

Dr. Debaraj Mukherjee

Department of Chemical Sciences

Bose Institute

Unified Academic Campus EN80, Sector V, Bidhan Nagar, Kol-700091

Phone: +91-9419293758

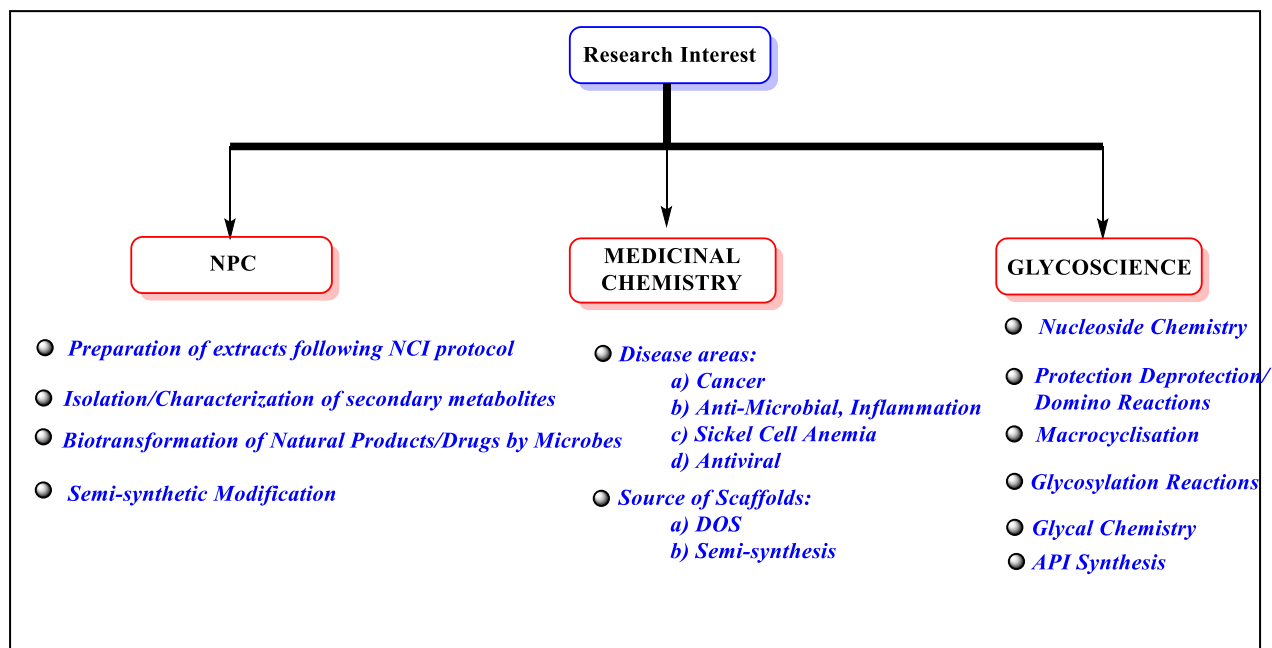
E-mail: debarajr1@gmail.com, debaraj@jcbose.ac.in



Education

- B.Sc (Hons)-Chemistry (1997)- **Calcutta University**
- M.Sc –Organic chemistry (1999)- **Calcutta University**
- PhD-Organic Chemistry (2006)-**Jadavpur university** (from **IICB**, CSIR Kolkata) Title
‘Synthetic approaches to biologically active carbohydrate compounds and analogues’

Research Expertise



Positions Held and Project Handled in development of new ideas

Position Held At Project handled/contribution in development of new ideas
IIIM-CSIR Jammu

Professor

(Department of
 Chemical Science,
 Bose Institute, Kolkata
 -January 2023
 onwards)

- ❖ As PI following is the project handled:
 - A Novel Approach to the Construction of N-alkylated Hydroxylaminolnterglycosidic Linkages from glycal epoxides: Application in the synthesis of esperamicin-calicheamicin cores (SERB project)(GA-3111)

Principal

Scientist

- ❖ All administrative responsibility

(NPMC- April 2021-
December 2022)

- ❖ As PI following are the projects handled:
- Exploit the amphiphilic nature of biological active compounds (antibacterial and non- antibacterial) and the separation efficiency of polymeric resin to isolate compounds with a high probability of exhibiting in vitro and in vivo activity. (Submitted)
- A Novel Approach to the Construction of N-alkylated HydroxylaminolInterglycosidic Linkages from glycal epoxides: Application in the synthesis of esperamicin-calicheamicin cores (SERB project)
- Exploiting chemical ecology for IPM: Deciphering the phyto-semiochemicals involved in Insect-Plant interactions of major crop pests of North East Region-India(GAP-3106) (DBT)
- “Discovery and Pre-clinical Development of Antivirals for COVID19 and other diseases(HCP-41).
- Repurposing of antiviral drugs for covid-19 drug (HCP29)

Principal Scientist and
Head Of Department
(NPC-Plant, Microbes,
BioOrganic Chemistry
Dept.) (2017-2021), Drug
Testing Laboratory (2020
March onwards)

- Synthesis of Dapagliflozin and sofosbuvir by novel glycosylation (GAP 2155) (2017-2020). (SERB)
- Chemical ecology and IPM of North East crop (GAP3106)
- Non-Infringing Process for APIs (MLP110009).
- Nucleoside as biofilm inhibitors of bacteria and to understand the underlying mechanism of action (MLP110008).
- Setting up a small molecule compound library screening platform for human serine protease TMPRSS2 and SARS-CoV2 RdRp (MLP-110001)
- CSIR Sickle cell project (HCP0008) (2017-till date)
- Repositioning of antiviral drugs for management of Covid-19 (HCP-29)
- Phytopharmaceutical mission project for sickle cell management and breast cancer (2017- till date)
- Discovery of molecules from Natural Product Chemistry Microbes (MLP-4011)
- CYP mediated bio transformation of drugs and natural products (MLP-4012)
- Advanced Phase-2 Sun Pharma project on Sinococuline

Sr. Scientist and Head of
the Department (NPC
Plant, Microbes,
BioOrganic Chemistry
Dept.) (2012-2017)

- New affordable synthesis of life saving drugs Dapagliflozin and Sofosbuvir using novel glycosylation methods (SERB_DST) EMR/2016/004710 Synthesis of affordable drug (MLP4015), Project Leader
- Development of multicomponent reaction for the generation of anticancer Lead molecule-GAP-1145 (DST sponsored, **Project Leader**, June 2010-2016.)
- Natural Product chemistry-Plant and Microbes, PI (MPL-4011,

- MLP-4012)
- Scientist (2009-2012)**
- Stem Cell Project (BSC 108 **Project Member**)
 - Development of multicomponent reaction for the generation of anticancer Lead molecule-GAP-1145 (DST sponsored, **Project Leader**, June 2010-2016.)
 - Development of novel target based anticancer therapeutics –SIP-0027(Core Project member, April-2007-2012).
 - Exploitation of Indian Rich Microbial diversity-NWP006 (Core Project member, April-2007-2012).
- Jr. Scientist (2006-2009)**
- Development of carbohydrate based biologically active compounds and new methodologies- RC approved MLP Project (Project Leader, March-2006 2007)

Research Group

Alumni

Thesis Title

Dr. Syed Khalid Yousuf

- **Scientist at IIM Srinagar (At present)**
 - **INSPIRE FELLOW at IIM Srinagar (2013-2018)**
- Studies towards the synthesis of biologically active compounds from Carbohydrate and natural precursors.

Dr. Altaf Hussain

- **Assistant Professor of Chemistry, Higher Education Department, Govt. of Jammu & Kashmir, India (At present)**
- Synthesis of benzannulated medium-sized & macrocyclic rings using carbohydrates as chiral template and development of new methods for addition reactions in glycols

Dr. Deepak K Sharma

- **Assistant Professor at Indian Institute of Technology (Banaras Hindu University), Varanasi (At present)**
 - **Post doc. Research Associate, Massachusetts Medical School, Worcester, Massachusetts USA (2015-2019)**
- Target based synthesis of medicinally important compounds inspired from microbial natural product scaffold.

Dr. Malikhrajuna Rao Lambunazae

- **Postdoc. Ntu Singapore (At present)**
 - **Research Associate, IIT-Chennai, India (2018-2019)**
 - **Research associate, Clearsynth Research Center, Hyderabad**
 - **SERB-NPDF, ICT-Hyderabad**
- Synthesis of medicinally important compounds from carbohydrates by development of novel methodologies

Dr. MadhuBabu Tatina

- Postdoc. Research Fellow, NTU, Singapore (At present)
- Postdoc. Res. Associate, IIT, Mumbai, India

Development of novel methods for C-glycosylation and synthesis of sugar derived versatile building blocks

Dr. Anil Kumar Kunusuru

Research associate in Nicolas Piramal, Gujrat, India (At present)

Development of new methods for C-glycosylation of glycals

Dr. Ashutosh K. Dash

Associate Professor at Shoolini University, Solan

Diversity Oriented Synthesis of Novel Benzopyran Derivatives and Evaluation of their Pharmacological Properties

Dr. Faheem Rasool

Assistant Professor of Chemistry, Higher Education Department, Govt. of Jammu & Kashmir (At present)

Study Towards Stereoselective Synthesis of Medicinally Important Glycosides from Sugar Enol-Ethers

Dr. Nazar Hussain

Postdoctoral Research Fellow
Centre Armand-Frappier Santé Biotechnologie
Institut national de la recherche scientifique (INRS)
531, boul. des Prairies
Laval (Québec), Canada, H7V 1B7

Development of New Methods for C-C Bond Formation in Sugar Enol-Ethers: Applications in the Synthesis of Chiral Aromatic Building Blocks

Dr. Ajaz Ahmed

Post doctoral fellow at UCLA, USA
Selected as a scientist CSIR ICT

N- glycosylation as a tool box for the generation of medicinally important nucleosides and disaccharide mimetics

Dr. Monika Bhardwaj

Postdoctoral Research Fellow Institute of Biological Chemistry Academia Sinica, Taipei, Taiwan

Development of new cascade reactions in carbohydrates for the generation of medicinally important scaffolds

Current Group (CSIR Fellow)

- Irshad Ahmed (UGC-JRF)
- Junaid Shafi Banday (PA)
- Norein Sakandar (CSIR-JRF)
- Bisma Rasool (UGC-MANF)
- Srija Bhattacharya (PA)
- Sanchari Kundu (PA)
- Rahul Haldar (UGC-JRF)

- SK Bappa (UGC-JRF)

Achievements

- Invited to join as an editorial board member in the prestigious Journal of Carbohydrate Chemistry (JCC), Taylor & Francis in 2023 for five years. JCC has been serving the community of carbohydrate chemists over the past 40 years.
- Received “**CSRI Bronze Medal-2023**” by Chemical research society of India.
- Received "**2020 Professor D.K. Banerjee Memorial Lecture Award**” at Pfizer Symposium on Organic Chemistry organized by Department of Chemistry, Indian Institute of Science, Bangalore, February 2020.
- Received “**Resource Person Award**” at Natural Products in Holistic Healthcare- Recent Trends & Future Prospects (NPH2) organized by the Department of Pharmaceutical Engineering & Technology, IIT (BHU), Varanasi, December 2020.
- Received **Dr. H C Srivastava Memorial Award-2019** by the ACCTI Executive Committee members in the International Carbohydrate conference (CARBO-XXXIV) on "Emerging Frontiers in Carbohydrate Chemistry and Glycobiology" held on December 5-7, 2019 at the University of Lucknow, Lucknow, India jointly organized by University of Lucknow, Lucknow and National Institute of Pharmaceutical Education and Research, Raebareli in association with ACCTI
- Received the DST **Boyscast fellowship** for an exchange programme with Professor. **David Crich**, Wayne State University, USA (**Nov2011-Nov2012**).
- Had been selected for the prestigious **D.S.T award** for ‘**Participation in the meeting of Nobel Laureates**’ in **Lindau**, Germany in **2002**. A team of 20 young researchers from all over India had been chosen to represent India in this meeting. Interacted with 19 laureates such as Ahmed Zewall (N.L.’99), George A. Olah (N.L.’94), Hartmut Michel (N.L.’88), Jean-Marie Lehn (N.L.’87), Harold Kroto (N.L.’96), Jerome Karle (N.L.’85), Robert Huber (N.L.’88), Richard Ernst (N.L.’91), Jahn Deisenhofer (N.L.’88) during week-long meeting.
- Visited various premier German Institute (sponsored by DFG) such as Ludwig-Maximilian University, Institute for Organic Chemistry & Biochemistry in T.U. Munchen, Max-Planck-Institute for Biochemistry, Martinsried, Bruker Biospin, University of Karlsruhe, University of Mainz, Max-Planck-Institute for polymer research, Kekule Institute for Organic Chemistry in **2002** and presented his work.

- Qualified National Eligibility Test (NET) for **Junior Research Fellowship** (CSIR), **2001** conducted jointly by the University Grants Commission and Council of Scientific and Industrial Research, Govt. of India
- Qualified in National Eligibility Test (NET) for **Lectureship 2000**.
- Obtained **93 percentile** in **GATE** (Chemical Science)**1999**
- Obtained **National Award** at 10th Class (**Rank-108**) **1992**
- Obtained **ACCT Young Scientist Award** in International Carbohydrate Conference (November 2006) at Delhi university **2006**
- Student Achievements:
 - A) Monika Bhardwaj got Best Poster Presentation award in **XV J-NOST** Conference for Research Scholars, University of Delhi, Delhi, October ,2019.
 - B) One of my student got **P.Sengupta Memorial Award** for the presentation entitled “Development of Novel C and O – Glycosylation Methods for The Synthesis of Oxabicyclic Scaffold and O-Aryl Ethers” in the 57th Annual Convention of Chemists, 2020 & International Conference on “Recent Trends in Chemical Sciences (RTCS-2020) ” organized by the Indian Chemical Society, Kolkata during December 26 – 29, 2020. The Abstract of the Presentation is published in the Abstract Book (Page 297).
 - C) Miss. **Norein Sakander** got **Best Poster Presentation award** at 60th ACC 2023 organised by Indian Chemistry Society at IIT Delhi from 20-21 dec, 2023.
 - D) Miss. **Bisma Rasool** got **Best Poster Presentation award** at 30TH CRSI-NCS 2023, Organised by Chemical Research Society of India at JNU, New Delhi from 2nd -5th Feb, 2023.
 - E) Mr. **Ajaz Ahmed** got RSC. Advances **outstanding student paper award 2021** Out of over 900 nominations all over the world.
 - F) Following of the students got faculty positions in research institute and university

Dr. Syed Khalid Yousuf Scientist at IIIM Srinagar (At present)

Dr. Altaf Hussain Assistant Professor of Chemistry, Higher Education Department, Govt. of Jammu & Kashmir, India (At present)

Dr. Deepak K Sharma Assistant Professor at Indian Institute of Technology (Banaras Hindu University),

Varanasi (At present)

Dr. Nazar Hussain Assistant Professor, BHU

Dr. Ashutosh K. Dash Associate Professor at Shoolini University, Solan

Dr. Faheem Rasool Assistant Professor of Chemistry, Higher Education Department, Govt. of Jammu &

Kashmir

Dr. Ajaz Ahmed Selected as a scientist CSIR IICT

Patents:

1. Synthesis of Gliflozins via Palladium Catalyzed Stereoselective Oxidative Coupling of Glycals with Aryl Halides (Patent No: **IN202211009236**) as **Principal Inventor**
2. Indolylkojyl derivatives as inhibitor of invasion and metastasis in human mammary gland carcinomas. 2016 (US Patent **PCT/IN2018/050060**) as **Principal Inventor**
3. A process for the preparation of n4-hydroxycytidine and its derivatives. Patent filed with United States application or **PCT international application number 18/558,928** on November 3, 2023 as **Principal inventor**.
4. A process for tetrahydroanthracenes production from *streptomyces curacoii* (MTCC-25420) and anticancer activity thereof. International Publication Number WO 2023/067617 A1 as **Inventor**
5. Pyranose based 2-deoxy -2-iodo nucleoside and its use as Anti-viral agent. Patent filed updated on 2023

- **Citations** : Total 2181; H-index: 26; i-10 index: 63 (Google scholar database)

Publications (selected)

- **2023**
- Design, Synthesis, and Biological evaluation of 3, 3'-Diindolylmethane N-linked glycoconjugate as Leishmanial Topoisomerase IB inhibitor with reduced cytotoxicity. Parampreet Kour, Pallavi Saha, Srijia Bhattacharya, Diksha Kumari, Abhipsa Debnath, Amit Roy, Deepak k. Sharma, **Debaraj Mukherjee***, Kuljit Singh. RSC Med. Chem., August, 2023, DOI: 10.1039/D3MD00214D.
- 2-Ketophenyl Assisted Biomimetic Synthesis of 3-Thio Substituted Glycals at Room Temperature. Irshad Ahmad Zargar, Norein Sakander, and **Debaraj Mukherjee***. Eur. J. Org. Chem., August, 2023, e202300780. doi.org/10.1002/ejoc.202300780. (IF 3.261)
- Switchable reactivity of 2-benzoyl glycals towards stereoselective access of 1-3 and 1-1 S/O linked disaccharides. Irshad Ahmad Zargar, Bisma Rasool, Norein Sakander and **Debaraj Mukherjee***. Chemical Communication, July 31, 2023, 59, 10448. DOI: 10.1039/d3cc02870d. (IF 4.9)

- Impact of Disease States on the Oral Pharmacokinetics of EIDD-1931 (an Active Form of Molnupiravir) in Rats for Implication in the Dose Adjustment. Mahir Bhardwaj, Abhishek Gour, Ajaz Ahmed, Sumit Dhiman, Diksha Manhas, Parul Khajuria, Priya Wazir, **Debaraj Mukherjee***, and Utpal Nandi*. *Molecular Pharmaceutics*, July 13, 2023, <https://doi.org/10.1021/acs.molpharmaceut.3c00314>. (IF 5.364)
- Lewis Acid Catalysed Regioselective Access of Novel C-2 Homo-Pyranose Nucleosides From 2-Acetoxy Methyl Glycals. Ajaz Ahmed, Norein Sakander and **Debaraj Mukherjee***. *Chemistry select*, March 2023, 8, e202300578. <https://doi.org/10.1002/slct.202300578> (IF 2.3)
- Regio and Stereoselective One-Pot Synthesis of 2-Deoxy-3-thio Pyranoses and Their O-Glycosides from Glycals. Bhardwaj, M. and **Debaraj Mukherjee***. *The Journal of Organic Chemistry*, April, 2023, 88(9), pp.5676-5686. <https://doi.org/10.1021/acs.joc.3c00146> (IF 4.335)
- Base-Mediated Transformation of Glycals to Their Corresponding Vinyl Iodides and Their Application in the Synthesis of C-3 Enofuranose and Bicyclic 3, 4-Pyran-Fused Furanose. Norein Sakander, Ajaz Ahmed, Irshad Ahmad Zargar, and **Debaraj Mukherjee***. *The Journal of Organic Chemistry*, June 14, 2023, DOI: 10.1021/acs.joc.3c00302. (IF 4.335)
- Pd catalyzed synthesis of Hetero 1,2-Interlinked C-Disaccharides by Coupling of iodo Glycals with Glycals. Bisma Rasool, Irshad Ahmad Zargar, Nazar Hussain, **Debaraj Mukherjee***. *Chemical Communication*, June 27, 2023, 59, 9090-9093 DOI: 10.1039/D3CC02421K. (IF 4.9)
- Stereoselective and regioselective Heck arylation at C-17 exocyclic double bond of andrographolide to generate labdane-based lead molecule against acute lung injury. Kumar, A., Gour, A., Dhiman, S., Hudait, N., Kumar, P., Vashishth, D., Kaur, S., Abdullah, S.T., Nandi, U. and **Debaraj Mukherjee*** *Journal of Molecular Structure*, August, 2023, 1286, p.135568. <https://doi.org/10.1016/j.molstruc.2023.135568> (IF 3.8)
- **2022**
- Isolation and anticancer activity evaluation of rare Bisaryl anthraquinone antibiotics from novel *S. treptomyces* sp. strain of NW Himalayan region, Ravi Singh Manhas, Syed Mudabir, Khalid Basir Mir, Ajaz Ahmed, Snigdha Sharma, Diksha Mahas, Harshita Tiwari, Amit Kumar, Amit Nargotra, Utpal Nandi, Anindya Goswami, Asha Chaubey and **Debaraj Mukherjee***. *Chemico-Biological Interactions* 365(2022) 110093. August 2022, <https://doi.org/10.1016/j.cbi.2022.110093>
- Ni-catalyzed domino transformation of enopyranoses and 2-iodo phenols/anilines to pyrano cis fused dihydro-benzofurans/indoles. Monika Bhardwaj, Bisma Rasool and **Debaraj Mukherjee***. *Chemical Communications*, May 2022, DOI: <https://doi.org/10.1039/D2CC02028A>
- Conversion of glycals to 2,3-Di-Substituted-3-deoxy-glycals via N-(Glycosyloxy) acetamides assisted C-2-Alkenylation and C-3-Nucleophilic Substitution. Irshad Ahmed Zargar, Nazar Hussain, **Debaraj Mukherjee***. *Chemistry- An Asian Journal*, April 2022, DOI: 10.1002/asia.202200350
- Setomimycin as a potential molecule for COVID-19 target: in silico approach and in vitro validation. Ravi S. Manhas, Harshita Tiwari, Mateen Noor, Ajaz Ahmed, Jyoti Vishwakarma,

Raja B. M. Tripathi, Ravishankar Ramachandran, Sreedhar Madishetti, **Debaraj Mukherjee***, Amit Nargotra, Asha Chaubey, Molecular Diversity, April 2022, DOI: <https://doi.org/10.1007/s11030-022-10441-5>

- Iodine Catalysed Tandem Stereoselective Acetalation-Glycosylation of Reducing Sugars Using Acetals/Ketals: Application in the Synthesis of Orthogonally Protected Nucleosides, Junaid Shafi Banday, Ajaz Ahmed and **Debaraj Mukherjee***. Chemistry Select, April 2022, DOI: 10.1002/slct.202201132
- Stereoselective Construction of Orthogonally Protected, N-O Interlinked Disaccharide Mimetics Using N-Substituted β - Aminoxy Donors. Ajaz Ahmed and **Debaraj Mukherjee***. Journal Of Organic Chemistry, March 2022, DOI: : <https://doi.org/10.1021/acs.joc.1c03097>
- Diastereoselective synthesis of glycopyrans 1,2-annulated with dioxazinanes from 1,2-anhydrosugars and N-substituted nitrones. Ajaz Ahmed, Norein Sakander, Faheem Rasool, Nazar Hussain, **Debaraj Mukherjee***. Organic and Biomolecular Chemistry, January 2022, DOI: 10.1039/d1ob02310a
- **2021**
- Design, Synthesis, Biological Investigations and Molecular Interactions of Triazole linked Tacrine Glycoconjugates as Acetylcholinesterase Inhibitors with Reduced Hepatotoxicity. Harmandeep Kaur Gulati, Sushil Choudhary, Nitish Kumar, Ajaz Ahmed, Kavita Bhagat, Jatinder Vir Singh, Atamjit Singh, Ajay Kumar, Preet Mohinder Singh Bedi, Harbinder Singh, **Debaraj Mukherjee*** Bioorganic Chemistry, November 2021, <https://doi.org/10.1016/j.bioorg.2021.105479>.
- Conversion of N-acyl amidines to amidoximes: a convenient synthetic approach to molnupiravir (EIDD-2801) from ribose. Ajaz Ahmed, Qazi Naveed Ahmed and **Debaraj Mukherjee***. RSC Advances, November 2021, 11, 36143, <https://doi.org/10.1039/d1ra06912h>
- The mechanism of conversion of substituted glycals to chiral acenes via Diels–Alder reaction: a computational study. Kalyanashis Jana, Padmaja D. Wakchaure, Nazar Hussain, **Debaraj Mukherjee*** and Bishwajit Ganguly. Organic & Biomolecular Chemistry, July 2021, 19, 6353.
- Effect of temperature and insect herbivory on the regulation of glucosinolate myrosinase system in *Lepidium latifolium*. Rohini Bhata, Sheenam Faiza, Villayat Ali, Manu Khajuria, **Debaraj Mukherjee***, and Dhiraj Vyas* *Physiologia Plantarum*. 2021, 172:53–63
- Glycerandomization: A promising diversification strategy for the drug development.
- Bharat Goel, Nancy Tripathi, **Debaraj Mukherjee***, Shreyans K. Jain*. *European Journal of Medicinal Chemistry*, 213, 2021, 113156
- **2020**

- LC and LC–MS/MS studies for identification and characterization of new degradation products of ibrutinib and elucidation of their degradation pathway. Lovekesh Mehta, Tanveer Naved, Parul Grover, Monika Bhardwaj, **Debaraj Mukherjee***. Journal of Pharmaceutical and Biomedical Analysis, November 2020, 113768, <https://doi.org/10.1016/j.jpba.2020.113768>.
- Synthesis and Conformational Analysis of 2-O-Silyl Protected Nucleosides from Unprotected Nucleobases and Sugar epoxides, Azaz Ahmed, Faheem Rasool, Gurpreet Singh, Meenu Katoch, **Debaraj Mukherjee.*** Eur. JOC., 2020, 4408–4416.
- 2-Halo Glycals as “Synthon” for 2-C-Branched Sugar: Recent Advances and Applications in Organic Synthesis, Nazar Hussain, Azaz Ahmed, **Debaraj Mukherjee.*** Asian J. Org. Chem. 2020, 9, 882 – 897, DOI: 10.1002/ajoc.202000195.
- Synthesis of Aryl Ethers of Carbohydrates via Reaction with Arynes: Selective O-Arylation of Trans Vicinal Dihydroxyl Groups in Carbohydrates. Monika Bhardwaj, Nazar Hussain, Irshad Ahmad Zargar, Ashutosh K. Dash, **Debaraj Mukherjee.*** Org. Biomol. Chem., 2020, 18, **4174–4177**. DOI: 10.1039/D0OB00540A.
- Description of Druglike Properties of Safranin and Its Chemistry behind Low Oral Exposure. Ashish Dogra, Pankul Kotwal, Abhishek Gour, Shipra Bhatt, Gurdarshan Singh, **Debaraj Mukherjee***, and Utpal Nandi*. ACS Omega, 2020 5 (17), 9885-9891.
- Conversion of Amino Acids to Aryl/Heteroaryl ethanol metabolites Using Human CYP2D6-Expressing Live Baker’s Yeast as potential Anti-Depressant Agent. Monika Bhardwaj, Shifali Chib, Loveleena Kaur, Amit Kumar, Bhabatosh Chaudhuri, Fayaz Malik, Saurabh Saran, **Debaraj Mukherjee***, RSC Medicinal Chemistry, 2020, 11,142
- 2-halo Glycals as “Synthon” for 2-C-Branched Sugar: Recent advances and applications in organic synthesis. Nazar Hussain, Ajaz Ahmed, **Debaraj Mukherjee.*** Asian Journal Of Organic Chemistry, 2020, DOI: 10.1002/ajoc.202000195.
- Recent advances in metal catalyzed carbonylation reactions by using formic acid as CO surrogate. Nazar Hussain, **Debaraj Mukherjee*** Chemistry Select , 2020, 10.1002/slct.202003395
- Metabolite detection and Profiling using Analytical Methods. Lovekesh Mehta Parul Grover, Tanveer Naved, **Debaraj Mukherjee***. Current Pharmaceutical Analysis, 17,1,2020.
- DOI: 10.2174/1573412915666190906142536
- **2019**
- Palladium catalysed carbonylation of 2-iodoglycals for the synthesis of C-2 carboxylic acids and aldehydes taking formic acid as carbonyl source. Ajaz Ahmed, Nazar Hussain, Monika Bhardwaj, Anuj Kumar, Amit Kumar, **Debaraj Mukherjee.*** RSC Advances, 2019, 9, 22227

- Indolylkojyl methane analogue IKM5 potentially inhibits invasion of breast cancer cells via attenuation of GRP78. Debasis Nayak, Archana Katoch, Deepak Sharma, Mir Mohd. Faheem Souneek Chakraborty, Promod Kumar Sahu, Naveed Anjum Chikan, Hina Amin, Ajai Prakash Gupta, Sumit G. Gandhi, **Debaraj Mukherjee***, Anindya Goswami. *Breast Cancer Research and Treatment*, 2019, DOI.org/10.1007/s10549-019-05301-0
- Green chemistry appended synthesis, metabolic stability and pharmacokinetic assessment of medicinally important chromene dihydropyrimidinones. Ashutosh K. Dasha, **Debaraj Mukherjee***, Abhijeet Dhulap, Saqlain Haider, Deepak Kumar. *Bioorganic & Medicinal Chemistry Letters*, 2019, 29, 24, 126750.
- Synthesis of Sugar-Based Enones and Their Transformation into 3,5-Disubstituted Furans and 2-Acyl-Substituted 1,2,3-Trideoxy Sugars in the Presence of Lewis Acids. Nazar Hussain, Monika Bhardwaj, Ajaz Ahmed and **Debaraj Mukherjee***. *Organic Letters*, 2019, 21, 3034–3037.
- Construction of Fused Oxabicyclic Scaffolds from Glycals and Styrenes via One-Pot Domino Transformations. Monika Bhardwaj, Faheem Rasool, Madhu Babu Tatina, and **Debaraj Mukherjee***. *Organic Letters*, 2019, 21, 3038–3042.
- Pharmacokinetic evaluation of medicinally important synthetic N,N' diindolylmethane glucoside: Improved synthesis and metabolic stability. Asmita Magotra, Abhishek Goura, Deepak K. Sharma, Ashutosh K. Dash, Gurdarshan Singha, **Debaraj Mukherjee***, Utpal Nandi*. *Bioorganic & Medicinal Chemistry Letters*, 2019, 8, 1007-1011.
- **2018**
- One-pot Regio and Stereoselective Synthesis of C-Glycosyl Amides From Glycals Using Vinyl Azides as Glycosyl Acceptors, Faheem Rasool, Ajaz Ahmed, Nazar Hussain Syed Khalid Yousuf, **Debaraj Mukherjee*** *Organic Letters*, 2018, 20, 4036-4039.
- Cross dehydrogenative coupling of sugar enol ethers with terminal alkenes in the synthesis of pseudo-disaccharides, chiral oxadecalins and a conjugated triene, Nazar Hussain, Madhubabu Tatina, **Debaraj Mukherjee*** *Org. Biomol. Chem.*, 2018, 16, 2666-2677.
- Dual Role of Par-4 in abrogation of EMT and switching on Mesenchymal to Epithelial Transition (MET) in metastatic pancreatic cancer cells. Katoch, A., Suklabaidya, S., Chakraborty, S., Nayak, D., Rasool, R., Sharma, **Debaraj, Mukherjee***, Faheem, M.M., Kumar, A., Sharma, P.R., Senapati, S., Kumar, L.D. and Goswami, A. *Molecular Carcinogenesis*. 2018, 57, 9, 1102-1115.

- Transformation of Substituted Glycals to Chiral Fused Aromatic Cores via Annulative π -Extension Reactions with Arynes, Nazar Hussain, Kalyanashis Jana, Bishwajit Ganguly, **Debaraj Mukherjee**, * Organic Letters, 2018, 20, 1572-1575.
- Detailed account on activation mechanisms of ruthenium coordination complexes and their role as antineoplastic agents, Mousumi Pal, Utpal Nandi, **Debaraj Mukherjee**, * European Journal of Medicinal Chemistry, 2018, 150, 419–445.
- **2017**
- Pd-Catalyzed Regio- and Stereoselective C–Nucleoside Synthesis from Unactivated Uracils and Pyranoid Glycals. Faheem Rasool, **Debaraj mukherjee***, Organic Letters, 2017, 19, 4936–4939.
- Regiospecific Synthesis of Ring A Fused Withaferin A Isoxazoline Analogues: Induction of Premature Senescence by W-2b in Proliferating Cancer Cells. Faheem Rasool, Debashis, Anindya Goswami and **Debaraj Mukherjee***, Nature Scientific Reports, 2017, 7, 13749.
- RU Rasool, D Nayak, S Chakraborty, MM Faheem , B Rah , P Mahajan, V Gopinath , A Katoch,, Z Iqra, SK Yousuf , **Debaraj Mukherjee***, LD Kumar, A Nargotra and A Goswami*, “AKT is indispensable for coordinating Par-4/JNK cross talk in p21 downmodulation during ER stress”, Oncogenesis, 2017, 6, e341.
- One-pot Mukaiyama type carbon-Ferrier rearrangement of glycals: Application in the syntheses of chromanone 3-C-glycosides. Ashutosh K. Dash, Madhu Babu Tatina, Said Khaalid Yousuf, S. Raina and **Debaraj Mukherjee*** Carbohydrate Research, 2017, 438, 1-8.
- **2016**
- Reaction of glycals with organic peroxides: Synthesis of 2-iodo, 2-deoxy and 2,3-unsaturated glycosides. Faheem Rasool, **Debaraj mukherjee*** Chemistry select, 2016, 1, 6553-6557.
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- **2015**
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- “Copper mediated highly stereoselective synthesis of C-glycosides from unactivated alkynes”; Anil Kumar, Syed Khalid Yousuf, **Debaraj Mukherjee***. *Chemical Communication*, 2013, 49, 10154-10156.
- “Synthesis of carbohydrate fused chiral macrocyclic benzolactones through Sonogashira reaction”; Altaf Hussain, Mallikharjuna Rao L, Deepak K. Sharma, Anil K. Tripathi, Baldev Singh and **Debaraj Mukherjee***. *RSC Advances*, 2013, 3, 19899-19904
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- "Ammonium chloride mediated synthesis of alkyl glycosides and evaluation of their immunomodulatory activity"; D. K. Sharma, M. Lambu, T. Sidiq, A. Khajuria, A. K. Tripathi, S. K. Yousuf, **Debaraj Mukherjee***. *RSC Advances*, 2013, 3, 11450-11455.
- “Fe/Al pillared clay catalyzed solvent-free synthesis of bisindolylmethanes using diversly substituted indoles and carbonyl compounds”; D. Sharma, A. Hussain, M. R. Lambu, S. K. Yousuf, S. Maity, B. Singh, **Debaraj Mukherjee***. *RSC Advances*, 2013, 3, 2211-2215.

- **2012**

- “Synthesis of benzannulated chiral macrocycles embedded in a carbohydrate template by intramolecular base free Sonogashira reaction on alumina support”; A. Hussain, S. K. Yousuf, D. Kumar, M. R. Lambu, B. Singh, S. Maity, **Debaraj Mukherjee*** *Advanced Synthesis and Catalysis* 2012, 354, 933–1940.
- “TCT mediated one-pot multicomponent transformation for the generation of orthogonally protected monosaccharide building blocks”; T. Madhubau, S. K. Yousuf, **Debaraj Mukherjee***. *Organic and Biomolecular Chemistry.*, 2012, 10, 5357-5360
- “Design and synthesis of novel N,N'-glycoside derivatives of 3,3'-diindolylmethanes as potential antiproliferative agents” D. K. Sharma, B. A. Rah, M. Lambu, A. Hussain, S. K. Yousuf, G. Jamwal, Z. Ahmad, N. Chauria, A. Nargotra, A. K. Tripathi, B. Singh, A. Goswami, **Debaraj Mukherjee***. *Med. Chem. Com.*, 2012, 3, 1082-1091.
- A novel MMP-2 inhibitor 3-azidowithaferin A (3-azidoWA) abrogates cancer cell invasion and angiogenesis by modulating extracellular Par-4. B. Rah, H. Amin, S. K. Yousuf, S Khan, G Jamwal, **Debaraj Mukherjee***, A. Goswami. *PLoS One*. 2012, 7, e44039.
- “Regioselective azidotrimethylsilylation of carbohydrates and applications thereof”; M. R. Lambu, S. K. Yousuf, **Debaraj Mukherjee***, Subhash Chandra Taneja*. *Organic and Biomolecular Chemistry*. 2012, 10, 9090-9098.

- **Previous publications**

- “Highly regio- and stereoselective one pot synthesis of carbohydrate based butyrolactones”; S. K. Yousuf, S. C. Taneja, **Debaraj Mukherjee***. *Organic Letters*, 2011, 13, 576-579.
- “Structural modifications of withaferin-A and evaluation of in-vitro cytotoxicity; a comprehensive SAR”; S. K. Yousuf, R. Majeed, M. Ahmad, P. L. Sangwan, B. Purnima, A. K. Saxena, K. A. Suri, **Debaraj Mukherjee***, S. C. Taneja. *Steroids*, 2011, 10–11, 1213-1222.
- “Stereoselective conversion of dihydropyran, dihydrofuran and glycals to 1-azido-2-halo derivatives using NIS/NBS -TMSN₃ combination”; S. K. Yousuf, A. Hussain, D. K. Sharma, A. H. Wani, B. Singh, S. C. Taneja, **Debaraj Mukherjee***. *Journal of Carbohydrate Chemistry*, 2011, 30, 61-74.
- “An efficient preparation of biologically important 1, 2 amino alcohols”; P. Gupta, A. Rouf, B. A. Shah, **Debaraj Mukherjee***, S. C. Taneja*. *Synthetic Communications*, 2011, 60, 3876.
- “Synthesis and cytotoxicity of novel benzopyran derivatives”; A. K. Tripathi,* **Debaraj Mukherjee***, S Koul, S. C. Taneja, S. Agrawal, P. R Sharma, A. K. Saxena *Indian J of Chem.*, 2011, 50B, 1619-1629.
- “Cu-Mn Bimetallic catalyst for Huisgen [3+2]-cycloaddition”; S. K. Yousuf, **Debaraj Mukherjee***, B. Singh, S. C. Taneja. *Green Chemistry*, 2010, 12,1568-1572

- “Multi-component cascade transformation of D-glucal to furan appended triazole glycoconjugates”; S. K. Yousuf, S. C. Taneja, **Debaraj Mukherjee***. Journal of Organic Chemistry., 2010, 75, 3097-3100.
- “Reaction of carbohydrates with Vilsmeier reagent: a tandem selective chloro-O-formylation of sugars”; N. Thota, **Debaraj Mukherjee***, M. V. Reddy, S. K. Yousuf, S. Koul, S. C. Taneja. Organic and Biomolecular Chemistry., 2009, 7, 1280-1283.
- “Facile synthesis of various 2-substituted-4-(2-pyridyl) benzopyran analogues as target potassium channel opener”; A. K. Tripathi, **Debaraj Mukherjee***, S. Koul, S. C. Taneja. Arkivoc, 2009, 4, 241-151.
- “Allyl Tetrahydropyranyl Ether: A versatile Alcohol/Thiol Protecting Reagent”; B. Kumar, M. A. Aga, **Debaraj Mukherjee***, S. Chimni, S. C. Taneja*. Tetrahedron Letters, 2009, 50, 6236-6240.
- “Domino Transformation of D-Glucal to Racemic- α -Substituted- β -Hydroxymethyl Furfuryl Derivatives” **Debaraj Mukherjee***, S. K. Yousuf, S. C. Taneja. Organic Letters, 2008, 10, 4831-4834
- “Indium trichloride promoted stereoselective synthesis of *O*-glycosides from trialkyl orthoformates” **Debaraj Mukherjee***, S. K. Yousuf, S. C. Taneja. Tetrahedron Letters, 2008, 49, 4944-4948.
- “An expedient chemo-enzymatic method for the synthesis of optically active masked 1,2-amino alcohols”; P. Gupta, S. C. Taneja*, B. A. Shah, **Debaraj Mukherjee***, R. Parshad, S. S. Chimni, G. N. Qazi. **Tetrahedron: Asymmetry**, 2008, 19, 1898-1903.
- “Tandem acetalation-acetylation of sugars and related derivatives with enolacetates under solvent-free conditions”; **Debaraj Mukherjee***, B. A. Shah, P. Gupta, S. C. Taneja. Journal of Organic Chemistry., 2007, 72, 8965-8968.
- “A rapid stereoselective C-glycosidation of indoles and pyrrole via indium trichloride promoted reactions of glycosyl halides”; **Debaraj Mukherjee***, S. K. Sarkar, U. S. Chowdhury and S. C. Taneja. Tetrahedron Letters, 2007, 48, 663-667.
- “Synthesis of two Lewis-X trisaccharides using regiospecific glycosylation reactions”; **Debaraj Mukherjee***, S. K. Sarkar, P. Chattopadhyay, U. S. Chowdhury. Journal of Carbohydrate Chemistry, 2005, 24, 251-259.
- “Synthesis of glycosides via indium(III) chloride mediated activation of glycosyl halide in neutral condition”; **Debaraj Mukherjee***, P. K. Roy, U. S. Chowdhury. Tetrahedron, 2001, 57, 7701-7704.

Book Chapters and Review articles:

- Nutraceutical Value of Wild Plants Used as Food and Medicine. Ashutosh K. Dash, Sunil Kumar and **Debaraj Mukherjee.*** From Ethnobotany to Ethnopharmacology: New India Publishing Agency, New Delhi, 2020.
- Biologically active carbohydrate-containing Macrocycles. Ashutosh K. Dash, Nazar Hussain, **Debaraj Mukherjee.*** Carbohydrates in Drug Discovery and Development, Publisher: Elsevier. 2020, 481-519, 1st Edition, ISBN: 9780128166758.
- Camphor sulphonic acid mediated quantitative 1,3-diol protection of major Labdane diterpene isolated from *Andrographis paniculata*. Venu Sharma, Kamal K. Kapoor, **Debaraj Mukherjee***,

Vivek K. Gupta, Manoj K. Dhar & Sanjana Kaul. Natural Product Research, 2018. <https://doi.org/10.1080/14786419.2017.1402313>.

- “Synthesis of macrolide natural products from carbohydrates”, Mallikharjuna Rao Lambu, Ashutosh K. Dash, Nazar Hussain, Sunil Bhat and **Debaraj Mukherjee***, Trends in Carbohydrate Chemistry, 9, 2017, 1-13.
- ‘Advances in C-alkynylation of sugars and its application in organic synthesis’ Madhu Babu Tatina, Altaf Hussain, Ashutosh K. Dash and **Debaraj Mukherjee***. RSC Advances 2016, 6, 75960-75972.
- PAWR-mediated suppression of BCL2 promotes switching of 3-azido withaferin A (3-AWA)-induced autophagy to apoptosis in prostate cancer cells. Bilal Rah, Reyaz ur Rasool, Debasis Nayak, Syed Khalid Yousuf, **Debaraj Mukherjee***, Lekha Dinesh Kumar & Anindya Goswami. Autophagy. 11:2, 314-331, 2015, DOI: 10.1080/15548627.2015.1017182.
- “Importance and synthesis of benzannulated medium-sized and macrocyclic rings (BMRs)” A. Hussain, S. K. Yousuf and **Debaraj Mukherjee***. RSC Advances, 2014, 4, 43241-4325.
- “Carbohydrate Based Blood Antigens in Cancer: Current Status and Future Perspectives” Syed Khalid Yousuf, **Debaraj Mukherjee***, S. C. Taneja, Letters in Drug Design & Discover. 2012, 9, 263-275.
- “Mutasythesis of medicinally important natural products through manipulation of gene governing starter unit” D. Sharma, S. K. Yousuf, **Debaraj Mukherjee***. Nat. Prod. Med. Chem. 2010, 368-391.
- “RN01582, 5, 6, 7, 8-Tetrafluoro -1,4 -dihydro-2,9-dimethyl-1,4 ethen onaphthalene” **Debaraj Mukherjee***. Encyclopedia of Reagents for Organic Synthesis. (doi:10.1002/047084289X.rn01582).
- An Overview of N-Heterocyclic Carbene: Properties and Applications." Norein Sakander, Ajaz Ahmed, Bisma Rasool and **Debaraj Mukherjee***. DOI: 10.5772/intechopen.1001331
- Recent Trends in the Synthesis and Biological applications of Triazole fused Carbohydrate Glycoconjugates towards Drug Discovery. Norein Sakander, Ajaz Ahmed and **Debaraj Mukherjee***.
- “Synthetic Strategies in Carbohydrate Chemistry” Chapter 10 “Vinyl sugar enol ethers in Organic Synthesis. Junaid Shafi Banday, Irshad Ahmed Zargar, Nandagopal Hudait and **Debaraj Mukherjee***. Publisher: Elsevier, Editor: Vinod Kumar Tewari, Paperback ISBN: 9780323917292

- “The Role of Chromenes in Drug Discovery and Development”. Parul Grover, Harmandeep Kaur Gulati, Jasha Momo H. Anal and Debaraj Mukherjee*. Publisher: Bentham Science Publishers Pte. Ltd. Singapore. Editors: Ashutosh Kumar Dash, Deepak Kumar. ISBN (paperback): 9789815124354
- “A succinct description on the synthesis of modified C-nucleosides of therapeutic significant”. Nandagopal Hudait, Noreen Sikander, Sanchari Kundu, Bisma Rasool, Jhimli Sengupta, **Debaraj Mukherjee***. SYNLETT, 2023, DOI: 10.1055/a-2202-8808
- “Recent Advances in the Synthesis of C-Glycosides from Glycals”. Ramanand Das, Malati Das, **Debaraj Mukherjee*** and Taraknath Kundu a. SYNTHESIS, 2023, DOI: 10.1055/a-2223-1303.

Invited Lectures

- **Invited Lecture** on ‘Advances in C-glycosylation and their application in organic synthesis’ at University of Delhi (Carbo Conference XXXI) 14th November **2016**
- **Invited Speaker & Chairperson** on ‘Medicinal Chemistry of C-glycosides’ at J&K science Congress Jammu University on 2-4 March 2017.
- **Defended successfully SERB EMR** at IISER Bhopal on 16th November DST-PAC.
- **Invited Lecture** on ‘DOS of bioactive natural products from Carbohydrate chiral pool and Development of novel methodologies’ at Centre for Biomedical Research Lucknow on 28th March **2014**
- **Plenary Lecture** on “Advances of multicomponent-one pot reactions in carbohydrate chemistry: scopes and limitations” at Bhavnagar University, Gujrat (XXIII Carbohydrate conference) on 22-24 Jan **2009**
- **Invited Lecture** on “Enhanced bioactivity of natural product from carbohydrate modification” at IICB Kolkata, on Feb **2009**
- Defended **DST project** “Novel reactions in carbohydrate chemistry for achieving the synthesis of anticancer agents” in front of experts at **IIT-Guwahati** on 16th **March 2013** in a workshop
- **Talk** on “Medicinal Chemistry of Dihydropyran based Macrolides derived from carbohydrates: Selective Inhibition of PI3K α ” in 27th ICS-**2014**, IISc. Bangalore in international symposium
- Defended Research Council meeting at IIIM Jammu from 2007 onwards almost every year.
- Presentation at **NOST conference in Udaipur, December 2019**
- **D.K.Banerjee Memorial lecture at IISc Bangalore on February 2020.**
- **Invited Lecture** on “Recent Advances in chemical sciences (RACS-2022)” at Department of Chemistry and Chemical Sciences, Central University of Jammu, 10-11th November 2022
- **Invited Lecture** on “International Carbohydrate Conference (CARBO-XXXVI), Emerging Trends in Glycochemistry, Glycobiology & Technology” at Department of Chemistry, Indian Institute of Technology-Bombay, December 5-7, 2022.

Poster Presentations:

- Poster presentations on “Chemoselective synthesis of suitably substituted LewisX derivatives” at IACS, Kolkata on 5-7 November 2003

- Work shop on “Molecular Modeling and Drug Design:in silico approach” at IIIM(formerly RRL) Jammu on 26-27 Jan, 2006
- Poster presentations on “A rapid stereoselective synthesis of modified C Nucleosides” at Delhi University on 25-29 Nov, 2006
- Poster presentations on “Structural modification of Boswellic acids for improved anticancer activity” at IICB Kolkata on 7-9 March, 2007
- Poster presentation on “Domino Transformation of Sugar to Bioactive Heterocyclic Intermediates” at Bhavnagar University, Gujrat (XXIII Carbohydrate conference) on 22-24 Jan 2009
- Poster presentation on “Synthesis, cytotoxicity and scanning electron microscopy based mechanistic studies of substituted benzopyrans” at Delhi university on 5-8 Jan 2010
- Poster presentation on “Synthesis of Benzannulated Macrocyclic Ethers, Thio-ethers and Benzolactones on Carbohydrate Template using heterogeneous Pd-catalyzed C-C couplings” in 27th ICS-2014, IISc. Bangalore.
- Poster presentation on “Tandem regio- and diastereo-selective synthesis of halogenated C-vinyl glycosides from unactivated arylacetylenes” in 27th ICS-2014, IISc. Bangalore.
- Poster presentation on “Copper mediated highly stereoselective synthesis of C-glycosides from unactivated alkynes” in 27th ICS-2014, IISc. Bangalore.
- Poster presentation on “Design and synthesis of novel N,N'-glycoside derivatives of 3,3'-diindolylmethanes as potential antiproliferative agents” in 27th ICS-2014, IISc. Bangalore.
- Poster presentation on “Tetrahedron Highly diastereoselective 1, 2-dichlorination of glycols using NCS/PPh₃”: study of substituent and solvent effects.” In National Science Congress 2015, Jammu University, Jammu.
- Poster presentations on “Synthesis of Chromanone C- Glycosides expending one pot Mukaiyama type Carbon- Ferrier rearrangement of Glycal” at University of Delhi (Carbo Conference XXXI) 14th November **2016**
- Poster presentations on “Cross Dehydrogenative coupling of sugar enol ethers with alkenes: new entries to C-branched sugars” at University of Delhi (Carbo Conference XXXI) 15th November **2016**
- Poster presentations on “Reaction of Glycols with Organic Peroxides under redox/ Photocatalysis” at University of Delhi (Carbo Conference XXXI) 15th November **2016**
- Poster presentations on “SP²-SP³ and SP²-SP² coupling of sugar enol ethers with activated and unactivated alkenes: new entries to C-branched sugars” at University of Jammu, 11th national conference on advances in chemical sciences and thermodynamics **2016**
- One of my student got Best Poster Presentation award in XV J-NOST Conference for Research Scholars, University of Delhi, Delhi, October ,2019

Membership of Professional Bodies

- ✚ Member, American Chemical Society 2009
- ✚ Life Member, Indian Association for the Cultivation of Science, Kolkata
- ✚ Reviewer of ACS, Science Direct Journal

- ✚ Reviewer of RSC Journals
- ✚ Reviewer of Wiley Journals
- ✚ Reviewer of SERB(DST) projects
- ✚ Member, CRSI