Bio-Data

1. **Name: Prof (Dr.) Uday Bandyopadhyay**

2. **Current Position and Address:**

Director
Bose Institute
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Former Professor, Academy of Scientific and Innovative Research (AcSIR),
Former Senior Principal Scientist
Division of Infectious Diseases and Immunology,
CSIR-Indian Institute of Chemical Biology
4, Raja S. C. Mullick Road, Jadavpur, Kolkata-700 032,
West Bengal, India

3. **Honors/Awards Received:**

- **J.C. Bose National Fellowship 2015**
- **Fellow of Indian National Science Academy (FNA), 2014**
- **Fellow of Indian Academy of Sciences (FASc), 2013**
- **Fellow of the National Academy of Sciences (FNASc), India 2008**
- **Fellow of the West Bengal Academy of Science and Technology (FAScT) 2009**
- **Humboldt Fellowship (Alexander Von Humboldt Foundation, Germany), 1996**
- **INSERM Fellowship, Paris, France, 1995**
- **Professor A. N. Bhaduri Memorial Lecture Award from the Society of Biological Chemist (India), 2012.**
- **Young Scientist Award from International Union of Biochemistry and Molecular Biology (IUBMB), 1994.**
- **Professor R. C. Shah Memorial Award, 96th Indian Science Congress, January 3-7, 2009, Shillong, Meghalaya**
- **Member of Molecular Immunology Forum (MIF) 2010**
- **Platinum Jubilee Lecture Award from 104th Indian Science Congress, 3-7 January, 2017 SV University, Tirupati**
- **Jnanchandra Ghosh Memorial Award 2020, Science Association of Bengal**
- **Vivek Jyoti Award by Vivekananda University, Barasat, West Bengal, 2022**

4. Educational Qualifications

Degree	***Year of passing***	***University/Institute***	***Subjects***
Ph. D	1994	Jadavpur University (Work done at CSIR-Indian Institute of Chemical Biology)	Studies on mercaptomethylimidazole induced gastric acid secretion in relation to peroxidase activity
Post-Doc	1995- 96	INSERM (French National Institute of Health), France, Paris.	Molecular Endocrinology
Post-Doc	1996-97	University of Hamburg, Humboldt Foundation, Germany	Immunology

5. Academic/Research Experience/Employment

Designation	***Name of Employer***	***Period***	
		From	***To***
Scientist Gr IV (2)	Council of Scientific and Industrial Research (Central Drug Research Institute, Lucknow)	10-10-2002	03-12-2006
Scientist Gr IV (3)	Council of Scientific and Industrial Research (Indian Institute of Chemical Biology, Kolkata)	04-12-2006	03-12-2009
Principal Scientist	Council of Scientific and Industrial Research (Indian Institute of Chemical Biology, Kolkata)	04-12-2009	02-06-2015
Senior Principal Scientist	Council of Scientific and Industrial Research (Indian Institute of Chemical Biology, Kolkata)	03-06-2015	02-04-2019
Director	Bose Institute, Kolkata An Autonomous organization of Department of Science and Technology (DST, Govt. of India)	03-04-2019	Continuing

6. ***RESEARCH EXPERIENCE:*** ***32 years***

Area of Specialization: Infectious Diseases (Malaria), Chemical Biology, Drug discovery,Biochemical Pharmacology and Cell biology

Research Accomplishments

Significant contribution has been made by Prof. Uday Bandyopadhyay in the area of mitochondrial biology with particular reference to the pathogenesis of malaria and gastric mucosal injury in the interface of mitochondrial fission-fusion dynamics, oxidative stress and cell death. Mitochondria are source as well as the target of reactive oxygen species (ROS), thus serving attractive sub-cellular targets to correct bio-energy disorder during different infectious and non-infectious diseases. Prof. Bandyopadhyay initiated his studies to understand the mitochondrial basis of disease development, progression and healing with special emphasis on cellular bioenergetic crisis and redox dyshomeostasis stemming from electron transport chain defect. He is keen towards unraveling the molecular players responsible for triggering mitochondrial oxidative stress and inflammatory tissue injury and subsequently using the knowledge to develop mitochondrial medicines as new generation sub-cellular therapeutics. Further, his scientific quest also includes exploring the *Plasmodium* genome and proteome towards identification and characterization of novel proteins which may serve as anti-malarial drug targets. His anti-malarial research interest also encompasses host-parasite interaction especially at the interface of host organ response against parasite-derived factors. In addition to basic research, Prof. Bandyopadhyay is also interested in antioxidant and anti-malarial drug discovery where he mainly focuses on mitochondrial-targeting, by novel non-toxic small molecules, to correct bio-energy dysfunctions and aberrant cell death. The specific areas or activities are briefly outlined:

A. Biology of malaria parasite and host-pathogen interaction

Malaria is a major public health concern in developing countries. According to the World Health Organization, the disease caused 216 million clinical cases, which included 6,55,000 deaths, in 2010. Emergence of drug resistant parasites has further added to the global health concern. Dr. Bandyopadhyay has been ardently involved in anti-malarial research where he explores the Plasmodium genome to identify novel drug targets and follows the host cell response against the parasite along with developing novel anti-malarial compounds against multidrug-resistant strains.

Exploring the Plasmodium genome and proteome

- In regards to exploring the *Plasmodium* genome and proteome for identifying novel drug targets, Dr. Bandyopadhyay has identified and characterized an Alba-family protein from human malaria parasite *P. falciparum*. This protein *P. falciparum* Alba3 (PfAlba3) binds DNA sequence nonspecifically at the minor groove and acetylation lowers its DNA binding affinity. He reported for the first time that PfAlba3 binds to the telomeric and sub-telomeric regions as well as to var gene promoter to control gene expression (Nucleic Acids Res. 2012). Protein oligomerization and their cooperative regulation played a very crucial role in DNA binding, chromatin packaging and regulation of gene expression. PfAlba3 is a novel non histone protein whose affinity for DNA is regulated by acetylation/deacetylation, however the exact molecular mechanism has not been resolved. Now he is concentrating to understand the molecular interaction between PfAlba3 and DNA in real time using surface plasmon resonance and single-molecule imaging techniques. He observed that PfAlba3 showed cooperative behavior in presence of DNA and this was achieved through interplay between the dimer-dimer stacking and higher order oligomer formations. Chemical silencing or point mutation of N-terminal lysines disfavored this DNA binding. Moreover, modification of these lysines not only interfered in DNA binding but also abolished the alteration in oligomeric status and cooperative binding. His study suggested the dynamic roles of PfAlba3 oligomerization in regulation of DNA binding, affinity and thus structure, stability and functional regulation.

- Further, he is also working on other putative Plasmodial proteins having unique phosphatase and other activities. The cellular architecture of the intra-erythrocytic stages of the human malaria parasite is very unique and contains some de novo generated organelles such as digestive vacuole. Presence of these *Plasmodium*-specific organelles points towards unique kind of protein transport mechanism that can be explored for target-based drug designing. Retromer complex plays a crucial role in intracellular protein trafficking and is conserved throughout the eukaryotes including malaria parasite, *P. falciparum*, where it is partially conserved. The assembly of retromer complex in RBC stages of malarial parasite is extremely difficult to explore because of its complicated physiology, small size, and intra-erythrocytic location. Nonetheless, understanding of retromer assembly may pave new ways for the development of novel antimalarials targeting parasite-specific protein trafficking pathways. Dr. Bandyopadhyay specifically worked on the assembly of Plasmodial retromer complex where he reported the characterization, stage specific expression and sub-cellular localization of a vacuolar protein sorting (VPS) candidate PfVPS29 in different asexual stages of *P. falciparum* (Protein Expr. Purif., 2016). In fact, he investigated the assembly of retromer complex in P. falciparum, by immunosensing coupled to highly sensitive Surface Plasmon Resonance (SPR) technique, wherein he could detect the different components in the retromer complex (Biochim. Biophys. Acta Proteins Proteom. 2018). Further, he also recently identified the interaction of *P. falciparum* Rab7 (PfRab7) with vacuolar protein sorting-associated protein 26 (PfVPS26) of retromer complex which mostly occurred near the digestive vacuole (DV) and Golgi complex in the trophozoite stage of the parasite. The study convincingly established the essentiality of specific Rab7 GTPase activity in retromer assembly, thereby highlighting that PfRab7 can be a potential anti-malarial drug target. In addition, he also showed that chloroquine disrupts DV to offer anti-malarial effect (Biochim. Biophys Acta Gen. Subj., 2020.).
- Further, Dr. Bandyopadhyay has identified a unique thioredoxin-like activity of macrophage migration inhibitory factor from *P. falciparum*, which provides antioxidant defense to the parasite (Free Radic. Biol. Med. 2011). He has established that the development of oxidative stress in malaria parasite is a novel way to develop new antimalarial by designing new redox active molecule (Free Radic. Biol. Med. 2012; 2008; Antimicrob. Agents Chemother., 2008). He has proved that the inhibition of *P. falciparum*choline kinase (PfCK) by hexadecyltrimethylammonium bromide leads to parasite death and confirmed the critical role of PfCK for parasite growth and the existence of Kennedy pathway in *P. falciparum* (Antimicrob. Agents Chemother., 2008; Biochim. Biophys. Acta. 2006). He reported that clotrimazole, by inducing the generation of reactive oxygen species or oxidative stress in *P. falciparum*, prevents parasite growth and development (J. Biol. Chem. 2005).

Anti-malarial drug discovery

Because rapid emergence of resistance against frontline antimalarial drugs is a matter of increasing concern. In this context, Dr. Bandyopadhyay has significantly contributed to anti-malarial drug discovery by developing new-generation antimalarial compounds. Hesynthesized (E)-2-isopropyl-5-methyl-4-((2-(pyridin-4-yl)hydrazono) methyl)phenol (18), which binds ferriprotoporphyrin-IX (Fe^{III}-PPIX) and offers antimalarial activity against chloroquine-resistant and sensitive strains of *P. falciparumin vitro*. Through structure-function analysis he proved that compound 18 binds Fe^{III}-PPIX through the -C═N-NH- moiety and 2-pyridyl substitution at the hydrazine counterpart plays a critical role in antimalarial efficacy. He further documented that compound 18 accumulates inside the acidic FV of *P. falciparum* followed by elevating the pH in FV. In fact, compound 18 also exhibited potent in vivo antimalarial activity against chloroquine-resistant *P. yoelii* and *P. berghei*

ANKA (causing cerebral malaria) in mice with negligible toxicity (ACS Infect. Dis., 2019). Further, he also developed a series of free iron-chelating conjugated benzothiazole hydrazones which are active against malaria parasite both in *in vitro* as well as *in vivo* murine model. Out of several bio-active benzothiazole hydrazones, compound 5f is most potent and prevent heme polymerization as an anti-malarial mechanism. Compound 5f exhibited anti-Plasmodial activity, *in vitro*, against a chloroquine/pyrimethamine-resistant strain of *P. falciparum*(K1) and *in vivo*, against lethal multiple-drug-resistant strain of Plasmodium yoelii in Swiss albino mice (Antimicrob. Agents Chemother., 2016). Apart from those other contributions of Dr. Bandyopadhyay, regarding anti-malarial drug discovery includes synthesis of a primaquine-chloroquine hybrid, which interacts with free heme and modulates heme-mediated biological reactions (Med Chem Comm., 2013). He has also established that epoxyazadiradione, a limonoid purified from Neem (Azadirachta indica) fruits inhibits malarial macrophage migration inhibitory factor (MIF), which is responsible for pro-inflammatory reactions in host (J. Biol. Chem. 2012). Further, he has also documented the Antiplasmodial activity of [(aryl)arylsulfanylmethyl]Pyridine (Antimicrob. Agents Chemother., 2008).

Host-parasite interaction in malaria

In regards to host cell response against malaria parasites, Dr. Bandyopadhyay has made unique contribution by identifying the critical role of oxidative stress-induced activation of mitochondrial pathway of apoptosis as the main etiological factor for liver damage during malaria, where he specifically identified the hepatoprotective action of the pineal hormone Melatonin against oxidative stress-associated hepatic mitochondrial damage and apoptosis during malaria (FASEB J. 2006; J. Pineal Res. 2007; Free Radic. Biol. Med.,2009). This has undoubtedly opened a new avenue to design a host-specific antiapoptotic-antioxidant molecule for combination therapy to protect vital organs from apoptotic death during malarial infection. Further, he has identified the role of free heme, neutrophils and NF-κB in triggering hepatocyte apoptosis during malarial infection. This study has further established that the damage can be prevented by reactive oxidant scavenger and iron chelators (J. Biol. Chem. 2012). Further, Dr. Bandyopadhyay has identified the association of Currently he is pursuing to evaluate the role of heme oxygenase 1 with the restoration of liver function after damage using an experimental model of murine malaria caused by Plasmodium yoelii (Infect Immun., 2014). He specifically showed that controlled stimulation of HO-1 activity holds the potential for triggering accelerated recovery of hepatic function through attenuating NF-κB-dependent inflammation.

Presently Dr. Bandyopadhyay is specifically involved in understanding the mode of action of DNA binding proteins in maintaining the integrity of Plasmodium genome and how novel anti-malarial strategies can be designed towards targeting these putative proteins.

B. Mitochondrial fission-fusion dynamics, oxidative stress and cell death

Non-steroidal anti-inflammatory drugs (NSAIDs) are popularly known as pain killers which are rampantly consumed by people worldwide to alleviate pain and inflammation stemming from multiple disorders. Recently NSAIDs are also successfully repurposed for anti-neoplastic chemotherapy against diverse malignancies. While these wonder drugs have multiple health benefits, unfortunately they severely damage the gastrointestinal mucosa, which is often experienced as a side effect of prolonged usage.

Molecular mechanism of oxidative stress and cell death in gastric mucosa and cancer

Besides being a matter of global concern, NSAID-induced gastric injury also serves as a wonderful experimental model for drug-induced organ damage and spontaneous healing as well as precisely exploring the molecular mechanism of NSAID-induced cytotoxicity. In this regard, Dr.

Bandyopadhyay has been working on the mechanistic basis of NSAID cytotoxicity in normal gastric mucosal and cancer cells to identify novel sub-cellular targets which can be exploited for optimizing NSAID usage while rationally bypassing the toxicity. Apart from NSAIDs, Dr. Bandyopadhyay has been also working on mechanistic basis of acute mental stress-induced gastric injury which is often realized as a major consequence in Stress Mucosal Disease (SRMD), a rapidly growing clinical burden attributed to stress, anxiety, depression and lifestyle-associated disorders.

Through his pioneering research on gastric mucosal cell injury, using cellular and rodent models, Dr. Bandyopadhyay showed that mitochondria are the prime targets of popular NSAIDs. Interestingly, even during acute mental stress gut mitochondria gets severely affected in a unique mechanism where brain, upon perceiving the stress signal, crosstalk with the gut by relaying signal through multiple factors (including glucocorticoid receptors), thereby triggering gut mitochondrial pathology which leads to mucosal injury and gastric luminal hemorrhage (Free Radic. Biol. Med. 2017). In either case intra-mitochondrial superoxide accumulation, formed due to electron leakage from the respiratory chain, is found to initiate a disruptive signaling cascade which jeopardizes mitochondrial structural dynamic homeostasis to induce hyperfission, bioenergetic crisis and consequent apoptosis in a cyclooxygenase-independent manner. He, for the first time, showed the instrumental role of mitochondrial hyperfission and aberrant mitophagy as ultimate dictators of gastric cell death and that pre-treatement with mitochondreial fission inhibitor Mdivi-1, prevents gastropathy (J. Biol. Chem. 2019, 2011, 2009; Free Radic. Biol. Med. 2017; Biochem. Pharmacol. 2016). His work specifically documented that indomethacin (an NSAID) induced TEM-detectable mitochondrial ultrastructural damage, specifically loss of cristae and accumulation of pro-apoptotic Bax, as an ode to depolarization and activation of intrinsic apoptosis in the rat gastric mucosa, through hyper activation of PKC-ζ-p38-DRP1 signaling pathway (J. Biol. Chem. 2019, 2011, 2009). Further, he proved that up-regulation of pro-apoptotic Bax, Bak and down-regulation of anti-apoptotic Bcl-2, Bcl-xL plays fundamental role in NSAID-induced gastric cell apoptosis, which favored mitochondrial Bax translocation to open mitochondrial permeability transition pores (MPTP). He provided evidence that opening of MPTP released apoptosis promoting factor, cytochrome c, which then activated caspase-9 and active caspase-9 further activated caspase-3. He observed that intramitochondrial $O_2^{\bullet -}$ is the progenitor ROS which increases the mitochondrial redox burden through transformation into hydrogen peroxide and hydroxyl radical ($^{\bullet}OH$) and that selective scavenging of intra-mitochondrial ROS by mito-targeted antioxidants like mitoTEMPO prevents gastric injury as well as accelerates healing of preformed gastropathy (Biochem. Pharmacol. 2016). The most significant finding was that the oxidation of mitochondrial aconitase is critical for the generation of $^{\bullet}OH$ and subsequent induction of apoptosis NSAID gastropathy (J. Biol. Chem. 2009). Interestingly, NSAID-induced gastric injury spontaneously heals with time, the molecular mechanism of which is fascinating and holds immense relevance because understanding wound resolution can help to design novel strategies in regenerative medicine. In this context, Dr. Bandyopadhyay showed that translocation of the heat shock protein heme oxygenase-1 (HO-1) to mitochondria is an inherent cytoprotective mechanism against mitochondrial oxidative stress, apoptosis and gastric mucosal injury (J. Biol. Chem. 2011). He further proved that HO-1 shows anti-inflammatory action against NSAIDs to offer gastroprotection (Free Radic. Biol. Med. 2013). This is a novel prostaglandin-independent pathway of induction of gastropathy by NSAIDS. In regards to his research endeavors on cancer, Dr. Bandyopadhyay showed that the pro-inflammatory cytokine macrophage migration inhibitory factor (MIF) regulates mitochondrial dynamics and cell growth of diverse human cancer cells lines through CD74-NF-κB signaling. Silencing of MIF and its cognate receptor CD74 were found to activate DRP1-dependent mitochondrial hyperfission along with suppression of NF-κB-dependent cell proliferation and induction of cell death through up-regulation of Bad, Bax, and p53 while down-regulation of Bcl-xL, and Bcl-2 (J. Biol. Chem. 2018).

Anti-oxidant and anti-ulcer drug discovery

In addition to basic research, Dr. Bandyopadhyay also translated his findings towards designing and synthesis of small molecule antioxidants which finds application inantiulcer drug discovery. Tryptamine-gallic acid hybrid is one such synthesized antioxidant which enters mitochondria to correct mitochondrial oxidative stress and functional defects to salvage NSAID-induced mucosal cell apoptosis thereby preventing gastropathy (Patent US 8901317 B2, 2014; European Patent, EP2616439 B1,2015; Japanese Patent, JP5868980, 2016; Indian Patent No: 327424, 2019). Tryptamine-gallic acid hybrid has been also found to block pro-inflammatory NF-κB signaling, neutrophil migration and consequent tissue injury (Free Radic. Biol. Med. 2013). Further, it was also a remarkable achievement to show that Neem (Azadirachta indica) bark extract is as potent as omeprazole in its antiulcer activity and it cures hyperacidity and ulcer in animal models and human subjects with no adverse effect (Bandyopadhyay et al., 2002; Bandyopadhyay et al. 2004). The isolation of novel antiulcer compound from the Neem has been patented (USA patent No 5730986, 1998; Japan Patent No 3286778, 2002; European Patent No EP0787495 B1, 2005). This basic research on Neem can be utilized to develop antiulcer product, which is ready for commercial exploitation.

Presently Dr. Bandyopadhyay is specifically involved in understanding aberrant mitochondrial metabolism in gastric cancer pathogenesis and interfering role of NSAIDs in cancer metabolism. He is also actively trying to dissect the molecular basis of mental stress-induced gastric injury and identify the soluble endogenous factors that transmit the stress signal from the brain to the gut through mitochondria thereby injuring the mucosa. He is presently using high depth sequencing-based approaches to excavate new actionable gastroprotective targets for designing novel therapeutic strategies.

7. **Professional Affiliations**:

Leadership in Research Project:

- Acted as a **Nodal Scientist** of 12th five-year plan project (42.5 Crores) of CSIR entitled "Bio-energetic Disorder: A multi-model approach to monitoring and management (BEnD)"

- Acted as a **Nodal Scientist** (CSIR-IICB) of 12th five year plan project **Emerging and re-emerging challenges in infectious diseases: Systems based drug design for infectious diseases (SPLENDID)**

- Acted as a ***Nodal Officer, Bose Institute: Indian Participation in the construction of Facility for Antiproton and Ion Research (FAIR) at Darmstadt, Germany***

Served as Council/ Senate/ Governing Body Member:

- Member of the Advisory Council of National Institute of Pharmaceutical Research (NIPER), Kolkata
- Member of the Management Council of CSIR-Indian Institute of Chemical Biology, Kolkata
- Member of West Bengal Academy of Science and technology (WAST)
- Member of Senate, NIPER (Kolkata)
- Member of the Governing Body, West Bengal University of Health Sciences (WBUHS)

- Member of the Governing Body, Institute of Advanced Study in Science and Technology, Guwahati (DST, Govt of India)
- Member of the Governing Body, S N Bose National Centre Basic Sciences, Kolkata (DST, Govt of India)
- Member of the Governing Body, Indian Association for the cultivation of Sciences, Kolkata (DST, Govt of India)
- Member of the Board of Research studies (Zoology), Cooch Behar Panchanan Barma University

Chairman and Membership of Technical Committees:

- Chairperson of Academic Affairs Committee, CSIR- Indian Institute of Chemical Biology (IICB), Kolkata
- Chairman of Science, Technology and Development Studies (STADS) Group, CSIR-IICB, Kolkata
- Chairman, Committee for Central Instruments, CSIR- IICB, Kolkata
- Member, Patent Advisory Committee, CSIR- IICB, Kolkata
- Member, Advisory Committee on Business Development Group, CSIR- IICB, Kolkata
- Member, Discovery Translation Committee, CSIR- IICB, Kolkata
- Member, Science Dissemination and Popularization Committee, CSIR- IICB, Kolkata
- Member, Chemical Safety Committee, CSIR- IICB, Kolkata
- Member, review committee for Ramanujan Fellowship, DST
- Member, Swarnajayanti Fellowship (DST) selection Committee

Teaching and other academic responsibilities:

- Served as a faculty/ Teacher of National Institute of Pharmaceutical Research (NIPER), Kolkata
- Served as a faculty /Teacher of Academy of Scientific and Innovative Research (AcSIR)
- Served as an examiner of M. Sc (Biochemistry/Physiology) courses of Calcutta University
- Served as an examiner of M. Tech courses (Bio-technology) of IIT, Kharagpur
- Serving as teacher for Academic staff college of UGC (on Chemistry/Biological sciences)
- Served as Resource person for UGC orientation programme/refresher course, University of Calcutta

Research project Assessment and review

- Assessment of various CSIR projects
- Assessment of various DST projects
- Assessment of ICMR projects
- Assessment of international projects from different countries

Referee to Scientific Journals:

Angew Chem; J. Med. Chem; Biochemistry; Biochem J; Free Radic Biol Med; Apoptosis; Microbes and Infection.; Bioorganic Medicinal Chemistry Letter.; Antimicrob. Agents. Chemother; Mol. Biochem. Parasitol; Protein; Oncotarget; Biochem Pharmacol; Express. Purif.

Professional Society Memberships/Academy:

- Life Member Society of Chemical Biology (India)
- Life Member Society of Biological Chemist (India),
- Life Member of Indian Cancer Society
- Life Member of Indian Science Congress association (ISCA) (Membership No: L30077)

8. Session Chair in International conférence

1. 18th All India Congress of Cytology and Genetics & **International Symposium** on "Translating Genes and Genomes" jointly organized by CSIR-Indian Institute of Chemical Biology and Archana Sharma Foundation of Calcutta From January 29-31, 2018: Co-Chairperson YOUNG SCIENTISTS SHORT PAPER SESSION and POSTER SESSION

2. **International Meeting** on Neurodegenerative Disorders: Current and Future Perspective: Co-hosted by Centre with Potential for Excellence in Particular Area (CPEPA), University of Calcutta, Institute of Neurosciences, Kolkata and Institute of Neurosciences, Newcastle, Upon Tyne, UK. February 10-12, 2017 Venue: The Oberoi Grand, 15, Jawaharlal Nehru Road, Kolkata, West Bengal: 700013

9. Invited Lecture delivered (National/International): 34

1. ***Central Calcutta Society for Advancement of Human Development & ResearchNational Symposium on Advances in Neurosciences Research and Management, in collaboration with INSA, Kolkata Chapter, Centenary Campus, Bose Institute****, Kolkata, 22 July, 2019, title: Mental stress and mitochondria: Mitochondrial dysfunction plays a critical role in the manifestation of gastric injury/ulcer during stress and anxiety*
2. **6th State Association of Physiologists and Pharmacologists of India (APPI) – Kolkata Branch at Dept. of Physiology, Calcutta National Medical College, Kolkata, 10th Feb. 2018***. Title: Correction of dysfunctional mitochondria in gastric mucosa: A new therapeutic strategy against gastric ulcer/injury caused by NSAID/mental stress.*
3. **International conference on Biotechnology & Biological Sciences**, August 25-26, 2017 at University of Engineering and Management, Kolkata. *Title: The pain killers (non-steroidal antiinflammatory drugs) damage structural and functional integrity of mucosal mitochondria to induce gastric injury/ulcer*.
4. ***Teacher's Training program, September 15-16, 2017, Sponsored by Pharmaceutical Council of India at National Institute of Pharmaceutical Education and Research, Kolkata.*** *Title: Focus on Infectious Diseases Biology: Malaria*
5. ***International conference on Biotechnology & Biological Sciences, August 25-26, 2017 at University of Engineering and Management, Kolkata.*** *Title: The pain killers (non-steroidal antiinflammatory drugs) damage structural and functional integrity of mucosal mitochondria to induce gastric injury/ulcer.*
6. ***3rd International Conference on Perspectives of Cell Signaling and Molecular Medicine, January 8-10, 2017, at Bose Institute, Kolkata****. Title: Prevention of mitochondrial pathology and redox imbalance in gastric mucosal cell is a novel therapeutic approach against non-steroidal anti-inflammatory drug-induced gastric injury.*

7. ***Platinum Jubilee Lecture in the Section of Medical Sciences (including Physiology) at the 104th Indian Science Congress to be held at SV University, Tirupati during January 3-7, 2017****. Title: Non-steroidal anti-inflammatory drugs (NSAIDs)-induced gastric injury/gastropathy: cause and correction.*
8. ***Colloquium on Biology:*** **Indian Association for the Cultivation of Science***,* on March 17, 2016*. Title: Mitochondria: A subcellular target to prevent non-steroidal anti-inflammatory drug (NSAID)-induced gastric ulcer.*
9. ***Satyendralal Das Memorial Lecture****:* **National Institute of Cholera and Enteric Diseases (NICED)** on February 29, 2016***.*** *Title*: *The management and utilization of free heme by malaria parasite for survival and induction of liver dysfunction in host.*
10. ***IAS orientation:*** **CSIR-Indian Institute of Chemical Biology** on January 322, 2016. *Title: Gastric ulcer: cause and correction.*
11. ***Ronald Ross Memorial Oration:*** **Vidyasagar University, Department of Physiology** on September 23, 2015. Title: *Induction of oxidative stress in Plasmodium falciparum: A potential approach to develop novel antimalarial.*
12. ***Preventive Medicine: Current Perspective: Central Calcutta Society for Advancement of Human Development and Research July 21, 2014, Co-sponsored by Indian National Science Academy, Local Chapter, Kolkata.*** *Title: Non-steroidal anti-inflammatory drug develops gastric mucosal injury by inducing mitochondrial oxidative stress and apoptosis.*
13. ***"Orientation Program" Academic Staff College, University of Calcutta July 30, 2014.****Title: Life style, stress and gastric ulcer: A cause-consequence relationship.*
14. ***School of life sciences, Jadavpur University, Kolkata 14 February, 2014,*** *Title: Designing of a novel tryptamine-gallic acid hybrid to prevent non-steroidal anti-inflammatory drug-induced gastric ulcer/gastropath.*
15. *National Symposium on "****Modern trends in Biological Sciences" organized by The Physiological Institute, Presidency University, Kolkata, India, February 21, 2014****. Title: Designing of a novel tryptamine-gallic acid hybrid to prevent non-steroidal anti-inflammatory drug-induced gastric ulcer/gastropathy*
16. ***International conference on "Ageing and Heath" at The School of Allied Health Sciences of the Polytechnic of Porto (ESTSP/IPP), 9th Academic Conference of Pharmacy "Aging and Health", April 19, 2013, School of Health Sciences, Porto, Portugal.*** *Title: Health Quality in Elderly: Contribution of Plants.*
17. ***Designing of a novel tryptamine-gallic acid hybrid to prevent non-steroidal anti-inflammatory drug-induced gastric ulcer/gastropathy: Indian Association of Biomedical Scientists,*** 7th One Day Seminar, 28 October, 2013, Department of Physical Education, Jadavpur University, Kolkata.
18. ***Indian Society of Chemical Biology, 27-29 January, 2013, CSIR-IICB, Kolkata.*** *Title: Designing of a novel tryptamine-gallic acid hybrid to prevent non-steroidal anti-inflammatory Drug(NSAID)-induced mitochondrial pathology and gastropathy.*
19. ***Refresher Course in Chemistry: Education and Research, Academic Staff College, University of Calcutta, September 3, 2013****. Title: Generation of cellular bio-energy and consequent of bio-energetic defects: An approach to correct bio-energetic defect by designing small molecule.*
20. ***CSIR-CECRI, Karaikudi, January 23, 2013.*** *Title: Generation of Bio-energy: Electron Transport Chain (ETC) and Extra ETC system.*
21. ***Indian Academy of Sciences, 5- 6 July, 2013, Indian Institute of Sciences, Bangalore.*** *Title: Designing of a novel tryptamine-gallic acid hybrid to prevent non-steroidal anti-inflammatory drug-induced gastric ulcer/gastropathy.*

22. ***World Neem Conference, 21-24 November, Nagpur, 2012.*** *Title: Neem bark extract offers antiulcer/gastroprotective effect through the inhibition of apoptosis and stimulation of gastric epithelial cell renewal*
23. ***Pondicherry University, 2012. Title:*** *Liver Dysfunction in Malaria: Involvement of Hepatic Free Heme Over-load, NF-κB Activation and Neutrophil Infiltration.*
24. ***A. N Bhaduri Memorial Lecture Award, 81st Annual Meeting of SBC(I), Kolkata 8-11 Nov, 2012.*** *Title: Non-steroidal anti-inflammatory drug (NSAID) induces mitochondrial pathology and apoptosis in gastric mucosal cell to develop gastropathy.*
25. ***5th Annual Meeting of the Cytometry Society (India), Calcutta University, Nanocenter October 12-13, 2012.*** *Title: Non-steroidal Anti-inflammatory Drug Triggers Mitochondrial Pathology to Damage Gastric Mucosa: Cause, Consequence and Correction.*
26. ***A. G Dutta Memorial lecture, CSIR-Indian Institute of Chemical Biology, January 22, 2011.*** *Title: Non-steroidal anti-inflammatory drugs (NSAIDs)-induced gastric ulcer: Role of mitochondrial pathology and apoptosis in gastric mucosal cell.*
27. ***Journey of a Molecule to be a candidate drug: Drug Target Identification, Validation and Drug development: Refresher Course On Chemistry: Journey to the third millennium;*** Academic Staff College, University of Calcutta, July 22, 2011
28. **NON-STEROIDAL ANTI-INFLAMMATORY DRUG (NSAID)-INDUCED GASTROPATHY: Critical role of mitochondrial pathology and apoptosis in gastric mucosal cells:** Molecular Immunology Forum 2010, Raichak , West Bengal
29. ***Indo-Brazil conference, Kolkata, Dec 10 -11, 2009****. Title: Induction of oxidative stress in Plasmodium falciparum: A potential approach to develop antimalarial.*
30. ***International Symposium on Frontier of Protein Sciences and Institute for Protein Research Retreat (IPR retreat) (2009) Institute for Protein Research, Osaka University,3-2 Yamadaoka Suta, Osaka 565 0871, Japan,*** *Title: NON-STEROIDAL ANTI-INFLAMMATORY DRUG (NSAID)-INDUCED GASTROPATHY: Critical role of mitochondrial pathology and apoptosis in gastric mucosal cells*
31. ***96th Indian Science Congress, January 3-7, 2009, Shillong, Meghalaya****. Title: A novel antiapoptotic effect of proton pump inhibitor to prevent gastric damage.*
32. ***76th Society of Biological Chemist (I) Annual Meeting, Nov. 25-27, 2007, Sri Venkateswara University, Tirupati****. Title: Malarial infection induces hydroxyl radical-mediated mitochondrial-dependent hepatocyte apoptosis.*
33. ***International Neem Conference held in Kunming, China, November, 2006****. Title: Antioxidant-antiapoptotic activity of neem bark extract to protect gastric ulcer, Proceedings of the 2006, P108-117*
34. ***16th International Congress of Biochemistry and Molecular Biology New Delhi, India. Volume II, 1994, September 19-22, P7-201****. Title: Mechanism of inactivation of lactoperoxidase by mercaptomethylimidazole: a model for thyroid peroxidase inactivation.*

10. Poster and abstracts in international conference

1. **Selective scavenging of intra-mitochondrial prooxidants corrects non-steroidal anti-inflammatory drug-induced gastropathy: an acid secretion-independent novel gastroprotective strategy. Somnath Mazumder**, Rudranil De, SubhashisDebsharma and Uday Bandyopadhyay. **Mechanistic and Therapeutic Approaches in Human and Animal Health, 2021;6-8th December 2021**, Dept. of Zoology, Cooch Behar Panchanan Barma University, India

2. **Non-Steroidal Anti-Inflammatory Drugs Induce Mitochondrial Hyperfission and Bioenergetic Crisis to Induce Gastric Cancer Cell Death**. SubhashisDebsharma, **Somnath Mazumder,**Rudranil De, Samik Bindu and Uday Bandyopadhyay (**2021**), **Frontiers in Cancer Science 2021 (FCS2021)**, 1-3rd November, 2021, Virtual, National university of Singapore, Singapore

3. **Impaired mitochondrial biogenesis and functionality contributes to gastropathy in Stress-related Mucosal Disease (SRMD); A mechanistic study**. SaikatPramanik, Subhashis Debsharma1, Rudranil De, Somnath Mazumder, **Uday Bandyopadhyay**.**Mechanistic and Therapeutic Approaches in Human and Animal Health, 2021;6-8th December 2021**, Dept. of Zoology, Cooch Behar Panchanan Barma University, India

4. Rab7 of Plasmodium falciparum is involved in its retromer complex assembly near the digestive vacuole.DebanjanSaha, Asim Azhar Siddiqui and**Uday Bandyopadhyay.Mechanistic and Therapeutic Approaches in Human and Animal Health, 2021;6-8th December 2021**, Dept. of Zoology, Cooch Behar Panchanan Barma University, India

5. **Aberrant mitochondrial dynamics: a new therapeutic target for the management of pain killer-induced gastropathy.** SubhashisDebsharma, Somnath Mazumder, Rudranil De, and **Uday Bandyopadhyay**. **India International Science Festival (IISF) 2020**, 22-24th December 2020, Virtual

6. **Non-steroidal anti-inflammatory drug, Indomethacin, impairs mitochondrial dynamics and cellular respiration to induce death in gastric cancer cells: the central effect targeting cellular metabolic hub.** Somnath Mazumder, Rudranil De, SubhashisDebsharma,Samik Binduand **Uday Bandyopadhyay**. **India International Science Festival (IISF) 2019**, 5-8th November 2019, Biswa Bangla Convention Centre & Science City, Kolkata, India

7. **Mental stress and mitochondria: mitochondrial dysfunction plays a critical role in the manifestation of gastric injury/ulcer during stress and anxiety**. Rudranil De, Somnath Mazumderand **Uday Bandyopadhyay**; **2nd International Conference on Biotechnology & Biological Sciences**, **Biospectrum 2018,** University of Engineering & Management (UEM), Kolkata, India

8. **Bleomycin-induced pulmonary myofibroblast transformation is positively associated with de-stabilization of mitochondrial dynamics due to enhanced fusion and autophagic deregulation.** Samik Bindu, Somnath Mazumder and **Uday Bandyopadhyay**; **INTZOOCON 2018**, 1-3rd February **2018**, University of Calcutta, India.

9. **Selective scavenging of intra-mitochondrial superoxide and prevention of aberrant mitochondrial fission can serve as novel therapeutic strategies to protect against NSAID-induced gastropathy.** Somnath Mazumder, Rudranil De and **Uday Bandyopadhyay**; **International Conference on Mitochondria in Health and Disease; 6th Annual Conference of Society for Mitochondrial Research and Medicine-India**; 10-11th February, **2017,** Jawaharlal Nehru University, New Delhi, India

10. **Essential role of macrophage migration inhibitory factor in maintaining mitochondrial integrity and dynamics in gastric adenocarcinoma cells for sustaining proliferation.**Rudranil De,

Somnath Mazumder, Souvik Sarkarand **Uday Bandyopadhyay**; **International Conference on Mitochondria in Health and Disease; 6th Annual Conference of Society for Mitochondrial Research and Medicine-India**; 10-11 February, **2017,** Jawaharlal Nehru University, India

11. **Prevention of mitochondrial pathology and redox imbalance in gastric mucosal cell is a novel therapeutic approach against non steroidal anti-inflammatory drug-induced gastric injury.**Somnath Mazumder and **Uday Bandyopadhyay**; **3rd International Conference on Perspectives of Cell Signaling and Molecular Medicine**; 8-10th January, **2017,** Bose Institute, India

11. ***Thesis guided (awarded) (15);*** **Post Graduate: 26**

Title of each thesis (Ph.D)

1. Characterization of Interacting Proteins in Retromer Complex of Human Malaria Parasite, *Plasmodium falciparum.* University of Calcutta, 2020
2. Design, Synthesis and Evaluation of Antimalarial Activity of a Novel Class of Hydrazonophenols . Jadavpur University 2019
3. Studies on the Mechanisms and Signalling Pathways of Stress-induced Mitochondrial Pathology and Associated Damage in Gastric Mucosal Cells. University of Calcutta, 2018.
4. Studies on the mechanism of non-steroidal anti-Inflammatory drugs (NSAIDs)-induced mitochondrial pathology and altered dynamics during gastric injury. University of Calcutta, 2018
5. Structural and functional characterization of putative vacuolar sorting protein 29 from the human malarial parasite, P. falciparum. University of Calcutta, 2017.
6. Design, synthesis and evaluation of anti-inflammatory activity of gallic acid derivatives, Calcutta University, 2015.
7. Identification and characterization of the enzymatic and immunoregulatory role of plasmodial macrophage migration inhibitory factor in host pathology, Jadavpur University, Kolkata, 2012.
8. Studies on the mechanism of oxidative stress-induced hepatocytes apoptosis and liver damage during malarial infection, Jadavpur University, Kolkata, 2012.
9. Identification and characterization of Alba family protein from human malaria parasite Plasmodium falciparum, Jadavpur University, Kolkata, 2012.
10. Studies on the mechanism and signaling pathway for non-steroidal anti-inflammatory drug (NSAID)-induced gastric mucosal cell apoptosis and gastropathy, Jadavpur University, Kolkata, 2012.
11. Design, synthesis and biological evaluation of some novel antioxidant-antiapoptotic molecules to protect organ damage due to oxidative stress, Jadavpur University, Kolkata, 2012.
12. Studies on the effect of antiulcer compounds on gastric mucosal apoptosis induced by indomethacin and reactive oxygen intermediates, Jadavpur University, Kolkata, 2009.
13. Studies on oxidative stress in liver during malaria, Jawaharlal Nehru University, New Delhi, 2008.
14. Studies on heme-induced oxidative stress and antioxidant-defense system in malaria parasite, Jawaharlal Nehru University, New Delhi, 2008.

15. Analysis of a putative gene from Plasmodium falciparum having sequence homology with choline kinase with a view to explore its chemotherapeutic potential, Jadavpur University, Kolkata, 2007.

12. Research Publications:

Total no of publication: 81

Google Scholars Citation, April 21, 2022
h-index: 42
i10- index: 75
Total citation: 10,176

Best 10 publications

1. Indomethacin impairs mitochondrial dynamics by activating the PKCζ-p38-DRP1 pathway and inducing apoptosis in gastric cancer and normal mucosal cells. Somnath Mazumder, Rudranil De, Subhashis Debsharma, Samik Bindu, Pallab Maity, Souvik Sarkar, Shubhra Jyoti Saha, Asim Azhar Siddiqui, Chinmoy Banerjee, Shiladitya Nag, Debanjan Saha, Saikat Pramanik, Kalyan Mitra, Uday Bandyopadhyay**. J Biol Chem**; 17;294 :8238-8258, **2019.**

2. Hydrazonophenol, a food vacuole targeted and ferriprotoporphyrin IX-interacting chemotype prevents drug resistant malaria. Saha SJ, Siddiqui AA, Pramanik S, Saha D, De R, Mazumder S, Debsharma S, Nag S, Banerjee C, Bandyopadhyay U. **ACS Infect Dis.** 5, 63-73, **2019**

3. Macrophage migration inhibitory factor regulates mitochondrial dynamics and cell growth of human cancer cell lines through CD74-NF-κB signaling. De R, Sarkar S, Mazumder S, Debsharma S, Siddiqui AA, Saha SJ, Banerjee C, Nag S, Saha D, Pramanik S, Bandyopadhyay U. **J Biol Chem**. ;293:19740-19760. **2018**

4. Acute mental stress induces mitochondrial bioenergetic crisis and hyper-fission along with aberrant mitophagy in the gut mucosa in rodent model of stress-related mucosal disease. De R, Mazumder S, Sarkar S, Debsharma S, Siddiqui AA, Saha SJ, Banerjee C, Nag S, Saha D, Bandyopadhyay U. **Free Radic Biol Med.** 113, 424-438, **2017**

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6. Novel anti-inflammatory activity of epoxyazadiradione against macrophage migration inhibitory factor: inhibition of tautomerase and pro-inflammatory activities of macrophage migration inhibitory factor. Alam A, Haldar S, Thulasiram HV, Kumar R, Goyal M, Iqbal

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7. Identification and molecular characterization of an Alba-family protein from human malaria parasite Plasmodium falciparum. Goyal M, Alam A, Iqbal MS, Dey S, Bindu S, Pal C, Banerjee A, Chakrabarti S, Bandyopadhyay U. **Nucleic Acids Res.** Feb 1;40(3):1174-90, **2012**.

8. Translocation of heme oxygenase-1 to mitochondria is a novel cytoprotective mechanism against non-steroidal anti-inflammatory drug-induced mitochondrial oxidative stress, apoptosis and gastric mucosal injury. Bindu S, Pal C, Dey S, Goyal M, Alam A, Iqbal MS, Dutta S, Sarkar S, Kumar R, Maity P, Bandyopadhyay U. **J. Biol. Chem.** 286, 39387-39402, **2011**.

9. Indomethacin, a non-steroidal anti-inflammatory drug, develops gastropathy by inducing reactive oxygen species-mediated mitochondrial pathology and associated apoptosis in gastric mucosa: A novel role of mitochondrial aconitase oxidation. Maity P, Bindu S, Dey S, Goyal M, Alam A, Pal C, Mitra K, **Bandyopadhyay U. J. Biol. Chem.** 284: 3058-3068, **2009**.

10. Clotrimazole Inhibits Hemo- peroxidase of *P. falciparum* and Induces Oxidative Stress: PROPOSED ANTIMALARIAL MECHANISM OF CLOTRIMAZOLE. Vishal Trivedi, Prem Chand, Kumkum Srivastava, Sunil K. Puri, Prakas R. Maulik, and Uday Bandyopadhyay **J. Biol. Chem.** 280, 41129-41136, **2005**.

List of Publications

1. Mediators of mitophagy that regulate mitochondrial quality control play crucial role in diverse pathophysiology. Rudranil De , Somnath Mazumder , **Uday Bandyopadhyay**. Cell Biol Toxicol. 37:333-366, **2021**

2. Rab7 of Plasmodium falciparum is involved in its retromer complex assembly near the digestive vacuole. Asim Azhar Siddiqui , Debanjan Saha , Mohd Shameel Iqbal , Shubhra Jyoti Saha , Souvik Sarkar , Chinmoy Banerjee , Shiladitya Nag , Somnath Mazumder , Rudranil De , Saikat Pramanik , Subhashis Debsharma , **Uday Bandyopadhyay.** Biochim Biophys Acta Gen Subj; 1864:129656, **2020**

3. Sirtuins as endogenous regulators of lung fibrosis: A current perspective Somnath Mazumder , Mukta Barman , **Uday Bandyopadhyay** , Samik Bindu. **Life Sci**; 258:118201, **2020**

4. Non-steroidal anti-inflammatory drugs (NSAIDs) and organ damage: A current perspective Samik Bindu , Somnath Mazumder , **Uday Bandyopadhyay** . Biochem Pharmacol; 180:114147. **2020**.

5. Indomethacin impairs mitochondrial dynamics by activating the PKCζ-p38-DRP1 pathway and inducing apoptosis in gastric cancer and normal mucosal cells. Somnath Mazumder , Rudranil

De , Subhashis Debsharma , Samik Bindu , Pallab Maity , Souvik Sarkar , Shubhra Jyoti Saha , Asim Azhar Siddiqui , Chinmoy Banerjee , Shiladitya Nag , Debanjan Saha , Saikat Pramanik , Kalyan Mitra , Uday Bandyopadhyay**. J Biol Chem**; 17;294 :8238-8258, **2019.**

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10. Management of Inflammation by Natural Polyphenols: a Comprehensive Mechanistic Update. Sarkar S, Mazumder S, Saha SJ, **Bandyopadhyay U**. **Curr Med Chem.**2016, 23, 1657-1695, **2016**

11. Selective scavenging of intra-mitochondrial superoxide corrects diclofenac-induced mitochondrial dysfunction and gastric injury: A novel gastroprotective mechanism independent of gastric acid suppression. Mazumder S, De R, Sarkar S, Siddiqui AA, Saha SJ, Banerjee C, Iqbal MS, Nag S, Debsharma S**, Bandyopadhyay U. Biochem Pharmacol**. 121, 33-52, **2016**.

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15. Ellagic Acid, a Dietary Polyphenol, Inhibits Tautomerase Activity of Human Macrophage Migration Inhibitory Factor and Its Pro-inflammatory Responses in Human Peripheral Blood Mononuclear Cells. Sarkar S, Siddiqui AA, Mazumder S, De R, Saha SJ, Banerjee C, Iqbal MS, Adhikari S, Alam A, Roy S, **Bandyopadhyay U. J. Agric. Food. Chem.**63(20):4988-98, **2015.**

16. TALEN mediated targeted editing of GM2/GD2-synthase gene modulates anchorage independent growth by reducing anoikis resistance in mouse tumor cells. Mahata B, Banerjee A, Kundu M, **Bandyopadhyay U**, Biswas K. **Sci Rep.** 12; 5: 9048, **2015**.

17. Trisubstituted Methanes (TRSMs): Synthesis and Bioevaluation as Anti-malarials Manna, S.K., Singh, P., Mondal, S., Goyal. M. **Bandyopadhyay, U.**, and Panda, G. **SOP Trans Org Chem**,1,8-20, **2014**.

18. Association of heme oxygenase 1 with the restoration of liver function after damage in murine malaria by *Plasmodium yoelii.* Sumanta Dey, Somnath Mazumder, Asim Azhar Siddiqui, Mohd. Shameel Iqbal, Chinmoy Banerjee, Souvik Sarkar, Rudranil De, Manish Goyal, Samik Bindu and **Uday Bandyopadhyay. Infect. Immun.** 82, 3113-26, **2014**.

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20. Synthesis and biological evaluation of primaquine–chloroquine twin drug: a novel heme-interacting molecule prevents free heme and hydroxyl radical-mediated protein degradation. Chinmay Pal , Souvik Sarkar , Somnath Mazumder , Susanta Adhikari and **Uday Bandyopadhyay. Med. Chem. Commun.** 4, 731–736, **2013.**

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23. Aryl aryl methyl thio arenes prevent multidrug-resistant malaria in mouse by promoting oxidative stress in parasites. Goyal M, Singh P, Alam A, Kumar Das S, Shameel Iqbal M, Dey S, Bindu S, Pal C, Kumar Das S, Panda G, **Bandyopadhyay U. Free Radic Biol Med.** 53, 129-142, **2012.**

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