Professor Sadhna Sharma Miranda House

Name: Dr. Sadhna SharmaDesignation: ProfessorDepartment: ZoologyEmail: sadhna.sharma@mirandahouse.ac.in



EDUCATION

- Ph.D.(Immunology), VP Chest Institute, University of Delhi, 1996.
- M.Sc. (Specialization: Endocrinology), Dept. of Zoology, University of Delhi, 1985.
- B.Sc.(Honours) Zoology, Daulat Ram College, University of Delhi, 1983.

CAREER PROFILE

- Professor at Dept. of Zoology, Miranda House, University of Delhi,
 April 2020 to date.
- Associate Professor at Dept. of Zoology, Miranda House, University of Delhi,
 April 2017 to April 2020.
- Assistant Professor at Dept. of Zoology, Miranda House, University of Delhi, - April 2006 to April 2017.
- Lecturer (Guest/Ad-Hoc) at Daulat Ram College, University of Delhi, 2005-2006.
- Visiting Fellow at School Of Biochemistry And Molecular Biology And John Curtin School Of Medical Research, Australian National University, Canberra, Australia, April-Sep, 2004.
- DST Young Scientist at Dept. of Microbiology, V. P. Chest Institute, University of Delhi, 2002-2004.
- Guest Lecturer At B. R. Ambedkar Centre For Biomedical Research, University of Delhi, 2000-2004.
- Research Associate at Dept. of Microbiology, V. P. Chest Institute University of Delhi, 1998-2002.
- Lecturer (Ad-Hoc) at ANDC, University of Delhi, 1996-1997.

Teaching and Research Excellence

- Sadhna has established an 'Immunology and Biotechnology' laboratory with state of the art equipment as part of Life Science Division of D S Kothari Centre for Research and Innovation in Science Education (DSKC), A Department of Science and Technology funded centre at Miranda House since 2008.
- She has got sponsored research grant of Rs.2.03 Crores from various National funding agencies like, DST, DBT, CSIR and ICMR.
- Recently she has got 2 projects sanctioned- from ICMR for a novel diagnostic test for TB and other from DST-SERB for a peptide based vaccine.
- Research activities of Sadhna are focused towards finding new Vaccine and Drug targets for tuberculosis/ cancer/ diabetes and include:
 Cloning, expression, purification and validation of new subunit vaccine candidates and drug targets for tuberculosis
 Study of immunomodulatory and cytotoxic activity of medicinal plants.
- Scientists from Department of Chemistry, University of Delhi; Department of Environmental Studies, DU and School of Biotechnology, GGSIP University are collaborating with her. This laboratory is also providing a flavour of research to many undergraduates, postgraduates and Ph.Ds.
- Recently Sadhna' work is recognized by The Immune Epitope Database and Analysis Resource (IEDB) that is sponsored by the National Institute of Allergy and Infectious Disease (NIAID).

IEDB Reference ID 1035611 (http://www.iedb.org/refId/1035611)

Academic Distinctions/Achievements:

Research Guidance: She has been recognized by the Faculty of Science, University of Delhi as independent supervisor for guiding four students for Ph.D. Four of her students have been awarded Ph. D degree and 2 are currently registered and pursuing their Ph.D under her supervision. She herself and 3 members of her team (a PhD student, her collaborating faculty Dr. Monika Sharma and a undergraduate Summer Trainee) have got prestigious Melinda and Bill Gates Travel Award to present their work on tuberculosis in USA, London, Canada and India respectively in different years.

She was coordinator of the Open source Drug Discovery (OSDD) Centre established by Council of Scientific and Industrial Research (CSIR) at Miranda House from 2010-2016 where about 100 undergraduate students performed cloning and expression of specific M.tb genes and bioinformatic approaches to drug discovery. Seven of her undergraduate students were also awarded TATA-CSIR- OSDD fellowships.

She is member of the Pedagogical Research team of the college and was awarded Australian Leadership Award Fellowship by AusAID in April 2013 to visit University of Sydney for a period of 3 weeks to enhance learning in labs.

She was also a recipient of Department of Science and Technology 'Young Scientist' and 'Women Scientist' projects and Autralia –India Council (AIC) fellowship, and has got 'Young Investigator Award' twice by Federation of Immunological Societies of Asia-Oceania (FIMSA) before joining Miranda House.

Sponsored projects (Annexure I):

Sadhna has got Research Grants of about 2.69 Crores in Miranda House with major projects granted from Department of Science and Technology (2006-2009); Council of Scientific and Industrial Research (2010-2016); Department of Biotechnology (2013-2017) and DU Star Innovation Project (2016-2019) carried out as Principal Investigator (PI); and Department of Science and Technology (2018-2021) as Co-Principal Investigator. Two more projects are sanctioned in 2022 from ICMR (35 lakhs) and DST-SERB (30 lakhs) - (Annexure I) Besides this. She was the overall coordinator of DBT Star College project with a grant amount of

Besides this, She was the overall coordinator of DBT Star College project with a grant amount of Rs. 79 lakhs (2016-20) for enhancing the research and teaching of undergraduate science laboratories with coordinators from four science departments of the college.

Publications (Annexure I):

Publications: 73 (39 in Refereed Journals in which 25 publications are in Miranda House) (22-International and 12-National Conference proceedings) Invited Talks: 04 (International); 06 (National) Cumulative Impact Factor : >60; Average Impact factor >2.7, and as per Google scholar on 31 August, 2023 - h-index = 14, i10 index = 17, Citations ~ 883 (https://scholar.google.co.in/citations?hl=en&user=08G3328AAAAJ)

Innovative Teaching Pedagogy:

Sadhna has been involved in teaching papers to the undergraduate students including Immunology, Cell Biology, Biochemistry, Biotechnology, Biostatistics and Bioinformatics using modern pedagogical tools such as power point presentations, online library resources, videos, and educational websites for her work. The classroom has interactive sessions in the form of quizzes, e-posters, group discussions, seminars and book reviews.

She has also introduced the 'Concept Labs' and 'Problem based Learning' (PBL) in the practical classes of Immunology and Biochemistry.

Besides this, she is also engaged in framing and revising syllabus as and when required including recent LOCF syllabus of Immunology Paper of B.Sc. (H) Zoology and is involved in organizing workshop and e-manuals for newly introduced courses and experiments in collaboration with Department of Zoology and Institute of Life Long Learning (ILLL), University of Delhi.

She has created Online Moodle Courses for 'Undergraduate immunology' and add on course-'Animal Cell culture and its application' which was quite useful for students in 'Covid' times.

She is also engaged in framing and revising syllabus as and when required including recent LOCF syllabus of DSE Immunology Paper of B.Sc. (H) Zoology and and NEP syllabus of Immunology Core Paper of B.Sc. Life Sciences is involved in organizing workshop and e-manuals for newly introduced courses and experiments in collaboration with Department of Zoology and Institute of Life Long Learning (ILLL), University of Delhi.

Contribution to Cultural and Corporate Life of College:

Other than teaching and research, Sadhna has contributed significantly in the following activities:

-Member, Research Monitoring Committee of College since 2008

- Coordinator, Department of Life Sciences (2009-11)

- Teacher-in Charge, Department of Zoology (2011-13)

-College Academic Committee and Admission committees (2009-2013)

-Member, College Staff Council Committees – Research Initiative and International Collaboration since 2010 and that of Placement Committee (2014-17).

- Coordinator, Zoology component of DBT Star College Project since 2011

- Member, Internal Quality Assurance Cell (IQAC) of College, 2015-2018

- Provided faculty support in compilation of NAAC Self Study Report and NAAC review team visit

- Overall Coordinator, DBT Star College Project November, 2016 –March 2020. Besides this,

-Member, Departmental Research Committee (DRC), Department of Zoology, University of Delhi (2014-2016)

- -Member, DU LOCF Team (2019), Department of Zoology, University of Delhi.
- Deputy Coordinator, Central Evaluation Centre, MH, 2019
- Chairperson, Institutional Biosafety Committee (IBSC), MH
- Coordination NII Science Setu at MH,2022
- Deputy Coordinator, Examination Centre, MH, 2022

Outreach and Contribution to the Growth of Institution

Sadhna has contributed significantly to the growth of the institution by organizing various Research and Education Outreach activities, the thrust area of Miranda House that resulted in good NAAC and NIRF rankings to the college. She is the founder coordinator of Add on Course in "Medical Biotechnology" which is successfully running in the college for last 12 years where every year 25-30 students gets hands on training on latest tools and techniques of biomedical sciences.

She has actively mentored nearly 200 students of UG, PG, Ph.D in six week long Summer Camp *Flavours of Research* / Training Programmes run by the college every year as part of DSKC since its inception in 2008.

She is also actively involved in the Inspire Internship program where about 250 school students are mentored by the undergraduate students trained during Miranda summer school in specially organized workshops in the DSKC laboratories and co-coordinated two Inspire Science Conclaves.

She has also organized Faculty Development Programmes in Genome Editing tools, Bioinformatics and Grant Writing, and domain specific workshops for students as well as open ended investigative projects in interdisciplinary themes for students. She has successfully conducted two 'Continuing Medical Education'(CME) programme for college teachers at DSKC, MH under the aegis of Indian Immunology Society. As part of DBT Star College Scheme since 2011 with a total grant of about Rs. 155 lakhs, she has also contributed immensely in acquiring the 'Star Status' to four Science departments of the College.

Sadhna Sharma

Annexure I

Sponsored Research Projects at Miranda House:

Ongoing Project as Principal Investigator (2022-25):

- Immunological validation and protective efficacy of multiepitope vaccine constructs designed from Mycobacterium tuberculosis dormancy associated proteins Rv2627c and Rv2628 in mouse model of tuberculosis. DST-SERB, Grant Amount Rs..27.87873 Lakhs. 2022-2025
- Rapid diagnosis of pulmonary tuberculosis based on detection of mycobacterial antigens within serum/urine samples by immuno-PCR assays. ICMR, Grant Amount Rs.35.87514 Lakhs, 2023-2024

Completed Projects as Principal Investigator:

- Study of macrophage apoptosis and mitochondrial integrity in response to PE/PE-PGRS family proteins of Mycobacterium tuberculosis. DST, Grant Amount Rs.68.378 Lakhs; (2018-2021) (Co-PI)
- Therapeutic Potential of Medicinal Plants: Culture, Extraction, Physicochemical Characterization and Testing Their Cytotoxic or Immune-Stimulatory Properties. PI, DU Star Innovation Project, Grant Amount Rs 26.67 Lakhs, 2016-2019
- Molecular Cloning And Immunological Validation Of Three Hypothetical Proteins of *M. Tuberculosis* With Strong T-Cell Epitopes, DBT, Grant Amount Rs. 66.48 Lakhs, 2013-2017
- 4. Expression, Purification And Characterization Of MymA Operon Protein Products of *Mycobacterium Tuberculosis* OSDD-CSIR; Grant Amount Rs. 21.79 Lakhs, 2012-2016
- Predicting Potential Inhibitors for Mtb Targets. TATA-OSDD-CSIR 2015; Grant Amount Rs. 2.4 Lakhs, 2014-15
- Cloning And Expression Of Selected Intraphagosomal Expressed Genes Of Mycobacterium Tuberculosis, CSIR, 2010-2012; Grant Amount Rs. 5.85 Lakhs
- Modulation of Toll Like Receptor (TLR) Signaling By Mycobacterium Tuberculosis: An Evasive Survival Strategy, DST Women Scientist Project, Grant Amount Rs 11.05 Lakhs (2006 – 2009).

Publications at Miranda House (2014-2023):

- Medha, Priyanka, Sharma, Sadhna, Sharma, Monika. PE_PGRS45 (Rv2615c) protein of Mycobacterium tuberculosis perturbs mitochondria of macrophages. Immunology and Cell Biology (2023). DOI: 10.1111/IMCB.12677 (Impact Factor 4.0)
- Priyanka, Medha, Sharma Sadhna, Sharma, Monika. Late stage specific Rv0109 (PE_PGRS1) protein of Mycobacterium tuberculosis induces mitochondria mediated macrophage apoptosis. Microbial Pathogenesis (2023). DOI: 10.1016/J.MICPATH.2023.106021 (Impact Factor 3.8)
- Monika Sharma, Medha, Priyanka,Sadhna Sharma. Deciphering the role of PE_PGRS45 (Rv2615c) protein of Mycobacterium tuberculosis in host macrophage apoptosis: Possible effector for persistence. Authorea (2023) –Preprint DOI: 10.22541/AU.167472189.99045390/V1
- P. Bhatt, M. Sharma, P.P. Sharma, B. Rathi, S. Sharma. *Mycobacterium tuberculosis* dormancy regulon proteins Rv2627c and Rv2628 as Toll like receptor agonist and as potential adjuvant. International Immunopharmacology 112 (2022) 109238. (Impact Factor 5.6)
- Medha Singh, Priyanka Taank, Parul Bhatt, Sadhna Sharma, Monika Sharma. Role of Cterminal domain of Mycobacterium tuberculosis PE6 (Rv0335c) protein in host mitochondrial stress and macrophage apoptosis. Apoptosis. (2022). 10.1007/s10495-022-01778-1 (Impact Factor 7.2)
- Shah, Srishti, Priyanka, Sharma, Sadhna. An Updated Trial Sequential Meta-analysis of Vitamin D Receptor Gene Polymorphism (Fok1, Bsm1, Taq1 and Apa1) and Risk to Tuberculosis. Indian Journal of Clinical Biochemistry. (2022). DOI: 10.1007/S12291-022-01091-3 (Impact Factor 2.1)
- Medha., Priyanka., Sharma, S. & Sharma, M. 2022. Design of a peptide-based vaccine from late stage specific immunogenic cross-reactive antigens of PE/PPE proteins of *Mycobacterium tuberculosis*. European Journal of Pharmaceutical Sciences 168: 106051(Impact Factor 4.6)

- 8. Medha., Bhatt, P., Priyanka., Sharma, M. & Sharma, S. 2021. Prediction and identification of T cell epitopes of COVID-19 with balanced cytokine response for the development of peptide based vaccines. In Silico Pharmacology 9 (1):40 (Impact Factor 3.112)
- Medha., Sharma, S. & Sharma, M. 2021. Proline Glutamate/ Proline-Proline-Glutamate (PE/PPE) proteins of Mycobacterium tuberculosis: The multifaceted immune-modulators. Acta Tropica 222: 106035
- Priyanka., Sharma, M. & Sharma, S. 2021. Ethnicity Based Comprehensive Evaluation of Polymorphism in Interferon Gamma gene and its association with Pulmonary and Extra-Pulmonary Tuberculosis Risk An updated Trial Sequential Meta-Ananlysis. International Journal of Mycobacteriology 10(3): 243-254.
- Medha Singh, Parul Bhatt, Monika Sharma, Mandira Varma-Basil, Anil Chaudhry, Sadhna Sharma. 2019. Immunogenicity of late stage specific peptide antigens of Mycobacterium tuberculosis. Infect Genet Evol. 2019 Jun 19; 74:103930. doi: 10.1016/j.meegid.2019.103930. (Impact Factor: 2.611) (Cited by 4)
- Swati Singh, Monika Sharma, Anil Chaudhry, Sadhna Sharma. 2019. Rv2626c and Rv2032 activate TH1 response and downregulate regulatory T cells in peripheral blood mononuclear cells of tuberculosis patients. Comparative Immunology, Microbiology and Infectious Diseases 62: 46-53. Elsevier (Impact Factor: 1.573) (Cited by 6)
- 13. Kirti Pandey, Swati Singh, Parul Bhatt, Medha, Monika Sharma, Anil Chaudhry, Sadhna Sharma. 2019. DosR proteins of Mycobacterium tuberculosis upregulate effector T cells and down regulate T regulatory cells in TB patients and their healthy contacts. Microbial Pathogenesis 126: 399-406. Elsevier (Impact Factor: 2.914) (Cited by 3)
- R Mishra, S Sharma, RS Sharma, S Singh, MM Sardesai, S Sharma, V Mishra. 2018. Viscum articulatum Burm. f. aqueous extract exerts antiproliferative effect and induces cell cycle arrest and apoptosis in leukemia cells. Journal of Ethnopharmacology 219, 91-102. Elsevier (Impact Factor: 3.115) (Cited by 2)
- Saraav, I., Pandey, K., Singh, S., Sharma, M & Sharma, S. 2017. *Mycobacterium tuberculosis* MymA is a TLR2 agonist that activates macrophages and a TH1 response. Tuberculosis 106: 16-24. Elsevier (Impact Factor: 2.727) (Cited by 5)
- 16. Saraav, I., Pandey, K., Misra, R., Singh, S., Sharma, M & Sharma, S. 2017. Characterization of MymA protein as a flavin-containing monooxygenase and as a target of isoniazid.

Chemical Biology & Drug Design. 89(1):152–160. Wiley Online Library (Impact factor:2.328) (Cited by 3)

- Mishra R, Das MK, Singh S, Sharma RS, Sharma S, Mishra V. 2017. Articulatin-D induces apoptosis via activation of caspase-8 in acute T-cell leukemia cell line. Mol Cell Biochem, 426(1), 87-99. Springer Link (Impact factor:2.561) (Cited by 8)
- Saraav, I., Pandey, K., Sharma, M., Singh, S., Dutta, P., Bhardwaj, A. & Sharma, S. 2016. Predicting promiscuous antigenic T cell epitopes of Mycobacterium tuberculosis mymA operon proteins binding to MHC Class I and Class II molecules. Infection, Genetics and Evolution. 44: 182–189. Elsevier (Impact Factor: 2.611) (Cited by 6)
- Pandey, K., Sharma, M., Saraav, I., Singh, S., Dutta, P., Bhardwaj, A. & Sharma, S. 2016. Analysis of the DosR regulon genes to select cytotoxic T lymphocyte epitope specific vaccine candidates using a reverse vaccinology approach. International Journal of Mycobacteriology. 5(1): 34-43. (Cited by 6)
- Sharma, M. & Sharma, S. 2015. Toll like Receptor-2 signaling in Mycobacterium tuberculosis infection- A double edged sword. Forum on Immunopathological Diseases and Therapeutics. 6(3–4): 227–235.
- Saraav Iti, Singh Swati, Pandey Kirti, Vishnoi Ekta, Sharma Monika & Sharma Sadhna.
 2015. Cell Wall-Associated *Mycobacterium Tuberculosis* rRv3083 Protein Stimulates Macrophages Through Toll-Like Receptor-2 (TLR2). International J. Mycobacteriol. 4: 176. (Cited by 3)
- Sharma Monika, Sharma Sadhna & Bose Mridula. 2015. *Mycobacterium Tuberculosis* Infected Macrophages Lead To Apoptosis Of Antigen Activated CD8 T Cells. International J. Mycobacteriol. 4: 174-5. (Cited by 1)
- Roy, S., Sharma, S., Sharma, M. & Bose, M. 2014. Differential signaling of inducible nitric oxide synthase induction in *Mycobacterium tuberculosis* infected alveolar epithelial cell line A549 in response to cytokines IFN-γ, TNF-α and IL-1β. International Journal of Mycobacteriology. 3: 17-24. (Cited by 9)
- Saraav, I., Singh, S., Sharma S. 2014. Outcome of *Mycobacterium Tuberculosis* and Toll-Like Receptor Interaction: Immune Response or Immune Evasion? Immunol. Cell Biol. 92: 741-746. Nature Publishing Group (Impact factor:3.795) (Cited by 42)

 Singh, S., Saraav, I., Sharma, S. 2014. Immunogenic Potential of Latency Associated Antigens against *Mycobacterium Tuberculosis*. Vaccine 32: 712-716. Elsevier (Impact Factor: 3.285) (Cited by 45)

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