Curriculum Vitae

SAMIK BINDU

CURRENT AFFILIATION **September 2016 - Till date**

Assistant Professor
Department of Zoology
Cooch Behar Panchanan Barma University,
Vivekananda Road, Cooch Behar,
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PREVIOUS POSITION

- Post Doctoral Research Scholar **July 2014 – August 2016**
  Department of Surgery
  University of Chicago
  5841 S. Maryland Avenue
  Chicago, IL 60637, USA

- Post Doctoral Research Fellow **May 2013 - April 2014**
  Department of Biology II
  Biocenter of the Ludwig Maximilians University
  GroßhadernerStr 2, D-82152 Planegg-Martinsried,
  Munich, Germany, Post code 82152

EDUCATION

- **Doctor of Philosophy (Ph.D.) in Science** **2008-2013**

Department of Life Science and Biotechnology, Jadavpur University, Kolkata, India
Thesis work performed in Division of Infectious Diseases and Immunology, CSIR-Indian Institute of Chemical Biology, Kolkata

Thesis supervisor: Dr. Uday Bandyopadhyay

Thesis title: **Studies on the mechanism and signaling pathway for non-steroidal anti-inflammatory drugs (NSAID)-induced gastric mucosal cell apoptosis and gastropathy.**

- **Project Assistant Level-II** **2007-2008**

  CSIR-Indian Institute of Chemical Biology, Kolkata
  Project Title: Evaluation and Correction of Mitochondrial Dysfunction in Disease

- **Master of Science (M.Sc.)** **2004-2006**
  Zoology with specialization in Cytogenetics,
  Maulana Azad College, University of Calcutta

- **Bachelor of Science (B.Sc.)** **2001-2004**
  Honours in Zoology,
  Asutosh College, University of Calcutta

PUBLICATION AND CITATION METRICS SUMMARY

Total: 21 Papers + 1 Book chapter + 3 Granted International Patents
Citation indices: According to Google Scholar

	All	Since 2011
Citations	530	490
h-index	14	14
i10-index	16	16

MEMBERSHIPS, HONOURS AND AWARDS

- Member, **American Heart Association**, Membership Number: 201404542
- ASBMB 2016 Graduate/**Postdoctoral Travel Award**, Experimental Biology, EB2016
- Senior Research Fellowship (SRF), 2010
  Council of Scientific and Industrial Research, New Delhi, India.
- Junior Research Fellowship (JRF), 2008 (CSIR-UGC Joint NET)
  Council of Scientific and Industrial Research, New Delhi, India.
- GATE in Life Science (2007) Graduate Aptitude Test for doing research work at Indian Institute of Technology, held by Ministry of Human Resource

RESEARCH EXPERIENCE **2007-Till date**

Technical Understanding and Experience

- **Cell Biology**- Confocal and fluorescence microscopy, TUNEL assay, fluorescence activated cell sorter (FACS) for cell purification and apoptosis, immunocytochemistry, isolation of mitochondria from gastric epithelial cells and hepatocytes and measurement of mitochondrial membrane potential (with JC-1) and respiration control ratio, *in vitro* cell culture (primary cells and cancer cell lines), gastric epithelial cell and hepatocyte purification.
- **Molecular Biology**- Isolation and quantitation of DNA and RNA, RT-PCR and PCR, Cloning (Gibson as well as recombineering techniques), site directed mutagenesis, and other DNA manipulations, preparing competent cells, transformation of competent *E. coli*, lipofectamine as well as virus mediated transfection.
- **Genetics:** Genetic crosses, development of new strains (*C. elegans*), maintenance of *C.elegans*, microinjection and generation of transgenic *C. elegnas***.**
- **Biochemistry**- Western immunoblot, Electrophoresis (Agarose and PAGE), Electrophoretic mobility shift assay (EMSA), Co-immunoprecipitation and Chromatin immunoprecipitation (ChIP), caspase assay, quantification of cellular oxidative stress (lipid peroxidation, protein carbonylation, GSH measurement), subcellular fractionation, estimation of ALT, ALP, AST, Bilirubin, assays related to detection of apoptosis, glutathione measurement, lipid peroxidation and protein carbonylation measurement.

- **Immunology**- Immunohistochemistry, ELISA, neutrophil isolation, chemotactic assays and neutrophil adhesion assay.
- **Animal Handling-** Generation of experimental gastric ulcer in rats by oral gavaging of non steroidal anti-inflammatory drugs (NSAIDs), ethanol or by inducing cold restraint stress. Intraperitoneal, sub cutaneous, intramuscular injections of drugs. Induction of experimental lung and cardiac fibrosis. Maintenance of *Caenorhabditis elegans* and their genetic cross over. Microinjection and generation of transgenic *C. elegnas***.**
- **Microbiology**- Media preparation, maintenance and culture of bacteria.
- **Softwares:** EndNote, Vector NTI, Microscope Imaging software (Application Suite Advanced Fluorescence: Leica Microsystem), Image J, GraphPad Prism, Origin, Adobe Photoshop, CorelDraw, MS Office.
- **Other skills:** Writing manuscript, writing fellowship proposals.

SUMMARY OF RESEARCH EXPERIENCE

- **Ph.D. Summary**

Mitochondrial oxidative stress, apoptosis, pathology and repair of gastric mucosa

I was assigned to work on a very important project related to injury and healing of gastric mucosa in rats after Non Steroidal Anti Inflammatory Drugs (NSAIDs) treatment in Dr. Uday Bandyopadhyay's laboratory. My work involved elucidation of signaling pathway of NSAIDs-induced oxidative stress mediated apoptosis in gastric mucosa and the inherent cytoprotective mechanisms operating in the injured gastric mucosa with a focus on the cytoprotective enzyme hemeoxygenase-1 (HO-1) in combating NSAIDs -induced gastropathy. Further I had explored the role of HO-1 in preventing mitochondrial oxidative stress mediated inflammation in gastric mucosa upon treatment with various gastro-damaging factors like different NSAIDs, ethanol and even cold restraint stress. I had also conducted extensive mechanistic studies on the gastroprotective action of small molecule antioxidant like gallic acid and mitochondrially targeted novel molecule, SEGA (tryptamine-gallic acid hybrid).

Other Projects:

I have also assisted my colleagues working on signaling pathways behind malaria-induced liver damage, identification and molecular characterization of an Alba-family protein from human malaria parasite *Plasmodium falciparum*, functional analysis of macrophage migration inhibitory factor of *Plasmodium falciparum*.

My works are published in peer reviewed journals including **Nucleic Acids Research: 2012; Journal of Biological Chemistry: 2008, 2009, 2011, 2012; Journal of Pineal Research: 2009; Free Radical Biology and Medicine: 2013, 2010**

- **Post-doctoral research experience in LMU, Munich**

The NSM neuroblast (NSMnb) of *C. elegans* divides asymmetrically to give rise to two cells with different sizes and fates, the NSM and the NSM sister cell (NSMsc). The NSM is larger and destined to differentiate into a serotonergic neuron while the NSMsc is smaller and programmed to die. However, the molecular mechanisms that couple asymmetric cell division and apoptosis are not well understood. CED-3 is essential for almost all programmed cell deaths in *C. elegans* development. However, it is not clearly known yet, whether the caspase CED-3 can have any additional roles apart from its protease function. We had investigated and found that *ced-3* plays a role in setting up the cell division machinery of the NSMnb, and subsequently controls the apoptosis of the NSMsc (**Published in *Nature Communications*, 2015).** Moreover, I also investigated the segregation pattern of cellular components such as mitochondria which has not been analyzed previously during the asymmetric NSMnb division.

- **Post-doctoral Research in the University of Chicago, Chicago, USA**

I investigated the role of Sirtuins in preventing pulmonary fibrosis in both animal and cell culture models. Human fibroblast cells were treated with TGFβ-1 to induce fibrosis. Mice, wild type as well as sirtuin knock-outs and transgenics, were subjected to bleomycin for the development of lung fibrosis (**Published in *American Journal of Physiology - Lung Cellular and Molecular Physiology*, 2016**). Moreover, I was also exploring the role of sirtuins (SIRT6, and SIRT3) in maintaining proper cardiac function in different cardiac dysfunction-models.

I had already participated in two other projects which investigated how lysine-acetylation regulates GSK3β activity, and thereby control the development of cardiac fibrosis (**Published in *Molecular and Cellular Biology*, 2015**) and how mitochondrial sirtuin (Sirt3) protects the heart from toxicity of doxorubicin by preventing the drug-induced mitochondrial DNA (mtDNA) damage via maintaining the expression of OGG1, a major DNA glycosylase which hydrolyzes oxidized-guanine (8-Oxo-dG) to guanine (**Published in *American Journal of Physiology - Heart and Circulatory Physiology*, 2016**). Besides, I had also published one review article in ***Trends in Endocrinology and Metabolism (2016)***.

COMPLETE LIST OF PUBLICATIONS AND PATENTS

Publications with peer review process

- ***During Postdoctoral Research from University of Chicago***

  - **Review Article**

Role of sirtuins in regulating pathophysiology of the heart. Samik Bindu, Vinodkumar Pillai, and Mahesh P Gupta. **Trends in Endocrinology and Metabolism. 2016 Aug;27(8):563-73. Epub 2016 May 19. [Impact factor: 8.964] ISSN: 1043-2760**

  - **Research Article**

1. **SIRT3 blocks myofibroblast differentiation and pulmonary fibrosis by preventing mitochondrial DNA damage.** Samik Bindu, Vinodkumar B Pillai, Abhinav Kanwal, Sadhana Samant, Gokhan Mutlu, Eric Verdin, Nickolai O. Dulin, Mahesh P Gupta. ***American Journal of Physiology - Lung Cellular and Molecular Physiology***, **2016 November 4, DOI: 10.1152/ajplung.00188.2016 [Impact Factor: 4.721], Print ISSN: 1040-0605; Online ISSN: 1522-1504**

2. **SIRT3 blocks aging-associated tissue fibrosis in mice by deacetylating and activating glycogen synthase kinase 3β**. Nagalingam Sundaresan*****, Samik Bindu*, Vinodkumar Pillai, Sadhana Samant, Yong Pan, Jing-Yi Huang, Madhu Gupta, Raghu Nagalingam, Donald Wolfgeher, Eric Verdin, and Mahesh Gupta. ***Molecular and Cellular Biology***, **2015 Dec 14;36(5):678-92**
   [Impact Factor: 4.427], Print ISSN: 0270-7306; Online ISSN: 1098-5549
   *** These authors contributed equally**

3. **Sirt3 protects mitochondrial DNA damage and blocks the development of doxorubicin-induced cardiomyopathy in mice.** Vinodkumar Pillai, Samik Bindu, Willard Sharp, Yong Fang, Gene Kim, Madhu Gupta, Sadhana Samant, and Mahesh Gupta. ***American Journal of Physiology - Heart and Circulatory Physiology***. **2016 Apr**

15;310(8):H962-72. [Impact Factor: 3.324], Print ISSN: 0363-6135 Online ISSN: 1522-1539

- ***During Postdoctoral Research, from LMU, Munich, Germany***

Engulfment pathways promote programmed cell death by enhancing the unequal segregation of apoptotic potential. Sayantan Chakraborty, Eric J Lambie, **Samik Bindu,** Tamara Mikeladze-Dvali and Barbara Conradt. ***Nature Communications*, 2015 Dec 10;6:10126. [Impact Factor: 11.329], ISSN (online): 2041- 1723**

- ***During Doctoral Research, CSIR-IICB, Kolkata***

1. **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. Samik Bindu**, Chinmay Pal, Sumanta Dey, Manish Goyal, Athar Alam, Mohd. Shameel Iqbal, Shubam Dutta, Souvik Sarkar, Rahul Kumar, Pallab Maity and Uday Bandyopadhyay (**2011**) **Journal of Biological Chemistry**, 286(45):39387-402. **[Impact Factor: 4.258], Print ISSN 0021-9258; Online ISSN 1083-351X**

2. **Non-steroidal anti-inflammatory drug induces proinflammatory damage in gastric mucosa through NF-κB activation and neutrophil infiltration: Antiinflammatory role of heme oxygenase-1 against non-steroidal anti-inflammatory drug. Samik Bindu**, Somnath Mazumder, Sumanta Dey, Chinmay Pal, Manish Goyal, Athar Alam, Mohd. Shameel Iqbal, Souvik Sarkar, Asim Azhar Siddiqui, Chinmoy Banerjee and Uday Bandyopadhyay (**2013**) **Free Radical Biology & Medicine**, 65:456-467. **[Impact Factor: 5.784], ISSN: 0891-5849**

3. **Gallic acid prevents nonsteroidal anti-inflammatory drug-induced gastropathy in rat by blocking oxidative stress and apoptosis.** Chinmay Pal*, **Samik Bindu***, Sumanta Dey, Athar Alam, Manish Goyal, Mohd. Shameel Iqbal, Pallab Maity, Susanta S. Adhikari, Uday Bandyopadhyay (**2010**) **Free Radical Biology & Medicine**, 49: 258-267. **[Impact Factor: 5.784], ISSN: 0891-5849**
   *** Both the authors have equally contributed**

4. **Tryptamine-gallic acid hybrid prevents non-steroidal anti-inflammatory drug-induced gastropathy: correction of mitochondrial dysfunction and inhibition of apoptosis in gastric mucosal cells.** Chinmay Pal, **Samik Bindu**, Sumanta Dey, Athar Alam, Manish Goyal, Mohd. Shameel Iqbal, Souvik Sarkar, Rahul Kumar, Kamal Krishna Halder, Mita Chatterjee Debnath, Susanta Adhikari & Uday Bandyopadhyay (**2012**) **Journal of Biological Chemistry**, 287(5): 3495-509. **[Impact Factor: 4.258]**
   [**Highlighted in Zee News, Yahoo News, India Gazette, CSIR World press, Mizo News, Health India, Sify News, WSN, Pluz Media, AALA Times on August 29, 2012], Print ISSN 0021-9258; Online ISSN 1083-351X**

5. **Lansoprazole protects and heals gastric mucosa from non-steroidal anti-inflammatory drug (NSAID)-induced gastropathy by inhibiting mitochondrial as well as Fas-mediated death pathways with concurrent induction of mucosal cell renewal.** Pallab Maity, **Samik Bindu**, Vinay Choubey, Athar Alam, Kalyan Mitra, Manish Goyal, Sumanta Dey, Mithu Guha, Chinmay Pal, and Uday Bandyopadhyay (**2008**). **Journal of Biological Chemistry**, 283(21): 14391–14401. **[Impact Factor: 4.258], Print ISSN 0021-9258; Online ISSN 1083-351X**

6. **Melatonin reduces indomethacin-induced gastric mucosal cell apoptosis by preventing mitochondrial oxidative stress and the activation of mitochondrial pathway of apoptosis.** Pallab Maity, **Samik Bindu**, Sumanta Dey, Manish Goyal, Athar Alam, Chinmay Pal, Russel Reiter and Uday Bandyopadhyay (**2009**) **Journal of Pineal Research**, 46:314–323. **[Impact Factor: 9.314], Online ISSN 1600-079X**

7. **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.** PallabMaity, **Samik Bindu**, Sumanta Dey, Manish Goyal , Athar Alam , Chinmay Pal, Kalyan Mitra, and Uday Bandyopadhyay (**2009**) **Journal of Biological Chemistry**, 284: 5, 3058–3068. **[Impact Factor: 4.258], Print ISSN 0021-9258; Online ISSN 1083-351X**

8. **Impact of intravascular hemolysis in malaria on liver dysfunction: involment of hepatic free heme overload, NF-κB activation and neutrophil infiltration.** Sumanta Dey, **Samik Bindu**, Manish Goyal, Chinmay Pal, Athar Alam, Mohd. Shameel Iqbal, Rahul Kumar, Souvik Sarkar and Uday Bandyopadhyay (**2012**) **Journal of Biological Chemistry**, 287 (32): 26630-26646. **[Impact Factor: 4.258], Print ISSN 0021-9258; Online ISSN 1083-351X**

9. **Malarial infection develops mitochondrial pathology and mitochondrial oxidative stress to promote hepatocyte apoptosis.** Sumanta Dey, Mithu Guha, Athar Alam, Manish Goyal, **Samik Bindu**, Chinmay Pal, Pallab Maity, Kalyan Mitra and Uday Bandyopadhyay (**2009**) **Free Radical Biology & Medicine**, 46 (2): 271–281. **[Impact Factor: 5.784], ISSN: 0891-5849**

10. **Identification and molecular characterization of an Alba-family protein from human malaria parasite Plasmodium falciparum.** Manish Goyal, Athar Alam, Mohd Shameel Iqbal, Sumanta Dey, **Samik Bindu,** Chinmay Pal, Anindyajit Banerjee, Saikat Chakrabarti and Uday Bandyopadhyay (**2012**) **Nucleic Acids Research**, 40 (3):1174-90. **[Impact Factor: 9.202], Online ISSN 1362-4962 - Print ISSN 0305-1048**

11. **Cysteine-3 and cysteine-4 are essential for the thioredoxin-like oxidoreductase and antioxidant activities of Plasmodium falciparum macrophage migration inhibitory factor.** Athar Alam, Manish Goyal, Mohd. Shameel Iqbal, **Samik Bindu**, Sumanta Dey, Chinmay Pal, Pallab Maity, Nahren Manuel Mascarenhas, Nanda Ghoshal, Uday Bandyopadhyay. (**2011**) **Free Radical Biology & Medicine**, 50: 1659–1668. **[Impact Factor: 5.784], ISSN: 0891-5849**

12. **Synthesis and bio-evaluation of human macrophage migration inhibitory factor inhibitor to develop anti-inflammatory agent.** Athar Alam, Chinmay Pal, Manish Goyal, Milan Kumar Kundu, Rahul Kumar, Mohd. Shameel Iqbal, Sumanta Dey, **Samik Bindu**, Souvik Sarkar, Uttam Pal, Nakul C. Maiti, Susanta Sekhar Adhikari and Uday Bandyopadhyay (**2011**) **Bioorganic & Medicinal Chemistry**, 19(24):7365-73. **[Impact Factor: 2.923], ISSN: 0968-0896**

13. **Novel antimalarial drug targets: hope for new antimalarial drugs.** Athar Alam, Manish Goyal, Mohd. Shameel Iqbal, Chinmay Pal, Sumanta Dey, **Samik Bindu,** Pallab Maity and Uday Bandyopadhyay (**2009**) **Expert Review of Clinical Pharmacology**, **2(5): 469–489. [Impact Factor: 2.488], ISSN: 17512433, 17512441**

14. **Novel anti-inflammatory activity of epoxyazadiradione against macrophage migration inhibitory factor: inhibition of tautomerase and proinflammatory activities of macrophage migration inhibitory factor.** Athar Alam, Saikat Haldar, Hirekodathakallu V. Thulasiram, Rahul Kumar, Manish Goyal, Mohd Shameel Iqbal,

Chinmay Pal, Sumanta Dey, **Samik Bindu**, Souvik Sarkar, Uttam Pal, Nakul C. Maiti and Uday Bandyopadhyay (**2012**) **Journal of Biological Chemistry**, 287:(29): 24844–61. **[Impact Factor: 4.258], Print ISSN 0021-9258; Online ISSN 1083-351X**

15. **Aryl aryl methyl thio arenes prevent multidrug-resistant malaria in mouse by promoting oxidative stress in parasites** Manish Goyal, Priyanka Singh, Athar Alam, Sajal Kumar Das, Mohd Shameel Iqbal, Sumanta Dey, **Samik Bindu**, Chinmay Pal, Sanjit Kumar Das, Gautam Panda and Uday Bandyopadhyay (**2012**) **Free Radical Biology & Medicine**, 53(1):129-142. **[Impact Factor: 5.784], ISSN: 0891-5849**

16. **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, M. Shameel Iqbal, Chinmoy Banerjee, Souvik Sarkar, Rudranil De, Manish Goyal, **Samik Bindu** and Uday Bandyopadhyay (**2014**) **Infection and Immunity,** 82(8):3113. DOI: 10.1128/IAI.01598-14. **[Impact Factor: 3.603], Print ISSN: 0019-9567 Online ISSN: 1098-5522**

- **Book chapter**

Uday Bandyopadhyay & **Samik Bindu**, Beneficial effect of neem on human health, Chapter VII, 187-218, In **Phytochemicals and human health :Pharmacological and molecular aspects: A Tribute to Late Professor Bimal Kumar Bachhawat (Food Science and Technology).** Edited by Akhlaq A. Farooqui and Tahira Farooqui, Nova science publishers, Inc., **2011**. N.Y, U.S.A.

- **Patents**

1. Uday Bandyopadhyay, Chinmay Pal, **Samik Bindu**, Susanta Adhikari, Patent "Tryptamine derivatives, their preparation and their use in gastropathy". P**atent US 8901317 B2, Date: Dec-2, 2014.**

2. Tryptamine derivatives, their preparation and their use in gastropathy, Uday Bandyopadhyay, Chinmay Pal, **Samik Bindu**, Susanta Adhikari, **EUROPEAN PATENT SPECIFICATION, EP 2616439 B1,** Date of publication and mention of the grant of the patent**: 16.12.2015 Bulletin 2015/51**

3. **Japanese Patent,** Uday Bandyopadhyay, Chinmay Pal, **Samik Bindu**, Susanta Adhikari, **PATENT SPECIFICATION, JP 5868980, Date: 15/01/2016**

- **Poster/ Short Article presented in International Conference:**

SIRT3 prevents bleomycin induced lung fibrosis in mice by blocking mitochondrial DNA damage and ROS synthesis. Samik Bindu, Vinodkumar Pillai, Sadhana Samant, Nickolai Dulin and Mahesh P Gupta**. Experimental Biology, EB2016,** April 2-6, at the San Diego Convention Center, 111 W Harbor Dr, San Diego, CA 92101

Sirtuins as negative regulators of cardiac fibrosis. Sadhana Samant, **Samik Bindu**, Prabhakar Ghorpade, Vinodkumar Pillai and Mahesh Gupta (**2015**) The FASEB Journal, vol. 29 no.1 supplement 674.5, **[Impact Factor: 5.299], ISSN: 1530-6860**

- **Abstract in International Conference:**

Neem Bark Extract Offers Antiulcer/ Gastroprotective Effect through the Inhibition of Apoptosis and Stimulation of Gastric Epithelial Cell Renewal. Uday Bandyopadhyay and **Samik Bindu**; World Neem Conference, **2012**

- **Full work presented in International Conference:**

Neem bark extract prevents non steroidal anti-inflammatory drug-induced gastric ulcer by inhibiting gastric mucosal apoptosis and favouring cell renewal. Uday Bandyopadhyay, **Samik Bindu**, Kalyan Mitra and Pallab Maity; World Neem Conference, **2012**