




Faculty Details Proforma for DU Web-site

Title	Prof./Dr./Mr./Ms./Mrs. Dr.	First Name	Suman	Last Name	Kundu	Photograph
Designation		Professor				
Address		Department of Biochemistry B.K. Bachhawat Block University of Delhi South Campus Benito Juarez Road New Delhi – 110021				
Phone No		Office				
		91-11-24112081				
		Residence				
		Mobile				
Email		suman.kundu@south.du.ac.in				
Web-Page		http://biochem.du.ac.in/web/				
Educational Qualifications						
Degree	Institution		Year			
Ph.D.	Banaras Hindu University		1999			
M.Phil. / M.Tech.						
PG	University of Calcutta		1994			
UG	University of Calcutta		1992			
Any other qualification						
Career Profile						
Post-doctoral Fellow, Department of Biochemistry, Biophysics & Molecular Biology, Iowa State University, USA, April 2000-Sept 2004. Protein Interactions Research Associate, Food and Feed Research, Pioneer Hi-Bred International Inc, USA, Oct 2004-Jan 2006. Lecturer, School of Biotechnology, Banaras Hindu University, Varanasi, India, Jan 2006-Dec 2006. Reader, Department of Biochemistry, University of Delhi South Campus, New Delhi, India, Dec 2006-Dec 2009. Associate Professor, Department of Biochemistry, University of Delhi South Campus, New Delhi, India, Dec 2009-Dec 2012. Professor, Department of Biochemistry, University of Delhi South Campus, New Delhi, India, Dec 2012 - ---						
Administrative Assignments						
Director, South Campus (Since Nov 2019) Director, Centre for Canadian Studies (Since Aug 2020) Acting Pro-Vice Chancellor (Nov 2019-June 2020) Acting Dean of Colleges (Nov 2019-June 2020) Acting Registrar (Sep 2, 2020-Oct 21, 2020) Dean, Faculty of Interdisciplinary and Applied Sciences (FIAS) Head, Department of Biochemistry Chairperson, Institutional Animal Ethics Committee (IAEC) Member, Institutional Biosafety Committee (IBSC) Co-ordinator, UGC-SAP Programme, Department of Biochemistry Member, FIAS, UDSC Member, BRS, FIAS, UDSC Ex-Teacher-In-Charge, CD, MALDI TOF-TOF, Proteomics Facility, CIF, UDSC Ex-Member, NAAC Peer Committee, UDSC						
Areas of Interest / Specialization						
The laboratory is dedicated to the structural and molecular understanding of protein stability, amyloidosis, protein-protein & protein-ligand interactions and structure-function relationship in proteins. The ubiquitous nature of a new class of hemoglobins in plants, the presence of novel hemoglobins in the microbial world, and the discovery of new hemoglobins in humans and other vertebrates have bolstered the hemoglobin research over the last few years. The main focus of the laboratory is the investigation of novel algal, plant, bacterial, animal and human hemoglobins involving techniques like laser flash photolysis, stopped-flow spectrometry, FTIR and EPR spectroscopy, site directed mutagenesis, computational biology and X-ray crystallography. Emphasis is on deciphering the mechanism of regulation of ligand binding in novel hemoglobins in						

general. The goal is to be a part of the effort to set up a 'biophysical fingerprint' for novel hemoglobins that can help assign physiological functions. Other related proteins like hemoglobin reductases are being simultaneously investigated for a better understanding of the function(s) of the novel globins. Stability, aggregation and amyloidosis related to classical and novel hemoglobins as well as hemoglobin based artificial blood substitutes are being studied as well. Comprehensive knowledge accumulated by hemoglobin researchers world-wide may be useful in improving oxygen transport and storage in mammalian circulatory systems, nitrogen fixing efficiency in plants, sensing and response to hypoxic conditions, scavenging efficiency under stress, understanding pathological of implications of hemoglobin amyloids and our ability to use heme protein based blood substitutes. The latter is currently being pursued fervently in the laboratory because of its translational value in medicine.

The laboratory is also focused on the spectroscopic and mass spectrometric characterization/screening of hemoglobin disorders with a goal to set up a simple, fast, economic, reliable diagnostics for such disorders using very small amounts of samples.

The laboratory also aims to seek structural insight of human dopamine β -hydroxylase (DBH), a drug target for complex traits. We proposed the first three-dimensional structure of DBH by *In silico* techniques. This is helping detailed investigation of structure-function relationship in this important enzyme and has laid a platform for rational therapeutic drug design. The laboratory is currently focused on the discovery of potential small molecules against DBH to combat cardiovascular diseases. Attempts are also being made to design potent molecules to combat cancer, malaria and leishmaniasis as well. Structure-based rational drug discovery and design is currently the major emphasis of the laboratory.

Subjects Taught

Proteins – Structure, Folding and Engineering; Enzymes and their Biotechnological Applications; Advanced Techniques in Biochemistry (discipline specific elective); Basics of Biochemistry (open elective); Practicals related to Proteins and Enzymes; Ph.D course work

Research Guidance

Supervision of Doctoral Thesis,
Awarded - Eight (Deepak Jangir, Amit Kumar, Sheetal Uppal, Manish Shandilya, Richa Arya, Sanjay Kumar Dey, Pushpanjali Dasauni, Gaurav Kumar)

Under progress - Seven

Mohd. Asim Khan, Since 2015
 Manisha Saini, Since 2015
 Sanjeev Kumar Yadav, Since 2015
 Chetna Dhembala, Since 2017
 Shruti Bhatt, Since 2018
 Varnita Anand, Since 2019
 Kajal Yadav, Since 2020

Supervision of M.Sc. Thesis
Completed - 17;
Ongoing – (Maneshwar Dixit, Shweta Rahar)

Supervision of M.Phil. Thesis - 1
Ravi Kant Sharma

Supervision of Post-doctorates - Three
Dr. Pankaj Prabhakar
Dr. Mohsin Raza
Dr. Swati Kundu

Publications Profile

In the Last Five Years (2016-2021)

1. Dhembala, C., Arya, R., Kumar, A., Kundu, S. and Sundd, M. (2021) "L. major apo-acyl carrier protein forms ordered aggregates due to an exposed phenylalanine, while phosphopantetheine inhibits aggregation in the holo-form" *International Journal of Biological Macromolecules*. 179, 144-153.
2. Shandilya, M., Kumar, G., Gomkale, R., Singh, S., Khan, M.A., Kateriya, S. and Kundu, S. (2021) "Multiple putative methemoglobin reductases in *C. reinhardtii* may support enzymatic functions for its multiple hemoglobins". *International Journal of Biological Macromolecules*. 171: 465-479.
3. Sharma, A., Saini, M., Kundu, S., Thelma B.K. (2020) "Computational insight into the three-dimensional structure of ADP Ribosylation factor like protein 15, a novel susceptibility gene for rheumatoid arthritis". *Journal of Biomolecular Structure and Dynamics*. In press. Doi: <https://doi.org/10.1080/07391102.2020.1860826>
4. Mukhi, N., Kundu, S. and Kaur, J. (2020) "Coping with stress: Role of *Arabidopsis* phyto-globins in defence against *Sclerotinia sclerotiorum*", *Journal of Plant Biochemistry and Biotechnology*. 29, 804-815.

5. Kumar, G., Dey, S.K. and Kundu, S. (2020) "Functional implications of vascular endothelium in regulation of endothelial nitric oxide synthesis to control blood pressure and cardiac functions". *Life Sciences* (Elsevier). 259: 118377.
6. Dey, S.K., Saini, M., Prabhakar, P., Kundu, S. (2020). "Dopamine β hydroxylase as a potential drug target to combat hypertension. *Expert Opinion on Investigational Drugs*. 29(9), 1043-1057.
7. Uppal, S., Khan, M.A. and Kundu, S. (2020) "Identification and characterization of a recombinant cognate hemoglobin reductase from *Synechocystis* sp. PCC 6803". *International Journal of Biological Macromolecules*, 162, 1054- 1063.
8. Uppal, S., Khan, M.A. and Kundu, S. (2020). "Stability and Folding of the Unusually Stable Hemoglobin from *Synechocystis* is Subtly Optimized and Dependent on the Key Heme Pocket Residues". *Protein & Peptide Letters*. 28(2), 164-182.
9. Dey, S.K, Saini, M., Dhembala, C., Bhatt, S., Rajesh, A.S., Anand, V., Das, H.K. and Kundu, S. (2020) "Suramin, Penciclovir and Anidulafungin bind nsp12, which governs the RNA-dependent-RNA polymerase activity of SARS-CoV-2, with similar interaction energy as Remdesivir-triphosphate, indicating potential in the treatment of COVID-19 infection". *OSFPreprints*, DOI: 10.31219/osf.io/urxwh
10. Agrawal, D.C., Yadav, A., Khan, M.A., Kundu, S.* and Kayastha, A.M.* (2020). "Denaturant induced equilibrium unfolding and conformational transitional studies of germinated fenugreek β -amylase revealed molten globule like state at low pH". *Protein and Peptide Letters*. 27, 1-12 (*joint corresponding author)
11. Arya, R., Sharma, B., Dhembala, C., Pal, R.K., Patel, A.K., Sundd, M., Ghosh, B., Makde, R.D. and Kundu, S. (2019). "A conformational switch from a closed apo- to an open holo-form equips the acyl carrier protein for acyl chain accommodation" *Biochim Biophys Acta - Proteins and Proteomics*. 1867, 163-174
12. Dasauni, P., Mahapatra, M., Saxena, R. and Kundu, S. (2018). "Refractive index of blood is a potential qualitative indicator of hemoglobin disorder in human". *J Proteins Proteomics*. 9(3), 159-168
13. Yadav, U., Arya, R., Kundu S. and Sundd, M. (2018) "The 'recognition helix' of the type II Acyl Carrier Protein (ACP) utilizes a 'ubiquitin interacting motif (UIM)' like surface to bind its partners". *Biochemistry*. 57 (26), 3690-3701
14. Shankar A, Fernandes J.L., Kaur K, Sharma M, Kundu S and Pandey GK. (2018). Rice phytooglobins regulate responses under low mineral nutrients and abiotic stresses in *Arabidopsis thaliana*. *Plant Cell Environ*. 41(1), 215-230.
15. Sharma, B., Jamdar, S.N., Ghosh, B., Yadav, P., Kumar, A., Kundu, S., Goyal, V.D. and Makde, R.D. (2017) Active site gate of M32 carboxypeptidases illuminated by crystal structure and molecular dynamics simulations. *Biochim Biophys Acta - Proteins and Proteomics*. 1865, 1406-1415
16. Mukhi, N., Kundu, S., and Kaur, J. (2017) "NO dioxygenase- and peroxidase-like activity of *Arabidopsis* phytooglobin 3 and its role in *Sclerotinia sclerotiorum* defense. *Nitric Oxide*. 68, 150-162
17. Punchaichira, T.J., Dey, S.K, Mukhopadhyay, A., Kundu, S., and Thelma, B. K. (2017) "Characterization of SNPs in the dopamine- β -hydroxylase gene providing new insights into its structure-function relationship" *Neurogenetics* 18, 155-168.
18. Uppal, S., Singh, A.K., Arya, R., Tewari, D., Jaiswal, N., Kapoor, A., Bera, A.K., Nag, A. and Kundu, S. (2016) "Phe288B10 Induces Channel-Forming Cytotoxic Amyloid Fibrillation in Human Neuroglobin, the Brain-Specific Hemoglobin". *Biochemistry* 55, 6832-6847
19. Uppal, S., Kumar, A., Shandilya, M., Mukhi, N., Singh, A. K., Kateriya, S., Kaur, J. and Kundu, S. (2016) "Penta- and Hexa-Coordinate Ferric Hemoglobins Display Distinct pH Titration Profiles Measured by Soret Peak Shifts". *Anal. Biochem*. 510, 120-128
20. Mukhi, N., Dhindwal, S., Uppal, S., Kapoor, A., Arya, R., Kumar, P., Kaur, J. and Kundu, S. (2016) "Structural and functional significance of the N- and C-terminal appendages in *Arabidopsis* truncated hemoglobin". *Biochemistry*. 55, 1724-1740.
21. Jebamercy, G., Durai, S., Prithika, U., Marudhupandian, S., Dasauni, P., Kundu, S. and Balamurugan, K. (2016) "Role of DAF-21 protein in *Caenorhabditis elegans* immunity against *Proteus mirabilis* infection". *J Proteomics*. 145, 81-90.
22. Vigneshkumar, B., Durai, S., Kundu, S. and Balamurugan, K. (2016) "Proteome analysis reveals translational inhibition of *Caenorhabditis elegans* enhances susceptibility to *Pseudomonas aeruginosa* PAO1 pathogenesis". *J Proteomics*. 145, 141-152.

Book Chapters

1. Kundu, S., Saini, M., Dey, S. K. & Kundu, S. (2020). Dopamine β hydroxylase: an enzyme with therapeutic potential to combat neural and cardiovascular diseases *In* *Frontiers in Protein Structure, Function, and Dynamics* (Singh, D.B and Tripathi, T. eds.), Springer Nature, Singapore (978-981-15-5529-9, 486507_1_En)
2. Dubey, V.K. and Kundu, S. (2014) "Processing of Recombinant Proteins" *In* *Gene and its Engineering*. First Edition Wiley India Pvt. Ltd., New Delhi, India (H. K. Das Ed). pp. 474-479
3. Kumar, A., Uppal, S. and Kundu, S. (2009) "The Red Goldmine: Promises of Biotechnological Riches" *Invited Book Chapter. Biotechnological Applications*, eds. C.S.K. Mishra, India and Dr. Pascale Champagne, Canada. IK Publishing House, Delhi.

Total Publications : 79

Conference Organization/ Presentations (in the last three years)

Conference Organization (last 3 years)

International Conference on "Frontiers in Biochemistry and Biotechnology: Strategies to Combat Human Diseases", Department of Biochemistry, Shivaji College (University of Delhi) in association with the Department of Biochemistry, University of Delhi, February 12-13, 2020 in Delhi.

Organized INSA-D.S Kothari Memorial Lecture – 2020 in Biotech Centre Auditorium, University of Delhi South Campus, on 17th February, 2020. Awardee: Dr. Madhu Dikshit, National Chair, Translational Health Science and Technology Institute, Faridabad and Former Director, CSRI-Central Drug Research Institute, Lucknow.

Organized, Symposium on "Strategies for Insight, Detection and Intervention of Human Diseases" on 7th March, 2018, Biotech Centre Auditorium, UDSC (sponsored by UGC-SAP programme)

Symposium on "Strategies to Combat Diverse Human Diseases" November 13, 2017, Biotech Auditorium (Grant – DST-PURSE; Phase II).

Conference Presentations : 61 oral and 112 posters (overall)

Research Projects (Major Grants/Research Collaboration)

- Principal Investigator, DRDO (LSRB), "Development of Hemoglobin Based Artificial Oxygen Carrier: Engineered Recombinant and Packaged Hemoglobin", 2018-2021
- Principal Investigator. DBT (Medical Biotechnology), "Screening Lead Molecules Identified by Structure-based Rational Drug Design Methods against Cytochrome b5 Reductase 3 and Dopamine Beta Hydroxylase in Spontaneously Hypertensive Rat Models for Antihypertensive Effects", 2017-2021 (one year extension).
- Co-Principal Investigator, DBT (part of COE-Phase II), "Systems biology of complex diseases: From genetic findings to lead molecule development for Rheumatoid arthritis", 2015-2021 (six months extension).
- Principal Investigator, UGC DAE-CSR project titled "Understanding the structure of *Leishmania major* phosphopantetheinyl transferase (LmjPPTase) and its interaction with cognate ACP", 2015-2020.
- Principal Investigator, DBT (Basic Research) project titled "Development of potent small molecule inhibitors against dopamine beta-hydroxylase to combat cardiovascular diseases", 2015-2018.
- Principal Investigator, DBT (Basic Research) project titled "Structure-function relationship in lupin leghemoglobin pertinent to a new, ubiquitous class of heme proteins with yet unknown physiological function", 2008-2011.
- Principal Investigator, DBT (Fast Track) project titled "Spectroscopic Characterization / Screening of Hemoglobin Disorders", 2008-2011.
- Principal Investigator, DBT (part of COE) project titled "Structure-function relationship in Dopamine Beta hydroxylase", 2008-2013.
- Student Exchange Programme (Collaboration) with University of Parma, Italy titled "Functional properties of plant hemoglobins embedded in nanoporous silica gels", 2011.
- Project Coordinator, Jointly by DST, Govt of India and Delhi University (DU-DST Purse Grant), titled "Characterizing Novel Globins Across Species and Deciphering their Stress Response and Interacting Partners: An Integrated, Holistic Approach for Function Elucidation", 2009-2012.
- Research Collaboration with Ural State Technical University-UPI, Ekaterinburg, Russia titled "Mossbauer Spectroscopy of Mammalian and other Novel Hemoglobins", 2008-2014.

Awards and Distinctions

- Fellow, Indian Academy of Biomedical Sciences, 2021
- Prof. Suresh C. Tyagi Oration Award for Young Faculty, 2017, by International Academy of Cardiovascular Sciences (India Section) at its 9th Annual Conference in Vallabhnbhai Patel Chest Institute, Delhi.
- Citation in Marquis Who's Who in Medicine and Healthcare 2011-2012 (8th Edition)
- Indo-US Research Fellow, Indo-US Science and Technology Forum, 2010
- DST (Government of India) Travel Award for Attending International Conference Abroad, 2008

Association With Professional Bodies

Membership

- Life Member, Indian Academy of Biomedical Sciences, 2021
- Member, International Society of Hypertension, United Kingdom (2016)
- Life Member, Academy of Cardiovascular Sciences, India
- Executive Council and Life Member, Proteomics Society of India

- Life Member, Indian Biophysical Society.
- Early Career Member, Biophysical Society, USA.
- Life Member, Society of Biological Chemists (India)

Editing

- Editor-in-Chief, Journal of Proteins and Proteomics, Springer Nature (Founder Editor, since 2010)

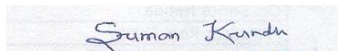
Reviewing

- Peer Reviewer for Protein Science, Scientific Reports, FEBS Letters, Journal of Agricultural and Food Chemistry, Indian Journal of Microbiology, PLoS One, Indian Journal of Biotechnology, Cell and Developmental Biology, Applied Biochemistry and Biotechnology, Letters in Drug Design and Discovery, F1000Research, Journal of Biomolecular Structure and Dynamics, Journal of Proteomics, Drug Design, Development and Therapy, Indian Journal of Medical Research, Proteins:Structure, Function, Bioinformatics, BMC Molecular and Cell Biology, Therapeutics and Clinical Risk Management.
- Reviewed grant applications for DST, CSIR, DBT
- Reviewed Ph.D/M.Phil Theses – Thirty seven

Other Activities

Patents

1. "Quinolone-Based Anti-Hypertensive Cardio-Protective Composition", Suman Kundu, Sanjay Kumar Dey, B.K. Thelma, Pankaj Prabhakar, Subir Kumar Maulik, Provisional Indian Patent applied (ID 20211102677), June 16, 2021.
2. "Novel Anti-Hypertensive Cardioprotective Composition Comprising of Dispiro[1H-Perimidine-2(3H),2'(3'H)-[1H]Perimidine]", Suman Kundu, Sanjay Kumar Dey, Gaurav Kumar, Vikash Kumar, Surya Ramachandran, Chandrasekharan Cheranellore Kartha, Provisional Indian Patent applied (ID 202111026998), June 16, 2021.
3. "A Furan-Based Anti-Rheumatoid Arthritis Composition", Suman Kundu, Manisha Saini, B.K. Thelma, Sanjay Kumar Dey, Richa Arya, Provisional Indian Patent applied (202121026835), June 17, 2021.
4. "An Anti-hypertensive Cardio-protective Composition", Suman Kundu, Sanjay Kumar Dey, B.K. Thelma, G. Kovuru, Subir Kumar Maulik, Pankaj Prabhakar, Manisha Saini, Provisional Indian Patent Application No 201811005899, 16/02/2018, CAP Filed on 12/02/2019. Abstract of Patent published on page number 39660 in the Official Journal of the Patent Office, number 35/2019 on 30/08/2019. Filed or examination on 04/01/2021
5. "Novel Anti-hypertensive and Anti-Cardiac Hypertrophic Compounds", Suman Kundu, B.K. Thelma, Subir Kumar Maulik, Pankaj Prabhakar, Sanjay Kumar Dey), Final Indian Patent submitted (ID 201711036983), October 16, 2018; Abstract of Patent published on page number 25766 in the journal number 25/2019 on 21/06/2019. Filed for examination 04/01/2021
6. "Isolated Polynucleotide Molecules Corresponding to Mutant and Wild-type Alleles of the Maize D9 Gene and Methods of Use". (2009) Lawit, Shai J.; Kundu, Suman; Rao, Aragula, G.; Tomes, Dwight T. Affiliation: Pioneer Hi-Bred International, Inc., Johnston, Iowa, USA. US Patent No. 7,557,266.



(Signature of Faculty Member)



(Signature & Stamp of Head of the Department)