



KUHULIKABHALLA

Research Scientist

EDUCATION

Ph.D. (Life Sciences)

International Center for Genetic Engineering & Biotechnology, New Delhi, India. 2008 - 2014

Master of Science (Biosciences)

Jamia Millia Islamia University, New Delhi, India. 2005 - 2007

Bachelor of Science (Biochemistry)

Sri Venkateswara College, University of Delhi, New Delhi, India. 2002 - 2005

RESEARCH EXPERIENCE

Cold Spring Harbor Laboratory (CSHL)

New York, USA.

Postdoctoral Fellow; Advisor - Bruce Stillman

2016 - present

Probing ORCs and other protein interactions involved in the human chromosome cycle to understand control of replication.

- Experimental validation of previously unobserved key origin recognition complex protein interactions across the course of cell cycle *in vivo* - Biochemistry, flow cytometry, co-immunoprecipitation, transient and stable cell line construction, live cell microscopy, immunofluorescence, etc.
- Used library based CRISPR/Cas9 guide RNA techniques to screen for new functional domains and correlate their significance.
- Analysis of next generation sequencing data using (R) packages like MAGeCK, *ibb*. Handling other customized softwares/servers like Prism 7 (Statistical), Yabi (NGS), Galaxy (NGS), Volocity (Microscopy), FlowJo (flow cytometry).

Special Center for Molecular Medicine, JNU &

International Centre for Genetic Engineering and Biotechnology

New Delhi, India.

Postdoctoral Fellow; Advisor - Anand Ranganathan

2015 - 2016

- Conceptualizing and spear-heading a project to decipher new host-specific drug targets for infectious diseases tuberculosis and malaria & discovering and designing *de novo* peptides to modulate the identified host target.
- Understanding the mechanism of action of inhibition of pathogenic invasion in host cells by interaction between *de novo* peptide M5 and ICAM-1 and ICAM-4.
- Setting up and operationalizing new laboratory in SCMM, JNU. Delivered upon administrative tasks such as project & fund management; liaising between university administration and our laboratory; negotiated with various vendors to ensure cost-effective acquisition of new laboratory equipments/consumables

International Centre for Genetic Engineering & Biotechnology
Graduate Researcher; Advisory - Anand Ranganathan

New Delhi, India.
2008 - 2014

Identifying novel host-pathogen interactions with a focus on intracellular pathogens such as mycobacterium and plasmodium. First study to show involvement of ICAM-1 and ICAM-4 in a receptor-like capacity; published in Nature Communications (Please refer to the list of publications).

- Generated 'codon-shuffled' peptide libraries and performed high-throughput screening to identify potential *de novo* peptide that bind host partners in novel host-pathogen interactions.
- Characterized protein-protein interactions between targets (ICAM-1 and ICAM-4) and a novel peptide (M5) employing various *in vivo* and *in vitro* techniques such as ELISA, co-immunoprecipitations and surface plasmon resonance.
- Investigated the physiological effect of the interaction between M5 with host ICAM-1 or ICAM-4 on 2D cell culture models of *Mycobacterium tuberculosis* and *Plasmodium falciparum*.
- Validated inhibitory effect of the peptide by RNAi-mediated modulation of host protein in primary cells harvested from the animal model.

All India Institute of Medical Sciences
Masters Research; Advisor - Shobha Broor

New Delhi, India.
2006

- Phylogenetic analysis and molecular epidemiology of prevalent strains of Dengue Virus circulating in New Delhi, during epidemic and non-epidemic periods. Sequences of characterized strains submitted to GenBank (accession nos. EF064771- EF064777)
- Handled patient sera, performed viral RNA isolation, cDNA synthesis etc.
- Designed and validated a multiplex PCR-based diagnostic protocol for identification of strain specific dengue infections.

Dr. B. R. Ambedkar Centre for Biomedical Research (ACBR)
Undergraduate Research; Advisor - Vani Brahmachari

New Delhi, India.
2004

Worked on a project entitled 'An attempt towards identification of the site of integration of the transgene containing Human FMR 1 fragment and to determine the CGG triplet repeat status in the germ cells of transgenic mice'.

FELLOWSHIPS, AWARDS & ACHIEVEMENTS

- Indian Council of Medical Research (ICMR) - Junior Research Fellowship (2008 - 2010)
- Indian Council of Medical Research (ICMR) - Senior Research Fellowship (2010 - 2013)
- Young scientist International Travel Support Award by Department of Science and Technology, Govt. of India.
- Gordon Research Conference partial scholarship to attend GRC Series - Peptides - Biology & Chemistry of.
- First author publication of graduate work highlighted in National daily newspapers and other news media
- Selected for Summer Undergraduate Research Program (SURP) 2004, by ACBR, University of Delhi.

TEAMWORK/LEADERSHIP EXPERIENCE

Workshop: Methods for Studying Protein-Protein Interactions

ICGEB Meetings and Courses 2012. New Delhi, India.

2012

- Organized, as a part of a 3 member team, a 2 week long international workshop on methods for studying protein-protein interactions.
- Trained participants in various in vitro and in vivo protein-protein interaction techniques.
- Conceptualized, wrote and edited the workshop brochure for participating delegates.

Novartis Biotechnology Leadership Camp

Indian School of Business (ISB). Hyderabad, India.

2009

- Selected to participate in a workshop about pharmaceutical and biotechnology entrepreneurship, conducted and instructed by Novartis and other industry scientists and leaders.
- Presented, as a part of an 8 member team, a 'VC pitch' to commercialize a new rapid diagnostic test for Alzheimer's, to a panel of 5 expert judges.

CONFERENCES/PRESENTATIONS

- "Host ICAMs play a role in cell invasion by Mycobacterium tuberculosis and Plasmodium falciparum". Bhalla, K., Chugh, M., Mehrotra, S., Rathore, S., Tousif, S., Dwivedi, V. P., et al. Poster presented at Annual Council of Scientific Advisors Meet, March 26-27, 2015, ICGEB, New Delhi.
- "Synthesis and Selection of de novo peptides directed against host factors imperative for establishment and persistence of Mycobacterium tuberculosis". Bhalla, K. and Ranganathan, A. Poster presented at 2012 Gordon Research Conferences: Peptides - Biology and Chemistry, February 19-24, 2012, California, USA.

PUBLICATIONS

- Tousif, S., Ahmad, S., **Bhalla, K.**, Moodley, P., & Das, G. (2015). Challenges of Tuberculosis Treatment with DOTS: An Immune Impairment Perspective. *J Cell Sci Ther*, 06(05)
- **Bhalla, K.**, Chugh, M., Mehrotra, S., Rathore, S., Tousif, S., Prakash Dwivedi, V., et al. (2015). Host ICAMs play a role in cell invasion by Mycobacterium tuberculosis and Plasmodium falciparum. *Nature Communications*, 6, 6049
- Samuchiwal, S. K., Tousif, S., Singh, D. K., Kumar, A., Ghosh, A., **Bhalla, K.**, Prakash, P., Kumar, S., Bhattacharyya, M., et al. (2014). A peptide fragment from the human COX3 protein disrupts association of Mycobacterium tuberculosis virulence proteins ESAT-6 and CFP10, inhibits mycobacterial growth and mounts protective immune response. *BMC Infectious Diseases*, 14(1), 355.

- Samuchiwal, S. K., Tousif, S., Singh, D. K., Kumar, A., Ghosh, A., **Bhalla, K.**, Prakash, P., Kumar, S., Trivedi, A. C., et al. (2014). A novel peptide interferes with Mycobacterium tuberculosis virulence and survival. *FEBS Open Bio*, 4(1), 735–740.
- Ghosh, A., Tousif, S., Bhattacharya, D., Samuchiwal, S. K., **Bhalla, K.**, Tharad, M., et al. (2013). Expression of the ARPC4 subunit of human Arp2/3 severely affects mycobacterium tuberculosis growth and suppresses immunogenic response in murine macrophages. *PLoS ONE*, 8(7), e69949.
- Tharad, M., Samuchiwal, S. K., **Bhalla, K.**, Ghosh, A., Kumar, K., Kumar, S., & Ranganathan, A. (2011). A three-hybrid system to probe in vivo protein-protein interactions: application to the essential proteins of the RD1 complex of *M. tuberculosis*. *PLoS ONE*, 6(11), e27503.

REFERENCES

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