Human Infectious Disease and Animal Models

Overview

The contribution of animal model studies to human well-being is enormous. Since past several centuries, animal model studies have allowed fast progression and discovery of scientific knowledge which ultimately helped to improve suffering, illness, and diseases in both humans and animals. As a result, many of the infectious diseases have been either eradicated or brought under control. As the demand for animal research increased over time, so also the rise in ethical concerns for animal use. On the other hand, the emergence and reemergence of deadly infectious diseases brought animal model studies to the limelight. As regulations require animal testing of novel vaccines before preclinical studies on human subjects, it became essential to have animal studies as part of the research and development activity of biomedical research.

Human immunodeficiency virus (HIV) is one the most significant pathogen of the history of mankind and is one of the leading causes of death across the globe. Despite thousands of researchers working worldwide, a successful vaccine is yet to come. One of the problems in the development of HIV vaccine is a lack of appropriate animal models for HIV. Simian Immunodeficiency virus (SIV), a close member of retrovirus family, infects macaques and it pathogenesis closely mimics to that of HIV infection in human. Availability of molecular virology tools to engineer a candidate virus vaccine has brought new hope towards the development of HIV vaccine. Groundbreaking discoveries in SIV research in macaque models in recent years, including results obtained from the laboratories of Dr. Byrareddy, has re-ignited hope to have a fruitful HIV vaccine shortly. And the future of HIV vaccine is heavily dependent on research in the macaque model. In this context, the course highlights the importance of animal research and aims to sensitize researchers in the context of ethical concerns and animal rights. The course is planned and offered as per the norms set by IIT Indore for ISWT subject.

Course participants will learn these topics through a series of lectures and tutorials supported by impressive audiovisual aids. Also, case hypothetical situations, real case studies and discussion will be shared to stimulate engagement and learning experience of the participants.

Modules	**Schedule dates: July 05 – July 15** **Lectures: Morning 10 AM to noon** **Tutorials: Afternoon 3 PM to 5 PM** **The number of participants for the course will be limited to fifty.**
You Should Attend If…	▪ you are a student, researcher or scientist in the discipline of biological science either engaged or intend to do animal research studies in future. ▪ you are an epidemiologist or clinician involved in infectious disease research ▪ you are a veterinarian or para-veterinarian or personnel working with any animal facility

Fees	The participation fees for taking the course is as follows: **Academic Institutions: Rs 1,000/- per participant for each host institute** **Participants from industry: Rs 10,000/- per participant for each institute** Free for participants from host institute The above fee include all instructional course materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr., free internet facility and refreshments. The participants will be provided with accommodation on payment basis.

The Faculty

Prof. Siddappa Byrareddy is a member of the faculty at the Department of Pharmacology and Experimental Neuroscience, University of Nebraska Medical Center, Omaha, NE, USA. He obtained his Ph.D. from National Institute of Mental Health & Neurosciences, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, India in 2007. His Ph.D. work won him the Indian National Academy of Science (INSA) Young Scientist Award in 2008. After holding a position of Assistant Professor at the Department of Pathology and Laboratory Medicine/Emory Vaccine Center, Emory University, Atlanta, GA, he moved to his current position.

Dr. Byrareddy started his research career working with Human Immunodeficiency Virus (HIV) and continued his studies in this field. Currently, he is using Simian Immunodeficiency Virus (SIV)- macaque model to find a find remedy for HIV. Specifically, his approach is to find an alternative treatment and preventive method that would minimize long-term usage of Anti-Retroviral Treatment (ART), which is often expensive and hurt the host. His recent work has shown that can sustained control of infection by SIV in rhesus macaques can be achieved by supplementing antiretroviral drugs with an antibody even after the virus integrates into the host chromosome.

Long-term goals of his laboratory are to participate in efforts to set up well-controlled clinical cohorts and in tandem with testing the outcome in relevant animal models as a synergistic platform for preclinical development of vaccines by

- developing biologically relevant primate models
- understanding the role of HIV *env* glycosylation in mucosal transmission
- providing a functional cure for HIV
- using mechanistic studies of neuroAIDS/drug abuse

studying dynamics of host-virus interaction during acute SIV/HIV infection

Dr. Debasis Nayak is an Assistant Professor of Indian Institute of Technology Indore. He is a veterinarian with a decade of experience in small and large animal research in the field of infectious disease. His obtained in his Ph.D. from University of Nebraska-Lincoln, NE, in 2008 in the field of Molecular Virology and Viral Pathogenesis. Currently, his research interest is in vaccine development and medical device research. He is a veterinarian and hands experience in working in the filed animal ethics and animal research.

Schedule	Lectures (Morning session)	Tutorials (Afternoon session)
5-Jul, 2017	Animal experimentation in biomedical research: A historical perspective. Studying physiology to medicine	Different types animal models (vertebrates, invertebrates, primates)
6-Jul, 2017	Moral considerations and rise of ethics in life sciences, Laws and regulatory issues, International, national and institutional framework for animal use	Is animal research necessary? Group discussion and case studies.
7-Jul, 2017	Hypothetical ideal animal model. The validation issues and challenges	Animal activists and their influence, a global perspective
8-Jul, 2017	Animal models for human infectious diseases. Success and failures of the past studies.	The risks of studying infection in living animal. Approaches to minimize the risk
9-Jul, 2017	Transgenic vs. humanized animals, Specific pathogen free (SPF) animals vs. non- SPF. Which to pick?	Brainstorming session: What if things go very wrong? A case study of mutant-flu as a threat to human race
10-Jul, 2017	Is there any alternate to animal model? Emerging biotechnology approaches to replace animal use in research.	Use of animals in research: An Indian historical perspective
11-Jul, 2017	Past approaches for vaccine development. Success and failures. Renewed interest for the animal model in the context of emerging infectious diseases such as Zika virus, Ebola, and Chikungunya, etc.	Basic training needs for handling animals in research
12-Jul, 2017	Use of non-human primates in infectious disease research. Special care and considerations. Animal rights and level of sensitiveness	Animal research in psychological studies
13-Jul, 2017	Viral pathogenesis and macaque model for AIDS. Where we stand now in achieving HIV cure and prevention? The potential to create HIV vaccine and viral therapy using macaque model	Hypothetical situations: When animal experimentation went wrong: What we learned from Hollywood movies.
14-Jul, 2017	How to translate knowledge gained through animal experimentations. What are the challenges and opportunities?	Comparative animal modeling. The legacies and direction. The infectious disease urgently need for animal model
15-Jul, 2017	Examination	

Course Coordinator

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