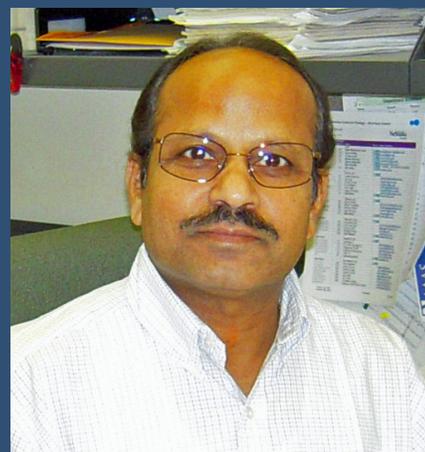
Foreign Faculty

Dr. Asit Pattnaik is a Professor of Virology in the School of Veterinary Medicine and Biomedical Sciences at the University of Nebraska-Lincoln and a member of the Nebraska Center for Virology. He has a long-standing successful research career in molecular virology and viral pathogenesis. Following completion of his graduate studies at Griffith University in Brisbane, Australia, he conducted post-doctoral research on influenza virus as well as vesicular stomatitis virus (VSV). In the early 90s, he developed the reverse genetics system for a negative-strand RNA virus, using VSV as the model virus, which has been widely used worldwide for recovery of most negative-strand RNA viruses from full-length cDNA clones of the viral genomes. His laboratory also developed the infectious clone for porcine reproductive

and respiratory syndrome virus (PRRSV), which has been used to address many important questions on the innate immune response, virulence, attenuation of PRRSV in infected pigs and attempts to develop PRRSV vaccine based on DIVA principles. Recently, working with Zika virus (ZIKV), he has generated a full-length infectious clone of the viral genome and is examining virus replication in cell culture as well as conducting pathogenesis studies in the mouse model for developing vaccines and antivirals against ZIKV. Overall, his research focus is on understanding the molecular biology of viral genome replication, viral pathogenesis, interferons, antivirals and viral vaccines. He has published over 70 peer-reviewed publications in high impact journals such as Cell, Nature Immunology, Immunity, PNAS, J. Virology, Vaccine, etc. His research work on PRRSV has led to two patents on the development of PRRSV vaccines. His research has been supported by the National Institute of Health (NIH), USA, the United States Department of Agriculture (USDA) and several other private organizations.

Host Faculty

Dr. Nayak is an Assistant Professor at Center for Biosciences and Biomedical Engineering at IIT Indore. He studied veterinary medicine India. He has completed his Ph.D. in the area of molecular virology and pathogenesis. His post-doctoral research training was in the field of viral immunology and intravital imaging under the mentorship of mentorship of Dr. Dorian McGavern at National Institute of Neurological Disorders and Stroke (NINDS), USA. His research uses a multidisciplinary approach spanning three major disciplines of life sciences such as virology, immunology, and neuroscience. Using lymphocytic choriomeningitis virus (LCMV) to probe how the immune system of the central nervous system (CNS) responds to the viral challenge, his group has established role type I interferon (IFN1) as the master regulator of modulating innate immune response in the brain. His current interest lies in the studying virus-host pathogenesis and recombinant viral vector-based vaccine development. Currently, his lab works with multiple viral pathogens those include Orf virus, ephemeral bovine fever virus (BEFV) and vesicular stomatitis virus.



Schedule July 02-07, 2018

Date	Morning Session		Afternoon
Time	10 AM	11 AM	3-5 PM
Jul-02	Lecture 1	Lecture 2	Tutorial 1
Jul-03	Lecture 3	Lecture 4	Tutorial 2
Jul-04	Lecture 5	Lecture 6	Tutorial 3
Jul-05	Lecture 7	Lecture 8	Tutorial 4
Jul-06	Lecture 9	Lecture 10	Tutorial 5
Jul-07	EXAMINATION		

Course Coordinators



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Dr. Sharad Gupta is an Assistant Professor in the discipline of Biosciences and Biomedical Engineering at IIT Indore. He received Ph.D. degree from IIT Kanpur, during Ph.D. his research was focused on extraction of intrinsic fluorescence from biological tissues and tissue phantoms. His current research lies at the intersection of biology, optics, and nanotechnology. He has developed various nanotechnology tools for the disease diagnosis and therapy. He has used nanoparticles for the delivery of hydrophobic biological anticancer molecules. His focus is to develop biocompatible and biodegradable nanoparticles for *the in-vivo* biomedical application. To achieve the same, he used a plant-virus, Brome Mosaic Virus (BMV), capsid protein sub-units to encapsulate a near-infrared chromophore Indocyanine Green. This virus like nanoparticles were later used for photoacoustic biomedical imaging. Currently, he is using the similar approach to be applied to vesicular stomatitis virus for disease diagnosis and therapy.



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