KIRTI

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CURRENT POSITION:

Postdoctoral associate at Dr. Premal shah's lab, HGINJ, NJ, USA

EDUCATION:

2018-till present	**Postdoctoral associate in HGINJ**
2013-2018	**Doctor of Philosophy (Ph.D.)** CSIR-Central Drug Research Institute, Lucknow, India. **Thesis title**: "Investigation of ribosomal assembly cofactors involved in organellar ribosome biogenesis in *Plasmodium falciparum*" (***Affiliation**: Jawaharlal Nehru University, Delhi, India)*
2010-2012	**Master of Science in Biosciences** Jamia Millia Islamia, Delhi, India
2007-2010	**Bachelor of Science in Life Sciences** Hans Raj College, Delhi University, Delhi, India

PUBLICATIONS:

- "Characterization of a *Plasmodium falciparum* rRNA methyltransferase" **Kirti Gupta,** Ankit Gupta and Saman Habib. Molecular and Biochemical Parasitology; 2018

- "Characterization of mitochondrion-targeted GTPases in *Plasmodium falciparum*" **Kirti Gupta**, Ankit Gupta, Afreen Haider and Saman Habib. Parasitology; 2018

- "Translation in organelles of apicomplexan parasites" Saman Habib, Suniti Vaishya and **Kirti Gupta**. Review in Trends in Parasitology; 2016; doi: 10.1016/ j.pt.2016.07.005.

- "Reduced ribosomes of the apicoplast and mitochondrion of *Plasmodium* spp. and predicted interactions with antibiotics" Ankit Gupta, Priyanka Shah, Afreen Haider, **Kirti Gupta**, M I Siddiqi, Stuart A Ralph and Saman Habib. Open Biology; 2014; 4: 140045.

FELLOWSHIPS/AWARDS:

- **Senior Research Fellowship (SRF)**, Council of Scientific and Industrial Research (CSIR), Govt. of India (2015 – 2017)
- **Junior Research Fellowship (JRF)**, CSIR, Govt. of India (2013 – 2014)
- Qualified **JRF (National Eligibility Test) CSIR**, June 2012 with **All India Rank- 15**.
- Qualified **GATE 2012** with **98.24%.**
- **First position** at graduation level**.**
- Awarded with special **Ram Nath Trikha prize** at graduation level.
- **Best Poster Award** in **"Har Gobind Khorana memorial symposium on Genes, Genomes and Membrane Biology"** held at NABI, Mohali, Chandigarh, Dec 2017.

PRESENTATIONS:

POSTER:

- "Investigation of ribosomal assembly cofactors involved in organellar ribosome biogenesis in *Plasmodium falciparum"* **Gupta K.** and Habib S. (poster presentation in "Reverse the challenge: Vector-borne, emerging infectious and noncommunicable diseases" joint annual conference of ISMOCD and IAE at Panjim, Oct 2014).
- "Assembly factors for biogenesis of the reduced mitochondrial ribosomes of the malarial parasite" **Gupta K.** and Habib S. (poster presentation in "Current Trends in Drug Discovery Research (CTDDR)" 6th International Symposium at CSIR-CDRI, Lucknow, Feb 2016).
- "Nuclear-encoded *Plasmodium falciparum* GTPases, EngA and Obg, are involved in the biogenesis of reduced mitochondrial ribosomes" **Gupta K.** and Habib S. (poster presentation in Meeting on "Cell Biology of Infections" held NCBS, Bangalore, Oct 2016).
- "*Plasmodium falciparum* organellar GTPases, EngA and Obg, involved in mitoribosome biogenesis and mtDNA interaction" **Gupta K.** and Habib S. (poster presentation in "Malaria parasite biology: strategies for drug and vaccine development" at ICGEB, New Delhi, Nov 2017).
- "*Plasmodium falciparum* GTPases, EngA and Obg, are involved in mitoribosome biogenesis and organellar DNA interaction" **Gupta K.** and Habib S. (poster presentation in "Har Gobind Khorana memorial symposium on genes, genomes & membrane biology" at NABI, Mohali, Chandigarh, Dec 2017).

RESEARCH EXPERIENCE:

2013-2018: Research Fellow, Molecular and Structural Biology division, CSIR-Central Drug Research Institute, Lucknow, India

Summary of research work:

Ribosome assembly requires a complex interplay of ribosomal RNA and proteins with assembly factors. Organelles (apicoplast and mitochondrion) of *Plasmodium* spp. are

predicted to have highly reduced ribosomes that lack several ribosomal proteins and have fractionated rRNA; their mechanism of biogenesis/assembly is thus of interest. We investigated parasite organellar ribosome assembly factors (RAFs) using a variety of *in silico* analyses like multiple sequence alignment and cellular targeting prediction. We identified 28 putative organelle-targeted RAFs (GTPases, chaperones/maturation factors, DEAD-box proteins) in *P. falciparum*. We then selected two putative GTPases, EngA and Obg, mainly involved in late steps of large ribosomal subunit assembly and a methyltransferase, KsgA, for further characterization in the parasite. Both GTPases are indispensable in bacteria and KsgA homologs are dispensable in prokaryotes but are essential for eukaryotic cell survival. Subsequently, we carried out recombinant expression and purification of the putative RAFs in bacterial hosts and raised polyclonal antisera against the purified RAFs in rabbit which was used for immuno-detection of the respective RAF in parasite lysate western blots. In immunofluorescence assays using specific antisera, the localization of the individual RAFs in *P. falciparum*-infected erythrocytes was determined. Images were acquired using fluorescent confocal microscopy. Further, structural modeling of RAFs with confirmed organellar localization showed conservation of key structural motifs that mediate their role in ribosome assembly. We also functionally characterized the organellar RAFs in *Plasmodium* using various biochemical assays like GTPase activity. Their ability to bind to ribosomes or DNA both *in vivo* and *in vitro* was also determined using filter-trap assay, pull-down, qRT-PCR, ChIP, EMSA, etc. *Pf*KsgA1 ability to complement bacterial homolog was also determined.

2012: M.Sc. Project, Center for Interdisciplinary Research in Basic Sciences (CIRBSc), Jamia Millia Islamia, Delhi, India

Title of work: "Characterization of Chikungunya Virus strain from clinical samples"

Summary of research work:
Chikungunya fever is a re-emerging acute viral infection that is endemic to tropical and sub-tropical countries. The aim of the study was to look for novel genetic changes in the isolates by sequence analysis. To understand the molecular basis of virulence and its implication in epidemic, a detailed systematic serological, virological and molecular investigation was under taken with the acute phase blood samples collected from patients with suspected chikungunya infection in Delhi-2011. Positive chikungunya virus strains were further characterized by DNA sequencing and phylogenetic analysis of envelope protein (E1) gene.

LAB SKILLS:

Molecular Biology/ Biochemistry: Genomic DNA/ RNA/ plasmid isolation, PCR/ Real-time PCR, cDNA synthesis, Gene Cloning, recombinant protein expression in bacterial system, agarose gel electrophoresis, Native/SDS-PAGE, protein estimation, enzyme kinetic, site-directed mutagenesis, western blotting, ELISA, ribosome isolation, ribosomal subunit preparation, ribosome splitting and binding of proteins to subunit by sucrose density gradient centrifugation.

Interaction studies: Filter binding assays, Co-immunoprecipitation, EMSA, chromatin immunoprecipitation (ChIP).

Immunology: Raising polyclonal anti-sera in rabbit and mice, Immunoblotting, affinity purification of antibodies and co-localization of proteins using immunofluorescence assays.

Chromatography: Affinity chromatography, size exclusion and ion exchange chromatography.

Microscopy: Basic light microscopy and Confocal Microscopy.

Cell Culture: Bacterial cell culture, maintenance of *Plasmodium falciparum* culture in human red blood cells, cryopreservation, thawing of parasite strains, synchronization of blood stage parasites (sorbitol/ Percoll method), enrichment of parasite culture (percoll method), infected blood smear preparation.

Bioinformatics: Sequence Analysis and 3D modelling of proteins. Proficient in using MODELLER for protein homology modelling and PyMOL for molecular visualization. Phylogenetic analysis.

Instrument handling: Hands-on use of laser confocal microscope (Leica SP8), AKTA purification system (GE healthcare), Image Quant LAS4000 (GE Healthcare), Beckman Ultracentrifuge Optima-XPN, etc.

PERSONAL INFORMATION:

Nationality	Indian
Sex	Female
Date of birth	1st April 1990
Marital Status	Single
Language proficiency	English; Hindi

REFERENCES:

Dr. Saman Habib (*Ph.D. Supervisor*)

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