Curriculum Vitae
Arindam Talukdar, Ph.D.

CONTACT DETAILS:

Permanent Address:
Ranee Residency, 8/23 Sahidnagar,
Haltu, Kolkata-700078

Mailing Address:
CSIR-Indian Institute of Chemical Biology
4, Raja S. C. Mullick Road, Jadavpur,
Kolkata-700032

Email: atalukdar@iicb.res.in

Mobile No: +91-9051646141

EDUCATION DETAILS:

Ph. D. Chemistry 1997 - 2003
National Chemical Laboratory, Pune, India.
(University of Pune)
Supervisor: Dr. Mukund K Gurjar

M. Pharmacy, Pharmaceutical Chemistry 1995 - 1997
University Institute of Pharmaceutical Sciences,
Panjab University, Chandigarh, India.
Supervisor:Prof. Tilak Raj Juneja

B. Pharmacy 1991 - 1995
Department of Pharmaceutical Sciences,
Nagpur University, Nagpur, India.

Post-doctoral Research Scholar 2004- 2005
The Ohio State University, USA
Supervisor: Prof. Peng George Wang

Post-doctoral Research Scholar 2005-2010
Purdue University, USA
Supervisor: Prof. Mark Cushman

INDUSTRIAL EXPERIENCE:

- **Senior Research Scientist**

Albany Molecular Research Inc. (AMRI) Singapore (2010-2012)

As a team leader, Dr. Talukdar was involved as one of the inventors to develop HTS hits to lead validation and put first-in-class molecules against epigenetic target SUV39H2 into clinic.

RESEARCH & LABORATORY EXPERIENCE:

M. Pharmacy Research Dissertation: Pharmaceutical Chemistry

Title: Synthesis and Mutagenic study of some nitrophenyl thioethers
University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh, India
Research Supervisor: Professor Tilak R Juneja
(October 1996- June 1997)

- Most of the nitroarenes (Chloramphenicol, metronidazole, niridazole, clonazepam), pesticides (nitroanilines, dintrophenol) are shown to exhibit mutagenicity and carcinogenicity.
- Nitrophenyl thioethers present very interesting model to study their mutagenicity since such compounds have both mutagenic potential due to nitroarene moiety and mutagenicity preventing potential due to alkyl thioether moiety.
- I have synthesized various nitro and nitrosophenyl thioethers to find out the structural requirements for the expression of mutagenicity, also the metabolic activation pathways that result in the formation of various species that damage DNA. The mutagenicity studies were performed *via* 'Ames Test' using *S. typhimurium* strains. The findings were published in two mutation research journals.
- **I'm joint corresponding author** (***Mutation Res***., **2002**, 518, 155-161; ***Mutation Res***., **2001**, 495, 97-102).

Ph.D, Chemistry:

Title: Synthesis Of Aza Analogue Of CMI-977, Terminal Disaccharide Unit Of *K. pneumoniae* And Some Useful Organic Transformations
National Chemical Laboratory, Pune, India (University of Pune)
Research Supervisor: Dr. Mukund K Gurjar
(October 1997- December 2003)

During my PhD., I was trained in the state-of-art carbohydrate synthesis and multi-step synthesis of natural products of biological importance. The highlight of the thesis is process development of stereoselective synthesis of Aza CMI-977: an antiasthmatic candidate, by application of Jacobsen's Hydrolytic Kinetic Resolution (HKR). **CMI-977 is being currently developed by Millenium Pharmaceuticals, USA as a potential lead candidate for chronic asthma and presently cleared Phase II clinical trial**. The methodology was extended to the large-scale process development of optically pure (S)-Metoprolol, a β-blocker.

- Accomplished the development of stereoselective process for synthesis of Aza CMI-977: an antiasthmatic candidate. World Patent application has been filed (**WO 2000001670 A1**).
- Development of large-scale process for synthesis of optically pure (S)-Metoprolol, a β-blocker, by the application of HKR, a marketed drug has been shown to be an effective

agent against hypertension, myocardial infraction and angina pectoris (***Heterocycles*, 1998**, 48, 1471).

- Synthesized terminal repeated disaccharide unit of the structurally novel heptoglycan of α 1→2 linkage present in *Klebsiella pneumonia* (**Tetrahedron, 2004**, *60*, 3267).
- Simple protocol to transform sugar-oximes to sugar-nitriles (***Synthetic Communications*, 2002**, 32, 3503).
- Synthesis of aryl allyl glycines through Heck reactions (***Synthesis*, 2002**, 315).

2004-2005 Post Doctoral Research Associate, Department of Chemistry and Biochemistry, The Ohio State University, Columbus, OH

Laboratory of **Professor Peng George Wang**

After completion of graduate study, I joined The Ohio State University, USA as postdoctoral fellow in Prof. Peng George Wang's Lab for studying in the field of glyco-chemistry. I was involved in an NSF funded important research project to develop cancer therapeutics. The main goal is to understand molecular mechanism of cancer and then apply the knowledge to produce novel sugar-drug conjugates, which will reduce the toxicity and also overcoming the problem of drug resistance in potential anticancer drugs such as Rebeccamycin and Daunorubicin.

• Bioorganic Chemist in a NSF project focused on development of uncommon sugar and complex carbohydrate epitopes (***Synlett*, 2005**, 1547).

• Synthesis of complex glycolipid analogues of Isoglobotrihexosyl Ceramide (iGb3) for NKT Cells activation (***J. Org. Chem*. 2007**, *72*, 9914-9923).

April 2005- May 2010. Post Doctoral Research Associate, Medicinal Chemistry and Molecular Pharmacology Division, Purdue University, West Lafayette IN

Laboratory of **Professor Mark S Cushman**

In prof. Mark Cushman's laboratory, I was engaged on an NIH-funded research project on antimicrobials entitled "Ligands for Probing the Active Site of Lumazine Synthase. Riboflavin, vitamin B2 plays an essential role in many critical biological processes and is necessary for the survival of bacteria. The enzymes (lumazine synthase and riboflavin synthase) that catalyze the final steps of riboflavin biosynthesis in bacteria, present a specific target for the design of new antibiotics. I was involved in rational design and development of various enzyme inhibitors with special emphasis to the inhibition of both Mycobacterium tuberculosis lumazine synthase and Mycobacterium tuberculosis riboflavin synthase.

• Structure based drug design using various software for molecular modeling, energy calculations, simulation and docking experiments of the hypothetical chemical entity.

• Lead medicinal chemist in a NIH project focused on design and development of nucleoside analogue as antibacterial agents targeting enzymes in riboflavin biosynthesis pathway (***J. Org. Chem*., 2012**, *77*, 6239-6261; ***J. Org. Chem*., 2007**,*72*, 7167-7175).

• High-throughput and Virtual screening based identification of hit compounds and its development as potent lumazine synthase and riboflavin synthase inhibitors (***Bioorg Med Chem***., **2010**, *18*, 3518-3534; ***J. Org. Chem***., **2009**, *74*, 5123–5134).

• Synthesis of small molecule library with antibacterial activity (***J. Org. Chem***., **2009**, *74*, 5123–5134).

• Development of novel synthetic methodologies (***J. Org. Chem***., **2010**, *75*, 3507-3510; ***Organic Letters***, **2006**, *8*, 1085).

Independent Scientist at CSIR-Indian Institute of Chemical Biology (IICB) Jan 2013

After joining CSIR-IICB as independent investigator as Senior Scientist and later on as Principal Scientist, my lab aims to answer fundamental questions that lie at the interface of chemistry and biology to perform rational design and synthesis of novel chemical entity to unravel the molecular mechanism and develop potential treatment for human diseases such as cancer, autoimmunity, metabolic disorder. Some of our initial works have been patented and published in highly reputed such as **Journal of Medicinal Chemistry, European Journal of Medicinal Chemistry, Medicinal Research Reviews** etc.

PUBLICATION:

1. Kundu B, Raychaudhuri D, Mukherjee A, Sinha BP, Sarkar D, Bandopadhyay P, Pal S, Das N, Dey D, Ramarao K, Nagireddy K, Ganguly D,* and **Arindam Talukdar***. Systematic Optimization of Potent and Orally Bioavailable Purine Scaffold as a Dual Inhibitor of Toll-Like Receptors 7 and 9. **Journal of Medicinal Chemistry**, **2021,** *64*, 9279–9301.
2. **Arindam Talukdar**,* Ganguly D, Roy S, Das N, Sarkar D. Structural Evolution and Translational Potential for Agonists and Antagonists of Endosomal Toll-like Receptors. **Journal of Medicinal Chemistry**, **2021,** 64, 12, 8010.
3. Pal S, Paul B, Bandopadhyay P, Preethy N, Sarkar D, Rahaman O, Goon S, Roy S, Ganguly D,* **Arindam Talukdar***. Synthesis and characterization of new potent TLR7 antagonists based on analysis of the binding mode using biomolecular simulations. **European Journal of Medicinal Chemistry, 2021,** 210, 112978.
4. Bezerra GA, Holenstein A, Foster WR, Xie B, Hicks KG, Bürer C, Lutz S, Mukherjee A, Sarkar D, Bhattacharya D, Rutter J, **Arindam Talukdar**, Brown PJ, Luo M, Shi L, Froese DS,* Yue WW.* Identification of small molecule allosteric modulators of 5,10-methylenetetrahydrofolate reductase (MTHFR) by targeting its unique regulatory domain. **Biochimie, 2021.** 183, 100.
5. Kundu B, Sarkar D, Chowdhuri SP, Pal S, Das SK, Das BB, and **Arindam Talukdar*.** Development of a metabolically stable topoisomerase I poison as anticancer agent. **European Journal of Medicinal Chemistry**, **2020**, *202*, 112551.

6. Mukherjee A, Raychaudhuri D, Sinha BP, Kundu B, Mitra M, Paul B, Bandopadhyay P, Ganguly D,* and **Arindam Talukdar*.** A Chemical Switch for Transforming a Purine Agonist for Toll-like Receptor 7 to a Clinically Relevant Antagonist. **Journal of medicinal Chemistry**, **2020**, 63, 4776.
7. Bhowmik D, Pal S, Lahiri A, **Arindam Talukdar***, Sandip Paul*. Emergence of multiple variants of SARS-CoV-2 with signature structural changes. **2020**. bioRxiv preprint. doi: 10.1101/2020.04.26.062471.
8. Pal S, **Arindam Talukdar***. Compilation of Potential Protein Targets for SARS-CoV-2: Preparation of Homology Model and Active Site Determination for Future Rational Antiviral Design. **2020**. ChemRxiv. doi: 10.26434/chemrxiv.12084468.
9. Kundu B, Das SK, Paul Chowdhuri S, Pal S, Sarkar D, Ghosh A, Mukherjee A, Bhattacharya D, Das BB,* and **Arindam Talukdar*.** Discovery and Mechanistic Study of Tailor-Made Quinoline Derivatives as Topoisomerase 1 Poisons with Potent Anticancer Activity. **Journal of Medicinal Chemistry, 2019**, *62*, 3428.
10. A Mukherjee, S Mishra, NK Kotla, K Manna, S Roy, B Kundu, Bhattacharya D, Saha KD, **Arindam Talukdar*.** Semisynthetic Quercetin Derivatives with Potent Antitumor Activity in Colon Carcinoma. **ACS Omega, 2019,** *4*, 7285.
11. Kundu B, Sarkar D, Ray N, **Arindam Talukdar***. Understanding the Riboflavin Biosynthesis Pathway for the Development of Antimicrobial Agents. **Medicinal Research Reviews. 2019,** 1-34.
12. Pal S, Kumar V, Kundu B, Bhattacharya D, Preethy N, Reddy MP, **Arindam Talukdar*.** Ligand-based Pharmacophore Modeling, Virtual Screening and Molecular Docking Studies for Discovery of Potential Topoisomerase I Inhibitors. **Computational and Structural Biotechnology Journal, 2019**, *17*, 291.
13. Paul B, Rahaman O, Roy S, Pal S, Satish S, Mukherjee A, Ghosh AR, Raychaudhuri D, Bhattacharya R, Goon S, Ganguly D* and **Arindam Talukdar*.** Activity-guided Development of Potent and Selective Toll-like Receptor 9 Antagonists. **European Journal of Medicinal Chemistry**, **2018**, *159*, 187.
14. Liu CSC, Raychaudhuri D, Paul B, Chakrabarty Y, Ghosh AR, Rahaman O, **Arindam Talukdar**, Ganguly D. Cutting Edge: Piezo1 Mechanosensors Optimize Human T Cell Activation. **Journal of Immunology**. **2018**. pii: ji1701118.
15. S Roy, B Paul, A Mukherjee, B Kundu, **Arindam Talukdar***. Copper-catalyzed selective C–N bond formation with 2-amino, 2-hydroxy and 2-bromo-5-halopyridine. **RSC Advances**, **2017**, *7*, 44366.
16. Roy S, Mukherjee A, Paul B, Rahaman O, Roy S, Maithri G, Ramya B, Pal S, Ganguly D,* and **Arindam Talukdar***. Design and Development of Benzoxazole Derivatives with Toll-like Receptor 9 Antagonism. **European Journal of Medicinal Chemistry**, **2017**, *134*, 334-347.
17. **Arindam Talukdar**, Zhao Y, Lv W, Bacher A, B. Illarionov, M. Fischer, and Mark Cushman. O-Nucleoside, S-Nucleoside, and N-Nucleoside Probes of Lumazine Synthase and Riboflavin Synthase. **J. Org. Chem**., **2012**, *77*, 6239-6261.
18. Mayhoub SA, **Arindam Talukdar**, and Mark Cushman. A Highly Efficient Oxidation of Benzyl Methyl Ethers with NBS Selectively Affords Either Aromatic Aldehydes or Aromatic Methyl Esters. **J. Org. Chem**., **2010**, *75*, 3507-3510.
19. **Arindam Talukdar**, Morgunova E, Duan J, Meining W, Foloppe N, Nilsson L, Bacher A, Illarionov B, Fischer M, Ladenstein R, Mark Cushman. Virtual Screening, Selection and

Development of a Novel Structural Scaffold for Inhibition of Lumazine Synthase. **Bioorg Med Chem**. **2010**, *18*, 3518-3534.

20. **Arindam Talukdar**, Breen M, Bacher A, Illarionov B, Fischer M, Georg G, Ye QZ, and Mark Cushman. Discovery and Development of a Small Molecule Library with Lumazine Synthase Inhibitory Activity. **J. Org. Chem**., **2009**, *74*, 5123–5134 (**Feature JOC Article**).
21. **Arindam Talukdar**, Illarionov B, Bacher A, Fischer M, Mark Cushman, Synthesis and enzyme inhibitory activity of the *S*-nucleoside analogue of the ribitylaminopyrimidine substrate of lumazine synthase and product of riboflavin synthase. **J. Org. Chem**., **2007**,*72*, 7167-7175.
22. Chen W, Xia C, Wang J, Thapa P, Li Y, **Arindam Talukdar**, Nadas J, Zhang W, Zhou D, Wang PG. Synthesis and Structure-Activity Relationship Study of Isoglobotrihexosylceramide Analogues. **J. Org. Chem**. **2007**, *72*, 9914-9923.
23. Kim HY, **Arindam Talukdar**, and Mark Cushman, Regioselective synthesis of *N*-β-hydroxyethylaziridines by ring-opening reaction of epoxides with aziridine generated in situ. **Organic Letters**, **2006**, *8*, 1085.
24. Luo S, Zhu, L, **Arindam Talukdar**, Mi X, Cheng J-P, Wang PG. Recent Advances in Rear Earth-Metal Triflate catalyzed Organic Synthesis in Green Chemistry. **Mini-Reviews in Organic Chemistry 2005**, *2*. 546.
25. Zhu L, **Arindam Talukdar**, Zhang G, Kedenburg JP, Wang PG. A divergent synthesis of uncommon sugars from furanaldehyde. **Synlett**, **2005**, 1547.
26. Gurjar, MK, **Arindam Talukdar.** Synthesis of terminal disaccharide unit of *Klebsiella pneumoniae*. **Tetrahedron**, **2004**, *60*, 3267.
27. **Arindam Talukdar**.* Unusual conversion of sugar oximes to sugar nitriles with ruthenium catalysts. **Synthetic Communications**, **2002**, *32*(22), 3503.
28. Gurjar, MK, **Arindam Talukdar**. Heck reaction of (*S*)-N-Cbz-allyl glycine *tert*-butyl ester with aromatic halides. **Synthesis**, 2002, 315.
29. Juneja, TR, **Arindam Talukdar***, Gupta, RL. Mutagenicity of Sulfoscanate: a comparative study. **Mutation Res**., **2002**, *518*, 155-161.
30. Chorghade MS, Gurjar MK, **Arindam Talukdar.** Fascinating Excursions into Chiral Chemistry: An Insider's Perspective. ***CHIMICA OGGI Chemistry Today*** **2002,** *20,* 20.
31. Juneja, TR, **Arindam Talukdar***, Mehta N, Gupta, RL. Effect of various alkyl and unsaturated substituents on the mutagenicity of some nitrophenyl thioethers. **Mutation Res**., 2001, *495*, 97-102.
32. Gurjar MK, Sadalapure K, Adhikari S, Sarma BVNBS, **Arindam Talukdar**, Chorghade MS. Kinetic resolution of aryl glycidyl ethers: A practical synthesis of optically pure β-blocker (*S*)-Metoprolol. **Heterocycles**, **1998**, *48*, 1471.

PATENTS

1. Quinazolinones Derivatives for Treatment of Non-Alcoholic Fatty Liver Disease, Preparation And Use Thereof. **PCT/IN2021/050621**.
2. Bicycle Topoisomerase I Inhibiting Compounds, Process For Preparation And Use Thereof. **WO/2019/229765**.
3. Purine Based Compounds As Toll-Like Receptor 9 Antagonist. **WO/2019/092739**.
4. Bicyclic Compound and Use Thereof for Inhibiting SUV39H2. **PCT/US2016/0051350**.

5. Blocking toll-like receptor 9 signaling with small molecule antagonist. **US10662177-B2**. **Grant date**: 26.05.2020
6. Preparation of 2,5-disubstituted pyrrolidines and tetrahydrothiophenes as leukotrine biosynthesis inhibitors. *PCT Int. Appl. WO 2000001670 A1* 13 Jan 2000, 80 pp. European Patent EP 1115702, 22 February **2002**.

BOOK CHAPTER

1. Molecular Docking for Computer-Aided Drug Design. Chapter-21; Computational Approaches Toward Development of Topoisomerase I Inhibitor: A Clinically Validated Target. **Arindam Talukdar**, Sourav Pal. Elsevier. 2021.
2. Protein–Protein Interaction Regulators. Chapter-13; Small Molecule Modulators of Endo-lysosomal Toll-like Receptors. **Arindam Talukdar**, Ayan Mukherjee, Dipyaman Ganguly. Protein–Protein Interaction Regulators. Royal Society of Chemistry. 2020.
3. N-Nitroso Compounds. Chapter-3; Nitric Oxide Donors and its Applications. **Arindam Talukdar**, Wang P. G. 2004. Wiley-VCH, Germany.

MANUSCRIPT SUBMITTED FOR PUBLICATIONS:

1. Fascinating Transformation of the SAM-Competitive Histone Methyltransferase Inhibitors from Nucleoside Analogues to Non-Nucleoside Analogues.
   Journal of Medicinal Chemistry: manuscript ID: **jm-2021-01208e**.
   Date of Submission: 7th July 2021.

   [The decision for the came back on 9th August. Based on the reviewers suggestions, the **Editor has asked to revise the manuscript** and submit the revision by 9th Oct 2021. The revision is ongoing and we plan to submit in due time.]

2. Topoisomerase I inhibitors: Challenges, Progress and the Road Ahead.
   Journal of Medicinal Chemistry: manuscript ID: **jm-2021-01623s**
   Date of Submission: 25th Jan 2021; Revision submitted again on 9th September 2021.
   [The initial decision was 'Reject-Resubmit' with correction suggested by reviewer and Editor. The manuscript was **again revised and resubmitted** to Editorial office on 10th September 2021 and under revision].

HONORS & AWARDS:

1. Global-Co-Chair, Membership committee, International Chemical Biology Society (ICBS).

LEADERSHIP EXPERIENCE:

2. **Development of First-in-class inhibitor** for epigenetic target SUV39H2. As team leader at Albany Molecular Research Inc, As one of the inventors to lead a team to design, develop and

validate candidate molecules and put them into preclinical stage.(Bicyclic Compound and Use Thereof for Inhibiting SUV39H2. PCT/US2016/0051350)

3. **Coordinator** of two international "Indo-Australian Workshop on Rational Drug Design" series (3-4 April 2018 and 26-27th February 2019) at IICB Kolkata. The workshop was meant for PhD/Postdoctoral students and Young faculties from across India. The objective of the workshop is capacity building and to spread the temper of drug discovery to as many students as possible across India.
4. **Coordinator** of Indo-Australian Web-Symposium on "Recent Advances in Drug Development" on 2nd and 3rd September 2021 at CSIR-Indian Institute of Chemical Biology, Kolkata, India. Many experts from around the world representing both academia and industry came on the same platform to share their experience-based advice towards the future of rational drug design. Students were given a platform to present their work related to drug discovery.
5. **PI of many project** from CSIR, SERB, DST, DBT including Indo-Australian bilateral projects
6. **Head of Business Development Group** (BDG) of CSIR-Indian Institute of Chemical Biology since June 2020. Responsible for various business related activity between Industry and IICB.

Major programmes/Projects currently as PI or Co-PI

Sl.No	Title of Project	Project Category	Participating Agencies	Your Role as defined
1.	Development of new drugs for leishmania- an australia-indian partnership	Australia-India Strategic Research Fund (AISRF)	DBT Current	PI
2.	Design and Development of Selective inhibitors of protein arginine methyltransferase 1 involved in epigenetic modifications	Core Research Grant (Chemical Sciences)	DST-SERB CRG/2019/000853 Current	PI
3.	Development of Drug-target based Assay platforms and screening against COVID 19	COVID-Management	CSIR- MLP-2037 Current	PI
4.	Non-alcoholic steatohepatitis (NASH)	Niche Creating Project (CSIR Mission Mode)	CSIR Current	Co-PI
5.	Deriving a pan-omics diagnostic pipeline for systems level immune health and therapeutic targeting in systemic autoimmunity	Niche Creating Project (CSIR Mission Mode project)	CSIR Current	Co-PI

6.	Exploring role of Mechanical cues in Immunocellular Regulation	FBR	CSIR Current	Co-PI
7.	Probing endosomal toll-like receptor 9 biology using novel small molecule antagonists	Chemical Sciences	DST-SERB EMR/2015/000117	PI

PROFESSIONAL EXPERIENCE:

- The Ohio State University, USA 2004-2005 Postdoctoral Research Associate,
- Purdue University, USA. April 2005- May 2010. Postdoctoral Research Associate,
- Albany Molecular Research Inc. (AMRI) Singapore. June 2010-2012. Senior Research Scientist.
- CSIR-Indian Institute of Chemical Biology. India. 2013-Jan 2017. Senior Scientist.
- CSIR-Indian Institute of Chemical Biology. 2017-Present. Principal Scientist.

Dr. Arindam Talukdar
Dr. Arindam Talukdar, PhD
Principal Scientist
Organic and Medicinal Chemistry Division
CSIR- Indian Institute of Chemical Biology, Kolkata
Email: atalukdar@iicb.res.in
https://iicb.res.in/faculty/arindam-talukdar
Phone: 9051646141