

# MHRD Scheme on Global Initiative on Academic Network (GIAN)

Department of Zoology  
Savitribai Phule Pune University

## Immunology and Vector Biology of Leishmaniasis

### Course Overview:

Leishmaniasis refers to a group of neglected tropical diseases affecting individuals in equatorial and subequatorial regions around the globe. *Leishmania* parasites, which are spread by the bite of phlebotomine sand flies, cause different forms of disease in humans. The most common forms are cutaneous leishmaniasis, which causes skin sores, and visceral leishmaniasis, which affects multiple internal organs (usually spleen, liver, and bone marrow). Drugs against leishmaniasis are expensive, toxic, have intensive treatment regimes, and resistance is common. There are 1–2 million new cases of leishmaniasis every year, an estimated 12 million people are infected worldwide, and 20,000–50,000 people die due to visceral leishmaniasis every year. Leishmaniasis occurs when infected sand flies deposit the protozoan *Leishmania* parasite into the skin of a mammalian host during feeding. Parasites establish infection within phagocytic cells of the immune system, the very cells typically associated with killing invading pathogens. Parasites establish chronic infection that varies depending on the strain from localized cutaneous leishmaniasis resulting in disfiguring skin sores and scarring; mucosal leishmaniasis, resulting in the destruction of the mucosa; or visceral leishmaniasis, resulting in disseminated infection of the internal organs and death in the absence of treatment.

There are no effective vaccines against any form of leishmanial disease. *Leishmania* have evolved numerous mechanisms of immune evasion that underlie the slow or incomplete development of naturally acquired immunity, and that compromise the development of vaccines and the efficacy of anti-parasitic drugs. Nonetheless, even if it is slow to develop, people often develop highly protective life-long immunity to reinfection following a single primary infection, indicating that protective “natural” immunity exists, thereby providing a blueprint that a vaccine need only emulate. Understanding the mechanisms of acquired resistance and immune evasion in Leishmaniasis will be required for the development of effective prophylactic or therapeutic vaccines. Similarly, understanding the molecular aspects of *Leishmania* survival and development in the sand fly vector will be essential to the development of transmission blocking vaccines.

The structure of this course will be a lecture on a topic coupled with a discussion of 2-3 papers in detail on that topic. Participants will read the papers prior to each discussion section and will be expected to engage in an active discussion of the findings in the papers. The discussion will focus on the hypothesis/question being addressed, the methods used and their strengths and weaknesses as well as the key findings and future experiments.

### Objectives:

The primary objectives of the course are as follows:

- To provide an overview of the epidemiology and vector biology of Leishmaniasis.
- To expose participants to key concepts in innate and adaptive immunity and the immune evasion strategies used by infectious pathogens, especially *Leishmania*, to produce chronic or persisting infections.
- To provide participants with knowledge of the key methods and approaches to study innate and adaptive immunity in clinical and experimental infection systems, and current strategies for vaccine development.
- To highlight all of the above discussions in the context of Indian Kala-aza.

<b>Dates :</b>	<b>18th February to 22nd February ,2019</b> Maximum Number of participants: 50
<b>Who can Attend?</b>	<ul style="list-style-type: none"> <li>• Students at all levels (MSc/MPhil/PhD) or Faculty from Universities and Institutes</li> <li>• Research scholar from Institutes</li> <li>• Participants from R/D Industries</li> </ul>
<b>Fees and Registration</b>	<p>The participation fees for taking the course is as follows:</p> <ul style="list-style-type: none"> <li>• Industry/ Research Organizations: Rs. 2000</li> <li>• Students from Academic Institution: Rs. 500</li> <li>• Students from SPPU : Free</li> </ul> <p>Appearing for evaluations/examinations during the course is necessary for the certificate of grades in the course.</p>

## The Faculty:

### Dr. David Sacks



David Sacks currently serves as Senior Investigator and Chief of the Intracellular Parasite Biology Section, Laboratory of Parasitic Disease, Division of Intramural Research, National Institute of Allergy and Infectious Diseases (NIAID), NIH, USA. After

pursuing his M.S. from the Harvard School of Public Health, Boston, Massachusetts, USA, he received his Ph.D. in 1978 from Harvard University, and performed postdoctoral work (1978-80) at the National Institute for Medical Research in London, England. His research program focuses on the clinical and experimental immunology of Leishmaniasis, and the cell biology of leishmanial infections within their mammalian hosts and sand fly vectors.

Dr. Sacks has been the recipient of numerous prestigious fellowships and awards, including Rockefeller Foundation Postdoctoral Fellowship (1978–1980), National Institutes of Health Merit Award (1989), Chalmer's Medal from the Royal Society of Tropical Medicine for Outstanding Contributions to Research in Parasitology (1989), National Institutes of Health Director's Award (1998), Bailey Ashford Medal from the American Society for Tropical Medicine and Hygiene for distinguished work in the field of tropical medicine (2001), American Academy of Microbiology Fellowship (2007), etc.

### Course Co-ordinator:

**Dr. Kalpana Pai**  
**Professor and Head ,**  
**Department of Zoology**  
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