Dr. Uma Siddhanta

Department: Biotechnology

Email ID: usiddhanta@sxccal.edu
usiddhanta@gmail.com

Phone: +91-33-22551275

Designation: Assistant Professor

Qualification: M.Sc., Ph.D.

Thesis Title: Active-site mapping of UDPglucose 4-epimerase from *Escherichia coli*.
Thesis work carried out under the guidance of late Prof. Amar Nath Bhaduri, at Indian Institute of Chemical Biology (CSIR), Kolkata. Degree awarded in 1994 by Jadavpur University

Post-doctoral research experience:

1995–1996: Department of Immunology, Cleveland Clinic Foundation, Ohio, USA

1997-2005: Department of Molecular Pharmacology, Department of Medicine & Department of Developmental and Molecular Biology, Albert Einstein College of Medicine, New York, USA

Publications & Abstracts *(from Ph.D. and post-doctoral work)***:**

Publications:

1. Identification of a biochemical link between energy intake and energy expenditure. Silvana Obici, Jiali Wang, Rahena Chowdury, Zhaohui Feng, **Uma Siddhanta**, Kimyata Morgan and Luciano
Rossetti **(2002) J. Clin. Invest**. 109(12), 1599.

2. An Arginine Residue is Essential for Stretching and Binding of the Substrate on UDP-Glucose 4-Epimerase from *Escherichia coli*: Use of a Stacked and Quenched Uridine Nucleotide Fluorophore
as Probe. **Uma Bhattacharyya**, Gautam Dhar and Amar Bhaduri **(1999) J.Biol.Chem.** 274 (21), 14573.

3. Distinct Roles for the p110a and hVPS34 Phosphatidylinositol 3´-kinase in Vesicular Trafficking, Regulation of the Actin Cytoskeleton, and Mitogenesis. **Uma Siddhanta**, James McIlory, Amishi Shah, Yitao Zhang and Jonathan M. Backer **(1998) J.Cell Biol.** 143 (6), 1647.

4. Domain swaping in inducible Nitric Oxide Synthase: Electron transfer occurs between flavin and heme groups located on adjacent subunits in the dimer. **Uma Siddhanta**, Anthony Presta, Baochen Fan, Dennis Wolan, Dennis L. Rousseau and Dennis J. Stuehr **(1998) J.Biol.Chem.** 273(30), 18950.

5. Comparative functioning of dihydro- and tetrahydropterins in supporting electron transfer, catalysis, and subunit dimerization in inducible Nitric Oxide Synthase. Anthony Presta, **Uma Siddhanta**, Chaoqun Wu, Nicolas Sennequier, Liuxin Huang, Husam M.Abu-Soud, Serpil Erzurum and Dennis J. Stuehr **(1998), Biochemistry 37**, 298.

6. Heme iron reduction and catalysis by a Nitric Oxide Synthase heterodimer containing one reductase and two oxygenase domains. **Uma Siddhanta**, Chaoqun Wu, Husam M.Abu-Soud, Jingli Zhang, Dipak K.Ghosh and Dennis J.Stuehr **(1996) J.Biol.Chem.** 271 (13), 7309.

Abstracts:
1. Heme iron reduction and catalysis by a Nitric Oxide Synthase heterodimer containing one reductase and two oxygenase domains. Uma Siddhanta and Dennis J. Stuehr (1996); in the Annual Meeting of American Society for Biochemistry and Molecular Biology, New Orleans,LA, USA

2. Functional asymmetry of the two potential active sites of Escherichia coli UDP-gluose 4-epimerase: Chemical modification of arginine residues. Amar Bhaduri and Uma Bhattacharyya (1994); in the XVI International Congress of Biochemistry and Molecular Biology, New Delhi, India

Workshop & Symposium Attended:

'Bioinformatics in Genomic and Proteomic', offered by the Indian Institute of Technology, Kharagpur, September 22 – 23, 2006.

'Life Science at Cross Road', Refresher Course in Life Science, organized by UGC Academic Staff College and Department of Botany, University of Calcutta, February 1-20, 2010.

Research Projects Undertaken:

1. 'Multiple drug resistance' is threatening the future continual use of antibiotics. Attempts to fix this problem will definitely include search for new antibiotics and modification of the existing or the newly discovered antibiotics. But these will turn out to be a temporary fix until and unless more is learned about antibiotic resistance – its origins and evolution. Soil-dwelling actinomycetes are probably the most relevant class of microorganisms to expand our knowledge on soil resistome. Most clinically relevant antibiotics originate from them. Consequently they, as a group, possess a myriad of antibiotics evasion strategies. My research interest is directed at sampling the soil antibiotic resistome - an under-recognized reservoir for resistance genes that has already emerged or has the potential to emerge in clinically important bacteria. The study could provide an early warning system for future clinically relevant antibiotic resistance mechanisms and serve as a foundation for new antibiotic development.

Concluded projects:

1) Minor research project from UGC [PSW-052/08-09 (ERO)]
Title: Search for Novel Antibiotic Resistance Gene(s) from Soil-dwelling Actinomycetes.

2) Minor research project UGC [PSW-45/12-13 (ERO)]
Title: Identification and Characterization of Actinomycetes Isolated from Soil and Exhibiting Intriguing Antibiotic Resistance Profiles.

2. In order to establish infection, intracellular bacteria like *Mycobacterium tuberculosis*, or parasites like *Leishmania donovani,* prevents fusion of phagosome with lysosome within the macrophage cells of its mammalian host. Logically it becomes relevant to understand the mechanism of the phagolysosomal fusion step and how these infectious agents successfully avert this. Thus the focus area of current research is to shed some light in the complex signaling events involved in the phagolysosomal fusion process taking *Leishmania donovani* as a prototype of intracellular parasites.

Concluded projects:

Major research project from DBT-WB [234 /Bt (Estt)/RD 12/2015]
Title: Elucidation of the Role of Differentially Phosphorylated Dok-3 (Downstream of Kinase 3) in the Biogenesis of Phagolysosome in *Leishmania donovani* Infected Macrophages.

Modules taught in the 'Five Year Integrated M.Sc. Course in Biotechnology', St. Xavier's College, Kolkata:

- Biochemistry
- Enzymology
- Bioenergetics & Metabolism
- Molecular Biology
- Cell Signaling
- Immunology
- Virology