

Dr. Soumya Basu



Designation: **Associate Professor,**
Dr. D.Y. Patil Biotechnology & Bioinformatics Institute,
Dr. D.Y. Patil Vidyapeeth, Pune

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EDUCATIONAL QUALIFICATIONS:

- Ph.D. in Life Sciences (2012) –Jadavpur University, Kolkata
- Advanced Diploma in Medical Writing and Regulatory Affairs- Syncorp Educational Institution, Bangalore
- M.Sc. in Microbiology (2003) – Kalyani University
- B.Sc. (Hons.) in Physics (2001) - University of Burdwan
- Higher Secondary in Science (1998) - W.B. Board of Secondary Education

POSTDOCTORAL TRAINING:

- **Research Associate**, Dept. of Biotechnology, Govt. of India, Tata Memorial Centre - ACTREC, Navi Mumbai (2013-2014)

EMPLOYMENT EXPERIENCE:

- **Associate Professor**, Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, Dr. D Y Patil Vidyapeeth, Tathawade, Pune (2020-Till Date)
- **Assistant Professor**, Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, Dr. D Y Patil Vidyapeeth, Tathawade, Pune (2014-2020)
- **Research Associate (Dept of Biotechnology, Govt. of India)**, Molecular Functional Imaging Laboratory, Advanced Centre for Treatment Research and Education in Cancer, Tata Memorial Center, Kharghar, Navi Mumbai (2013-2014)
- **Senior Research Fellow (ICMR)**, Dept. of In-vitro Carcinogenesis & Cellular chemotherapy, Chittaranjan National Cancer Institute, Kolkata (2008-2011)
- **Project Assistant (UGC)**, Dept. of Pharmacy, Jadavpur University, Kolkata (2006-2008)
- **Project Assistant**, Dept. of Biophysics, Molecular Biology & Genetics, University of Calcutta, Kolkata (2005)
- **Lecturer (Microbiology)**, Kulti College, University of Burdwan (2003-2004)

FIELD OF SPECIALIZATION:

Drug Design and Development/ Preclinical Research/ Cancer Biology/Cell and Molecular Biology/Animal Tissue Culture / Artificial Intelligence and Machine Learning

Specific Areas of Research Interest:

- Design and development of natural product analogs targeting PPAR pathway in Lung Carcinoma
- Study of small molecules targeting Exosomal-miRNA as possible cancer therapeutics
- Non coding RNAs as possible cancer drug targets
- Networking and pathway analysis for different cancer types

AWARDS/HONOURS/MEMBERSHIP OF VARIOUS ACADEMIC BODIES:

Awards/Achievements:

- DST SERB Early Career Research Award (2017-2020)
- Department of Biotechnology (DBT), Govt. of India, Research Associateship, 2012
- GATE, 2004
- NET (LS), 2003
- National Merit Scholarship, 1996

Fellowships:

- Department of Biotechnology (DBT), Govt. of India, Research Associateship, 2012-14
- ICMR Senior Research Fellowship, 2008 – 11
- UGC project assistantship, 2006 - 08

Membership in Scientific Societies:

- Life member “The Cytometry Society”-India.
- Life member “All India Cell Biology Society”- India.

ACADEMIC ACTIVITIES:

Teaching & Research Experience:

1. **Lecturer, Kulti College**, University of Burdwan (1.3 years)
2. **Project Assistant**, Dept. of Biophysics, Molecular Biology & Genetics, University of Calcutta, Kolkata (1year)
3. **Project Assistant** (UGC), Dept. of Pharmacy, Jadavpur University, Kolkata (2 years)
4. **Senior Research Fellow, PhD** (ICMR), Dept. of In-vitro Carcinogenesis & Cellular chemotherapy, Chittaranjan National Cancer Institute, Kolkata (>3years)
5. **Research Associate (Dept of Biotechnology, Govt. of India)**, Molecular Functional Imaging Laboratory, Advanced Centre for Treatment Research and Education in Cancer, Tata Memorial Center, Kharghar, Navi Mumbai (1.6 years)
6. **Assistant Professor**, Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, Dr. D Y Patil Vidyapeeth, Tathawade, Pune (5.6 years)
7. **Associate Professor**, Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, Dr. D Y Patil Vidyapeeth, Tathawade, Pune (>10 months)
8. **Recognized Ph.D. Research Guide** in Biotechnology at Dr. D.Y Patil Vidyapeeth, Pune (> 2 years)
9. **Paper-setter and/or Examiner (B. Tech., M. Tech., M.Sc.)** for Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, University of Burdwan

No. of Ph.D., Postdoctoral, B. Tech, M. Tech. /M.Sc. students Guided:

1. Ph. D. : 2 (in process)
2. Postdoctoral : Nil
3. M.Sc, M.Tech and B. Tech: 12+ 1 (Other Universities)

No. of Funded/Non-Funded (as Fellow) Research Projects Completed and in Hand:

(A) Projects awarded as Principal Investigator by DST SERB Early Career Research Award:

1. Design, synthesis and evaluation of novel structural analogs of natural products as a selective modulator of PPAR pathway for lung cancer therapy (Amount sanctioned: Rs. 48.5 lakhs, 2017-2020)

(B) Projects awarded as Principal Investigator by DPU:

1. Deciphering Mechanism of Anticancer Activity of Plumbagin on Oral Carcinoma cell line
(Amount sanctioned: 5 lakhs, (2015-2017).
2. Evaluation of chemopreventive/anti-cancer activity of Lactic Acid Bacteria on Colon Carcinoma
(Amount sanctioned: 20 lakhs, 2015-2017).

(C) Projects Handled (as Fellow):

1. Department of Biotechnology-Research Associate: “Genetic sensor for monitoring in vivo dynamics of caspase-3 activation” at ACTREC, Kharghar, Navi Mumbai.
2. Indian Council for Medical Research- Senior Research Fellow, Project (PhD Thesis): “Reactive Oxygen Species mediated Targeted Therapy in Drug-Resistant Cancer” at Chittaranjan National Cancer Institute, Kolkata.
3. UGC-Project Fellow: ‘Synthesis, biological evaluation and quantitative structure activity relationship (QSAR) study of glutamine analogs as possible antitumor agents” at Department of Pharmaceutical Technology, Jadavpur University
4. Project Fellow (Voluntary): “Study of amino acid networking within proteins”, Dept. of Biophysics, Molecular Biology & Genetics, University of Calcutta
5. M. Sc. Dissertation Project: “Study of genotoxicity using different physical agents by SOS chromotest” at Biophysics Division, Saha Institute of Nuclear Physics (SINP), Kolkata.

Anonymous Reviewer:

International Journals:

- PLOS ONE
- Advances in Vaccines and Vaccination Research

In Charge/Member in Different Internal Committees (Administrative/Research /Academic Committees:

- Extracurricular extension and sports committee-Chairman
- National Service Scheme-Program Coordinator
- Committee for monitoring Research Activities of the Institute (CMRAI)-Member
- Internal Quality Assurance Cell (IQAC)-Member
- Student Welfare Committee-Member
- Timetable committee and annual calendar of events-Member
- Store & Purchase Committee-Member
- Anti-ragging Committee-Member
- Grievance Redressal Committee-Member
- Committee for Annual All-rounder Students Award-Member
- National Board of Accreditation (NBA) Committee-Member

RESEARCH PAPERS IN PEER REVIEWED JOURNALS:

(a) Publications (Original Paper):

1. Kaur J, Chikate T, Bandyopadhyay P, **Basu S**, Chikate R, Cu(II) complexes of hydrazones–NSAID conjugates: synthesis, characterization and anticancer activity, Journal of Coordination Chemistry, 10.1080/00958972.2020.1843160, (1-17),

(2020)

2. Lokhande K B, Ballav S, Yadav R S, Swamy K V, **Basu S**, Probing intermolecular interactions and binding stability of kaempferol, quercetin and resveratrol derivatives with PPAR- γ : docking, molecular dynamics and MM/GBSA approach to reveal potent PPAR- γ agonist against cancer, *Journal of Biomolecular Structure and Dynamics*, (1-11), (2020)
3. Lokhande, K.B., Ballav, S., Thosar, N. Swamy K V, **Basu S**. Exploring conformational changes of PPAR- γ complexed with novel kaempferol, quercetin, and resveratrol derivatives to understand binding mode assessment: a small-molecule checkmate to cancer therapy. *J Mol Model* 26, 242 (2020).
4. Banerjee P, Roy C, Gepreel M, Ranjan A, **Basu S**, Bhattacharyya S; Probing nano-scale phase separation at atomic resolution within β -type Ti - Mn alloy; a potential candidate for biomedical implants. *ACS Biomater. Sci. Eng.* 2019, 5, 10: 5005-5014. (Impact factor: 4.5)
5. Sangeeta Ballav, Kiran Bharat Lokhande, Ipshita Dabhi, Sonal Inje, Amit Ranjan, K. Venkateswara Swamy, **Soumya Basu**; Designing novel quercetin derivatives as MMP9 inhibitors in colon carcinoma, an in vitro and in silico approach; *Journal of dental research and Review Journal of Dental Research and Review* 7 (5), 30
6. Tarun Jha, **Basu Soumya**, Amit Kumar Halder, Nilanjan Adhikari, Soma Samanta; Possible Anticancer Agents: Synthesis, Pharmacological Activity and Molecular Modeling Studies on some 5-N-Substituted-2-N-(Substituted Benzenesulphonyl)-L(+)-Glutamines; *Medicinal Chemistry Research*, 2017; 26: 1437–1458.
7. Banerjee K*; **Basu S***; Das S; Sinha A; Biswas M; Choudhuri SK. Induction of intrinsic and extrinsic apoptosis through oxidative stress in drug resistant cancer by a newly synthesized Schiff base copper chelate; *Free Radic Res.* 2016; 50(4):426-46 “*”Co Author.
8. **Basu S**, Ganguly A, Chakraborty P, Sen R, Banerjee K, Chatterjee M, Efferth T, Choudhuri SK. Targeting the mitochondrial pathway to induce apoptosis/necrosis through ROS by a newly developed Schiff's base to overcome MDR in cancer; *Biochimie.* 2012 Jan; 94(1):166-83.
9. Ganguly A, Chakraborty P, Banerjee K, Chatterjee S, **Basu S**, Sarkar A, Chatterjee M, Choudhuri SK. Iron N-(2-hydroxy acetophenone) glycinate (FeNG), a non-toxic glutathione depletor circumvents doxorubicin resistance in Ehrlich ascites carcinoma cells in vivo; *Biometals.* 2012 Feb; 25(1):149-63.
10. Ganguly A, **Basu S**, Banerjee K, Chakraborty P, Sarkar A, Chatterjee M, Choudhuri SK. Redox active copper chelate overcomes multidrug resistance in T-lymphoblastic leukemia cell by triggering apoptosis; *Mol Biosyst.* 2011 May; 7(5):1701-12.
11. Ganguly A, **Basu S**, Chakraborty P, Chatterjee S, Sarkar A et al. Targeting mitochondrial cell death pathway to overcome drug resistance with a newly developed iron chelate; *PLoS ONE* 2010, 5:e11253.
12. **Basu S**, Majumder S, Chatterjee S, Ganguly A, Efferth T, Choudhuri S K. Detection and characterization of a Glutathione conjugate of a novel copper complex; *In vivo*, 2009, 29: 401-408.
13. Chattopadhyay B, **Basu S**, Chakraborty P, Choudhuri S K, Mukherjee A K, Mukherjee M. Synthesis, spectroscopic characterization, X-ray powder structure analysis, DFT study and in vitro anticancer activity of N-(2-methoxyphenyl)-3-methoxysalicylaldimine; *J Mol Structure*, 2009, 932:90–96.
14. **Basu S**, Chattopadhyay B, Ganguly A, Chakraborty P, Roy Chowdhury P, Samanta S, Mukherjee M, Mukherjee A K, Choudhuri S K. Synthesis, X-ray powder structure analysis and biological properties of a mononuclear Cu(II) complex of N-2-hydroxyhippuric acid; *Appl Organometal Chem* 2009, 23: 527–534.
15. Jha T, Samanta S, **Basu S**, Halder AK, Adhikari N, Maiti M K (2009) QSAR study on some orally active Uracil derivatives as human gonadotropin-releasing-hormone receptor antagonists; *Internet Electron. J Mol Des* 7 (11), 234–250.
16. Alam M, Samanta S, Halder A K, **Basu S**, Jha T. QSAR modelling of KATP-p β channel opener R/S-3,4-dihydro-2,2-dimethyl-6-halo-4-(substituted phenylaminocarbonyl- amino)-2H-1-benzopyrans using MLR-FA techniques. *Euro J Med*

Chem. 2009. 44: 359-364.

17. Samanta S, Alam M, **Basu S**, Majhi T, Roy D K, Jha T. Chemoimmunotherapeutic approach to Prolong Survival Time in Combination with Immunization and Glutamic acid Derivatives with Antitumor Activity in Tumor-Bearing Mice; *Biol Pharm Bull.* 2007. 30(12): 2334-233.
18. Panda P, Samanta S, Alam M, **Basu S**, Jha T. QSAR for Analogs of 1,5-N,N'- Disubstituted-2-(substitutedbenzenesulphonyl) Glutamamides as Antitumor Agent; *Internet Electron J Mol Des.* 2007. 6(9): 280-301.
19. Alam M, Samanta S, Halder A K, **Basu S**, Jha T. Structural finding of R/S-3,4-dihydro-2,2-dimethyl-6-halo-4-(substituted phenylaminocarbonyl- amino)-2H-1-benzopyrans as selective pancreatic beta cells KATP-p β channel opener; *Can J Chem.* 2007. 85(12):1053-1063.

(b) Manuscripts under communication:

1. Molecular dynamic simulations reveal the structural determinants of Plumbagin and its derivatives to CXCR4 in cancer therapy; Kiran Bharat Lokhande, Bhagyesh Shingwekara, Sangeeta Ballav, K. Venkateswara Swamy, Soumya Basu
2. Interaction of Kaempferol, Resveratrol, Quercetin and their derivatives with Peroxisome proliferator-activated receptors- γ (PPAR- α) as a therapeutic target in cancer: Structure based Molecular docking and Molecular Dynamic studies; Kiran Bharat Lokhande, Sangeeta Ballav, Rohit Singh Yadav, K. Venkateswara Swamy, Soumya Basu.
3. A redox-active, glutathione-depleter Schiff's base reverses doxorubicin resistance in vitro and in vivo. Soumya Basu, Kaushik Banerjee, Soumitra Kumar Choudhuri.

(c) Manuscripts under preparation:

4. Modulation of EMT-immune response axis by newly developed Quercetin derivaive in Lung carcinoma; Sangeeta Ballav, Kiran Bharat Lokhande, Amit Ranjan, Mrinalini Bhosale, Subhash Padhye, Ramesh Bhonde, K. Venkateswara Swami, Soumya Basu*.
5. Redox active copper chelate increases antioxidant enzymes activity in vital organs in Erlich Ascite Carcinoma mice model. Soumya Basu, Soumitra Choudhuri.

(d) Proceedings Publication:

1. Choudhuri SK, Chatterjee S, Ganguly A, **Basu S**, Chakraborty P, Biswas J. Overcoming multidrug resistance (mdr) through oxidative stress- A novel approach. *International Symposium on Prognostic and Predictive Factors in Cancer Management.* 2008 Dec: 36-37.

(e) Book Chapter:

1. Use of BRET for measuring protein-protein interactions. Shalini Dimri, Soumya Basu, Abhijit De., *Methods Mol Biol.* 2016;1443:57-78., Humana Press, Clifton, N.J., USA, (Impact factor: 10.71).

(f) Posters presented:

1. Sangeeta Ballav, Amol Dilip Jadav, Nishant Vyas , Kiran Bharat Lokhande, Amit Ranjan , K. Venkateswara Swami, Mrinalini Bhosale, Subhash Padhye, **Soumya Basu**. Impact of PPAR- γ ligand on TGF- β 1-induced epithelial-mesenchymal transition in A549 cells. 39th Annual Conference of Indian Association for Cancer Research on "Leading the fight against cancer". Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram. 2020 February.

2. Sangeeta Ballav, Kiran Lokhande, Nachiket Tosar, Nishant Lodha, K. Venkateswara Swamy, **Soumya Basu**. *In silico* studies of Kaempferol, Quercetin, Resveratrol and their derivatives with PPAR- γ as a therapeutic target in cancer. XLII All India Cell Biology Conference and 2nd International Conference on “Trends in Cell and Molecular Biology”. BITS Pilani, KK Birla Goa Campus, Goa. 2018 December.
3. Lokhande K, Ballav S, Yadav R S, Ranjan A, Swamy K V, **Basu S**. Studies of Kaempferol, Quercetin, Resveratrol and their derivatives with PPAR- γ as a therapeutic target in cancer: An in silico Approach. Indo-Australia Symposium on “Epithelial- Mesenchymal Transition”. Oct 2018.
4. Banerjee K, Ganguly A, **Basu S** and Choudhuri S K. P-Glycoprotein Mediated Collateral Sensitivity to Overcome Multidrug Resistance in Cancer through a Newly Synthesized Platinum Complex. 30th Annual Convention of Indian Association for Cancer Research and International Symposium on “Signaling Network and Cancer”. 2011 February.
5. Banerjee K, Ganguly A, **Basu S**, Choudhuri S K. P-Glycoprotein (ABCB1) Mediated Collateral Sensitivity to a newly synthesized Platinum complex overcomes multidrug resistance in cancer. UGC-Sponsored National Level Seminar on “Microbiology: Development and Challenges in Basic and Applied Research. April 2011.
6. **Basu S**, Ganguly A, Banerjee K, Choudhuri S K. Reactive oxygen species mediated induction of apoptosis by a copper complex overcomes drug resistance. 29th Annual Convention of Indian Association for Cancer Research and Symposium on Biology of Cancer Stem Cells. 2010 Feb: p88.
7. **Basu S**, Samanta S, Jha T. Synthesis of some 5-*N*-substituted-2 (substituted benzenesulphonyl) glutamines as potential anticancer agents. National Symposium on 21st Century Research in Biochemistry and Biophysics, 2007, p 112.
8. **Basu S**, Kundu S. Network Properties of Amino Acids within Protein Structures: A Comparative Study. National Symposium on Molecules, Interactions and Design, A Biophysical Perspective, Indian Biophysical Society, 2006 Jan, p 113.

(g) Conferences/Workshops attended:

1. Science-Academies'-IN-YAS "Science Leadership Workshop", June 22-June 28, 2020
2. Workshop on Social Entrepreneurship, Swachhta & Rural Engagement for Higher Educational Institutions in Association with Mahatma Gandhi National Council of Rural Education on 9/19/2020.
3. Delegate, Eligibility to introduce and teach the bioethics curriculum. 3T-IBHSC Bioethics Training Program at Dr. D. Y. Patil Vidyapeeth, Pune.2018 December.
4. Delegate, Workshop on Health Science Education Technology. 2018 July.
5. Delegate, National Symposium on “Recent Advances in Modern Biology and Biotechnology”. Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, Pune. March 2017.
6. Delegate, Conference on “ERP training for Academic Module”. Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, Pune. 2017 January.
7. Delegate, Conference on “International Workshop on Application of Flow Cytometry for Health Care Professionals”. Central Research Facility, Dr. D. Y. Patil Medical College, Hospital & Research Centre, Pimpri. 2016 March.
8. Delegate, Workshop on “Faculty Development”. Dr. D. Y. Patil Vidyapeeth’s University Centre for Professional Educational & Faculty Development (UCPE& FD). 2014 October.

INVITED TALK

Soumya Basu. (2020). Invited talk on “Cellular Immunotherapy: CAR-T Cell Therapy” at “**National Biotechnology Summit**” organized by Govt. of India and Jax Foundation.