

Curriculum vitae

Chandra, Harish, M.Sc, PGD, Ph.D.

Present address: Department of Environmental Microbiology, Babasaheb Bhimrao Ambedkar University Lucknow.

Former address: Department of Environmental Health, University of Cincinnati College of Medicine Cincinnati OH 45267 USA

E mail address: chandrhh@gmail.com

Phone contact: +91-7701848635

Research Interests:

Immunotoxicology; Immunoproteomics of microbial pathogens; Environmental Microbiology, Novel Drug Targets/ Vaccine Development; DC-T cell Interaction; Host-Pathogen Interaction; Microbiome/Metagenomics

Research and Teaching Experience: 14 years

Objective: To carry out quality research/teaching using strong scientific skills and educational background for the advancement of health sciences to alleviate human sufferings.

Research Experience:

Dec 2017 to till present

Assistant Professor: Babasaheb Bhimrao Ambedkar University (A Central University)
Vidya Vihar, Raebareli Road, Lucknow – 226025 Accredited 'A' Grade by NAAC

Jan 2012 to till Dec 2017

Post-Doctoral Fellow/Research Associate: Microbial Pathogenesis Laboratory, Department of Environmental Health, University of Cincinnati College of Medicine, Cincinnati, OH 45267-0056 USA.

Sept 2008 to Dec 2011

Senior Research Fellow: School of Biotechnology Jawaharlal Nehru University New Delhi, 110067, India with Prof Rakesh Bhatnagar in the project “Synthesis and characterization of Poly-L- glutamine of *Mycobacterium tuberculosis*”.

June 2004 to till Feb 2011

Senior Research fellow: International Centre for Genetic Engineering & Biotechnology (ICGEB) New Delhi- 110067, India in the project “Attenuation of virulence of *Mycobacterium bovis* by disruption of glutamine synthetase gene”.

July 2001 to October 2002

Project Research Technician: National Institute of Immunology New Delhi- 110067 India, in the project “Latent *M. tuberculosis* New targets & Drug delivery system, Bio Enhancer & Therapeutics”.

Six months dissertation for M.Sc.

“Cloning & expression of bovine FSH gene in *Baculovirus* expression vector system (BEVS)” from Jamia Hamdard University, New Delhi.

Selected peer-reviewed International publications:

1. Yadav N, **Chandra H***. Modulation of alveolar macrophage innate response in proinflammatory-, pro-oxidant-, and infection- models by mint extract and chemical constituents: Role of MAPKs. 2017 **Immunobiology** 2018 Jan;223(1):49-56. ***As corresponding author.**
2. Yadav N, **Chandra H***. Suppression of inflammatory and infection responses in lung macrophages by eucalyptus oil and its constituent 1,8-cineole: Role of pattern recognition receptors TREM-1 and NLRP3, the MAP kinase regulator MKP-1, and NFκB. *PLoS One*. 2017 Nov 15;12(11):e0188232. ***As corresponding author.**
3. Dawn A, **Chandra H**, Ade-Browne C, Yadav J and Kumari H. Frontispiece: Multifaceted Supramolecular Interactions from C-Methylresorcin[4]arene Lead to an Enhancement in In Vitro Antibacterial Activity of **Chemistry - A European Journal** Gatifloxacin. 2017 Dec 27. DOI:10.1002/chem.201787264
4. Dawn A, **Chandra H**, Ade-Browne C, Yadav J and Kumari H. Multifaceted Supramolecular Interactions from C-methylresorcin[4]arene Lead to an Enhancement in In Vitro Antibacterial Activity of Gatifloxacin. 2017 **Chemistry - A European Journal** 2017 Oct 12. doi: 10.1002/chem.201704291.
5. Apurva Badkas^{a§}, Evan Frank^{a§}, Zilan Zhou^{b§}, Mina Jafari^{b§}, **Harish Chandra**^{a§}, Vishnu Sriram^{b§}, Joo-Youp Leeb,^{*} Jagjit S. Yadav. Modulation of *in vitro* phagocytic uptake and immunogenicity potential of modified Herceptin-conjugated PLGA-PEG nanoparticles for drug delivery. *Colloids and Surfaces B: Biointerfaces*. DOI10.1016/j.colsurfb.2017.12.001

(§) **As first co-authors who made equal contributions.**

6. **Chandra H**, Yadav JS. T-cell antigens of *Mycobacterium immunogenum*, an etiological agent of occupational hypersensitivity pneumonitis. **Molecular Immunology** 2016, **75**:168-177.
7. **Chandra H**, Yadav JS. Human leukocyte antigen (HLA)-binding epitopes dataset for the newly identified T-cell antigens of *Mycobacterium immunogenum*, **Data in Brief** 2016, **8**:1069-71.
8. **Chandra H**, Lockey J, Yadav JS. Novel antigens of *Mycobacterium immunogenum* relevant in serodiagnosis of occupational hypersensitivity pneumonitis in machinists. **Annals of Allergy Asthma and Immunology** 2015, **525**-6.
9. Garg R, Tripathi D, Kant S, **Chandra H**, Bhatnagar R, Banerjee N. A Conserved hypothetical protein Rv0574c is required for cell wall integrity, stress tolerance and virulence of *Mycobacterium tuberculosis*. **Infection and Immunity** 2015, **83**:120-9.
10. **Chandra H**, Yadav E, Yadav JS. Alveolar macrophage response to the hypersensitivity pneumonitis pathogen *Mycobacterium immunogenum* is genotype-dependent and is mediated via JNK and p38 MAPK pathways. **PLoS One** 2013, **8**(12):e83172.
11. Tripathi D, **Chandra H**, Bhatnagar R. Poly-L-glutamate/glutamine synthesis in the cell wall of *Mycobacterium bovis* is regulated in response to nitrogen availability. **BMC Microbiology** 2013, **13**: 226.
12. **Chandra H**, Basir SF, Gupta M, Banerjee N. Glutamine synthetase encoded by *glnA-1* is necessary for cell wall resistance and pathogenicity of *Mycobacterium bovis*. **Microbiology** 2010, **156**: 3669–3677.
13. **Chandra H**, Khandelwal P, Khattri A, Banerjee N. The type1 fimbriae of *Xenorhabdus nematophila* is necessary for colonization of the nematode *Steinernema carpocapsae*. **Environmental Microbiology** 2008, **(5)**: 1285-95.

Manuscripts: (Ready for communication/ communicated)

14. **Chandra H**, Manish K. Gupta, Ying Wai lam, Yadav JS. A Predominantly Orphan Secretome in *Mycobacterium abscessus* as Revealed by a Multi-pronged Strategy. (In revision, **Journal of Proteomics**).
15. **Chandra H**, Ahlers B, Lam YW, Yadav JS. Mycobacterial antigens from in-use Machining Fluid. (In preparation)
16. **Chandra H**, Ahlers B, Lam YW, Yadav JS. Identification of Mycobacterial Immunoreactive Proteins from Mycobacteria contaminated in-use Machining Fluid. (In preparation)
17. Bhattacharya SS*, **Chandra H***, Yadav JS. Immuno-PCR based sensitive detection of mycobacterial antigens in metal working fluid matrix. (* Equal contribution manuscript in preparation)
18. **Chandra H**, Bhattacharya SS, Porollo A, Yadav JS. Functional characterization of genetic polymorphisms of human P450 of CYP1A1 in *Pichia pastoris*. (In preparation)
19. **Chandra H**, Huang S, Yadav JS. Transcriptomic analysis of PAHs exposed mycobacterial antigens challenged Human Dendritic cells. (In preparation)
20. **Chandra H**, Yadav JS. Current trends in pathogenesis related genes in *Mycobacterium spp.* and their knock out strategies of interdisciplinary relevance. (Review in prep.)

Abstracts and presentations:

International:

1. **Chandra H**, Lam YW, Yadav JS (2016). Antigen Profiling of Field Metalworking Fluids. 17th Annual 2015 Pilot research project (PRP) Symposium of **NIOSH –supported Education and Research Center (ERC)** University of Cincinnati, October 13-14, 2016, College of Nursing Procter Hall University of Cincinnati, Cincinnati OH, USA OH 45221 (**Oral presentation**).
2. **Chandra H**, Huang S, Yadav JS (2016): Immuno-modulatory Effects of PAH Exposure on Human Immune Cells and Role of CYP1A1-mediated Bioactivation. Center for Environmental Genetics Pilot Research Symposium August 25, 2016 Kehoe Auditorium Kettering Laboratory Building University of Cincinnati, Cincinnati OH, USA. (**Oral presentation**)
3. **Chandra H**, Lam YW, Yadav JS (2015). Antigen Profiling of Field Metalworking Fluids. 16th Annual 2015 Pilot research project (PRP) Symposium of **NIOSH –supported Education and Research Center (ERC)** University of Cincinnati, October 8-9, 2015 Engineering research Center, University of Cincinnati, Cincinnati OH, USA (Poster).
4. **Chandra H** and Yadav JS (2015). Occupational Hypersensitivity Pneumonitis: Discovering relevant immuno-dominant antigens. **50th Anniversary of Department of Environmental Health and 85 years of research excellence** at the Kettering research laboratory. October 9-10, 2015 at University of Cincinnati, Cincinnati OH USA. (Poster).
5. **Chandra H**, Bhattacharya SS, Porollo A, Yadav JS (2014). Functional Characterization of genetic polymorphisms of human p450 cyp1a1. **Center for Environmental Genetics (CEG)** – Fall 2014 Symposium Sept 17th 2014, University of Cincinnati, Cincinnati OH USA (**Oral presentation**).

6. **Chandra H** and Yadav JS. Identification and evaluation of novel immuno- reactive Proteins of *Mycobacterium immunogenum* for serodiagnosis of MWF hypersensitivity pneumonitis **114th General Meeting of American Society of Microbiology**. Boston, Massachusetts USA (Poster).
7. Garg R, Tripathi D, Kant S, **Chandra H**, Bhatnagar R, Banerjee N. A Conserved Hypothetical Protein Rv0574c Is Required for Cell Wall Integrity and Virulence of *Mycobacterium tuberculosis*. **113th General Meeting of American Society of Microbiology**. Denver, Colorado USA (Poster).
8. **Chandra H** and Yadav JS. Immunogenic Potential of Recombinant Protein Antigens of *Mycobacterium Immunogenum*, an Etiological Agent of Hypersensitivity Pneumonitis. **113th General Meeting of American Society of Microbiology**. Denver, Colorado USA (Poster).
9. **Chandra H** and Yadav JS. Interaction of *Mycobacterium immunogenum* and its antigens with alveolar macrophages: an etiological agent of hypersensitivity pneumonitis. **20th Annual Midwest Microbial Pathogenesis Conference (MMPC 2013)** Columbus Ohio USA (Poster).
10. Garg R, Tripathi D, Kant S, **Chandra H**, Bhatnagar R, Banerjee B. A dormancy protein Rv0574c is required for cell wall integrity and virulence of *Mycobacterium tuberculosis H37Rv*. **FEBS-EMBO 2014 congress, Paris, France** from 30 August - 4 September 2014 (Poster).

Research Grants/support awarded:

The following research Grants were awarded as PI/Co-I:

1. CEG (NIH/NIEHS grant no. P30ES006096): CEG' **Pilot project** award 2017-2018: 'PAH exposure modulates lung microbiome-immune cell interactions via exosomal miRNAome' (\$30,000).
My role: Chandra, Harish (**Co-investigator**)
2. The University of Cincinnati (UC) Education and Research Center (ERC) **pilot research project** training grants (NIOSH grant no.T42/OH008432-10): 2015-2016: 'Microbiome changes as markers of exposure and stress in firefighters'. (\$8000)
My role: Chandra, Harish (**Principal investigator**)
3. CEG (NIH/NIEHS grant no. P30ES006096): CEG' **Pilot project** award 2016-2017: Role of PAH exposure in AhR- mediated host immune defense. (\$15,000)
My role: Chandra, Harish (**Principal investigator**).
4. CEG (NIH/NIEHS grant no. P30ES006096): CEG' **Pilot project** award 2015-2016: 'Immuno modulatory effects of PAH exposure on Human monocyte derived DCs and T cells and role of CYP1A1 mediated bio activation'. (\$15,000)
My role: Chandra, Harish (**Principal investigator**)
5. The University of Cincinnati (UC) Education and Research Center (ERC) **pilot research project** training grants (NIOSH grant no.T42/OH008432-10): 2015-2016: "Antigen profiling of field Metal working fluids" (\$7000)
My role: Chandra, Harish (**Principal investigator**)
6. CEG (NIH/NIEHS grant no. P30ES006096): CEG' **New Investigator scholars (NIS)** award 2015-2016: 'Developing a T Cell-based diagnostic for occupational hypersensitivity pneumonitis'. (\$5000)
My role: Chandra, Harish (**Principal investigator**)
7. CEG (NIH/NIEHS grant no. P30ES006096): CEG' **New Investigator scholars (NIS)** award 2014-2015: 'Developing a T Cell-based diagnostic for occupational hypersensitivity pneumonitis'. (\$4000)
My role: Chandra, Harish (**Principal investigator**)

8. R01 OH007364-07 Yadav (PI) 2010- 2015
My role: Chandra, Harish (Research Associate)

Supervisory and Advisory activities:

2012-present:

1. Mentored/ supervised a summer student for his Science talent search project at UC in our mentors lab.
2. Supervised one Volunteer Research graduate student at UC in our mentor's lab.
3. Supervising student workers in our laboratory at UC.

2004-2011:

1. Supervised 2 Trainee graduate students/ For Lab rotations at ICGEB New Delhi.
2. Supervised and trained 3 Graduate students for working in Biosafety Label 3 labs at ICGEB New Delhi India.

Research lab management activities:

2012-present:

1. Maintenance and handling of Laboratory equipments.
2. Chemical purchases/Invoices and project budget management.
3. Chemical inventory managements including regulatory chemicals.
4. Chemical and Biological waste management Biosafety.
5. Radiation safety managements and regular monthly monitoring of radioactive contaminations in our labs.

Honors, Awards and Professional activities:

1. Received seven federally funded research grants as Pilot project programs in University of Cincinnati: **New Investigator Scholars (NIS) award** grant for 2 consecutive times for 2014-15, Three **CEG pilot** projects grants for the years 2015-2017. (NIH/NIEHS grant no. P30ES006096) and Two **ERC pilot** project program (T42/OH008432-10 from NIOSH) for the year 2015 and 2017. (<http://healthnews.uc.edu/imagegallery/?/24813/>), (<http://healthnews.uc.edu/news/?/26309/>).
2. **National eligibility Test (NET)** for Lectureship December 2003 CSIR/UGC (Council for Scientific & Industrial Research/University Grant Commission of India).
3. **SRF (Senior Research Fellowship) CSIR** (Council for Scientific & Industrial Research Human resource development group, India) from April 2009-2011.
4. Served as **Evaluation Judge** for Capstone Poster symposium **2013 to 2016** and Graduate student research Forum **2013** University of Cincinnati, Cincinnati Ohio USA.
5. **Reviewer** for Center for Environmental Genetics (CEG) pilot project grants 2014 a **NIH-NIEHS**-supported Center (see <http://eh.uc.edu/ceg/>).
6. **Editorial board member** for Herald scholarly open access- Journal of Clinical studied and Medical Case Reports (a peer reviewed international Journal); Journal of occupational and Environmental Hygiene.
7. **Reviewer for Journals:** 1) Indian Journal of Microbiology, 2) Global Book Springer publishing, 3) Elsevier Book publishing, 4) | CRC Press | Taylor & Francis Group, 5) Critical reviews in Biotechnology, 6) Critical reviews in Microbiology, 7) Frontiers in Microbiology,

Membership professional bodies:

1. American Association for the Advancement of Science (AAAS) Science program for excellence (Nominated by University of Cincinnati). (Membership ID 20322499).
2. Center for environmental genetics (CEG).
3. American Society of Microbiology (ASM).
4. Association of Microbiologist of India (AMI).

Academic Qualifications:

Ph.D. in Biosciences (Awarded 2012):

Doctoral thesis entitled “**Role of Extracellular *M. Bovis* Glutamine Synthetase in the Survival of *M. Bovis* in Host Macrophages**” from Jamia Millia Islamia University, New Delhi.

Under the supervision of Prof. Rakesh Bhatnagar (**Jawaharlal Nehru University**) & Prof. Seemi Farhat (**Jamia Millia Islamia University**).

The research work was carried out **International Center for Genetic Engineering and Biotechnology (ICGEB)** new Delhi, India under the supervision of Dr. Nirupama Banerjee Bhatnagar.

M.Sc. in Biotechnology: (2004) from Ch. Charan Singh University Meerut India.

B.Sc. in Biological sciences: (1999) from University of Delhi, India.

Intermediate in Science group: (1995) (Physics, Chemistry, Biology & Mathematics) from CBSE Delhi, India.

Matriculation: (1993) from CBSE Delhi, India.

Professional Training for skills:

Post Graduate Diploma in Molecular and Biochemical Technology: (2001) from University of Delhi, India, Practical course in Recombinant DNA Technology, Immunology and basic laboratory techniques.

Work with Select Agents in a BSL-3 Facility: Active user of University of Cincinnati **Select agents BSL-3 Facility** and has worked with pathogenic strains of *M. tuberculosis H37Rv* and *M. bovis* and emerging pathogens of non-tuberculous mycobacterial species.

Health and Safety Plan Preparation: Has successfully completed the Occupational Safety and Health Administration (OSHA) / Lab Compliance Bloodborne Pathogens Training Course.

Familiarity with AAALAC requirements: AAALAC International is a private, nonprofit organization that promotes the humane treatment of animals in science through voluntary accreditation and assessment programs. I have successfully completed the University of Cincinnati compliance certificates courses in Occupational Health & Safety Program for Animal Handlers Working with Rodents in Research Introduction for actively using the Laboratory Animal Medical Services (LAMS) Facility, University of Cincinnati.

Scientific Skills:

Molecular Biology: Isolation and analysis of DNA, RNA, plasmid DNA, restriction analysis of DNA fragments, purification of DNA fragments from agarose gels, preparation of the cDNA and genomic DNA libraries, nucleic acid labeling and detection by Southern and Northern blotting, PCR, RT-PCR, inverse PCR, mega primer based gene fusion, site directed mutagenesis, transformation of DNA by electroporation in *Mycobacterium species*, cloning and expression of genes in *E. coli* and Yeast expression system (*Pichia pastoris*), generation of knockout mutant strains of *Mycobacterium bovis* and *M. tuberculosis H37Rv* by allelic exchange. Familiar with genome editing tools of CRISPR/CAS9 system.

Biochemical Techniques: Agarose gel electrophoresis, SDS PAGE, Purification of proteins by gel filtration, ion exchange, affinity and thin layer chromatography, HPLC, derivatization of amino acids and analysis by GCMS. Enzyme activity assays developed for intracellular and extracellular glutamine synthetase from *Mycobacterium bovis*.

Immunochemical Techniques: Generation and purification of Immunoglobulins from mice and rabbits, antigen-antibody interaction techniques such as double diffusion, single radial diffusion and immunoprecipitation in solutions, immuno-electrophoresis, rocket immuno-electrophoresis, Western blotting and enhanced immunoassays (ELISA) and expert in immuno-proteomics. Isolation and analysis of PBMCs from Human blood and purification of CD4⁺ and CD8⁺ T cells. Generation of Dendritic cells from the PBMCs isolated monocytes. Isolation and analysis of alveolar macrophages from Mouse lung lavage. Isolation and analysis of spleenocytes from mycobacterial antigen challenged mouse strains. FACS analysis of immune cells using multicolor probes and ELISPOT Assays to study Dendritic cell- T cell interactions.

Proteomics: IEF, 2D separation, in-gel trypsin digestion and peptide extraction, iTRAQ methods and sample preparation for Mass spec analysis.

Bioinformatics analysis: BLAST genomes; proteins/ nucleotide sequence alignments; analysis of epitopes; analysis of T cell and B cell binding antigens and epitopes and familiar with different online tools for immunoinformatics analysis.

Cell culture methods: Maintenance of macrophage cell lines, such as J-774, THP-1, MHS, Insect cell lines, SF-9, SF-21, PBMCs, Dendritic cells, T cell separations and maintenance and DC-T Cell co-culture Assays.

Microscopic Techniques: Light microscopy, Transmission electron microscopy (TEM), Negative staining methods, Immunogold labeling methods.

Microbial Strains handled: *E. coli DH5α*, *E. coli XL1-blue*, *E. coli BL21*, *E. coli M15*, *Xenorhabdus nematophila*, *Leishmania donovani*, *Mycobacterium smegmatis mc²155*, *M. tuberculosis H37Rv*, *M. bovis*, *M. immunogenum* 500706, *M. abscessus*, *M. chelonae*, *Streptococcus pneumoniae*, *Legionella pneumophila* etc.

Dr. Harish Chandra