Professor Pradip K Chakraborti

Dr. Pradip Kumar Chakraborti
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Specialization :
Molecular Biology/ Biochemistry/ Biotechnology

Sub area: Drug target identification, mycobacterial signaling pathway

Education :
B.Sc. Hons. 1974; M.Sc. 1976; Ph.D. 1982 (Visva-Bharati, Santiniketan, India)

Teaching Subjects

a) Molecular Biology
b) Essential of Genetic Engineering
c) Biotechnology and Human Health
d) Expression of Genetic information
e) Ethical aspects of Biotechnology

Awards and honors

- Visiting Associate in the Fogarty International Programme, NIH, Bethesda, USA.
- National Biosciences Award for Career Development (Department of Biotechnology, Govt. of India, New Delhi).
- JC Bose National Fellowship (Department of Science & Technology, Govt. of India, New Delhi).
- Member, Guha Research Conference, India.
- Fellow, National Academy of Sciences, Allahabad, India.
- Fellow, Indian Academy of Sciences, Bangalore, India.
- Fellow, Indian National Science Academy, New Delhi, India.

Professional affiliations

- Life member, Society of Biological Chemists, India.
- Member, American Society of Biochemistry and Molecular Biology, USA.
- Member, American Society for Microbiology, USA.

Recent Selected Publications

1) Involvement of an efflux system in mediating high level of fluoroquinolone resistance in *Mycobacterium smegmatis*; **Biochem Biophys Res Commun (1996)** 226: 362 – 368;
2) Modular structure of glucocorticoid receptor domains is not equivalent to functional independence. Stability and activity of the steroid binding domain are controlled by sequences in separate domains. **J Biol Chem**. (1996) 271: 21430-21438;
3) Identification of an ABC transporter gene that exhibits m-RNA level overexpression in fluoroquinolone resistant *Mycobacterium smegmatis.* **FEBS Letters (1998)** 425: 151 – 156;
4) Mechanism of drug resistance: a novel role of phosphate specific transporter. Book Chapter: In 'Drug resistance: mechanism and management' (Singhal RL and Sood OP eds.) pp. 22 – 25. Communicore (Ranbaxy Science Foundation (1998);
5) Activation of rat androgen receptor by androgenic ligands is unaffected by anti-androgens in *Saccharomyces cerevisiae*. **Gene** (1998) 209: 247 – 254.
6) Role of ABC importer in mycobacterial drug resistance. **Bioscience Reports** (1999) 19: 293-300
7) Synergistic activation of yeast expressed rat androgen receptor by modulators of protein kinase A **J. Mol.Biol** (1999) 286: 669 – 681
8) Involvement of a natural transport system in the process of efflux mediated drug resistance in *Mycobacterium smegmatis*. **Mol. Gen. Genetics** (2000) 262: 949-956
9) Evidence that phosphate specific transporter is amplified in a fluoroquinolone resistant *Mycobacterium smegmatis* **Eur J Biochem** (FEBS J) (2000) 267: 4028 – 4032
10) B subunit of phosphate specific transporter from *Mycobacterium tuberculosis* is a thermostable ATPase ***J Biol Chem*** (2001) 276, 44590-97.
11) Evidence that a eukaryotic type serine/ threonine protein kinase from *Mycobacteriumtuberculosis* regulates morphological changes associated with cell division. **Eur J Biochem** (FEBS J) (2002) 269: 1078 – 1085.
12) Intrinsic contributions of polar amino acid residues towards thermal stability of an ABC-ATPase of mesophilic origin. **Prot.Sci.** (2003) 12: *2118*–2120.
13) Amino acid residues involved in autophosphorylation and phosphotransfer activities are distinct in nucleoside diphosphate kinase from *Mycobacterium tuberculosis*. ***J Biol Chem***, (2004) 279, 43595-603.
14) Nucleoside diphosphate kinase from Mycobacterium tuberculosis cleaves single strand DNA within the human c-myc promoter in an enzyme-catalyzed reaction **Nucliec Acids Res.** (2005) 33:2707-2714
15) Nucleotide-induced conformational change in the catalytic subunit of the phosphate-specific transporter from *M. tuberculosis*: Implications for the ATPase structure. **Biochim Biophys Acta** (BBA- Proteins and Proteom) (2005) 1750: 112-121.
16) The carboxy-terminal end of the peptide deformylase from *Mycobacterium tuberculosis* is indispensable for its enzymatic activity **Biochem Biophys Res Commun (2005)** 332:418-425.
17) Identification of regions involved in enzymatic stability of peptide deformylase of *Mycobacterium tuberculosis*. **J. Bacteriol (2005)** 187:8216-8220.
18) GTPase activity of mycobacterial FtsZ is impaired due to its trans-phosphorylation by the eukaryotic-type Ser/Thr kinase, PknA. **J Biol Chem (2006)** 281:40107-40113
19) Inter-domain interaction reconstitutes the functionality of PknA, a eukaryotic-type Ser/Thr kinase from *Mycobacterium tuberculosis*. **J Biol Chem (2008)** 283:8023-8033
20) Ability of PknA, a mycobacterial eukaryotic-type serine/threonine kinase to transphosphorylate MurD, a ligase involved in the process of peptidoglycan biosynthesis **Biochem J** (2008) 415: 27-33
21) Three consecutive arginines are important for the mycobacterial peptide deformylase enzyme activity **J Biol Chem (2008)** 283: 23754–23764
22) Evidence for the presence of R250G mutation at the ATPase domain of Topoisomerase II in an arsenite-resistant *L. donovani* that exhibits differential drug inhibition profile. **Int J Antimicrob Agent (2009)** 33:80-85
23) Intermolecular phosphotransfer is crucial for efficient catalytic activity of nucleoside diphosphate kinase. **Biochem J (2010)** 430:539-549
24) Signalling mechanisms in mycobacteria **Tuberculosis** (Edinb) **(2011)** 91:432-440
25) Amino-terminal extension present in the Methionine aminopeptidase type 1c of *Mycobacterium tuberculosis* is indispensible for its activity **BMC Biochemistry (2011)** 12: 35
26) Secretory nucleoside diphosphate kinases from both intra- and extracellular pathogenic bacteria are functionally indistinguishable **Microbiology (2011)** 157: 3024-3035
27) Amino Acids Involved in Polyphosphate Synthesis and Its Mobilization Are Distinct in Polyphosphate Kinase-1 from *Mycobacterium tuberculosis*. **PloS ONE (2011)** 6: e27398

28) Identification of crucial amino acids of bacterial peptide deformylases affecting enzymatic activity in response to oxidative stress. **J Bacteriol (2014)** 196: 90-99
29) Evidence that phosphorylation of threonine in GT motif triggers activation of PknA, a eukaryotic-type Serine/Threonine kinase from *Mycobacterium tuberculosis*. **FEBS J (2015),** 282: 1419-1431.
30) Eukaryotic-type Ser/Thr protein kinase mediated phosphorylation of mycobacterial phosphodiesterase affects its localization to the cell wall. **Front Microbiol (2016),** 7: 123.
31) Phosphorylation Modulates Catalytic Activity of Mycobacterial Sirtuins. **Front Microbiol (2016),** 7: 677.
32) Multi-domain truncated hemoglobins: New members of the globin family exhibiting tandem repeats of globin units and domain fusion. **IUBMB life (2017),** in press.
33) Phosphorylation of mycobacterial phosphodiesterase by eukaryotic-type Ser/Thr kinase controls its two distinct and mutually exclusive functionalities. **J Biol Chem (2017),** 292: 17362-17374. (34)
34) Eukaryotic-type Ser/Thr kinase mediated phosphorylation at Thr-169 perturbs mycobacterial guanylate kinase activity. **Bioscience Reports (2017),** 37: BSR20171048.

Patents: Mycobacterial peptide deformylase. PCT Publication No. WO2008015524; Granted Patent: **India** 254355, **US** 8426580, **US** 8907076, **France** 2046955, **Germany** 2046955, **Australia** 2007280137, **Japan** 5 203366, **China** 101541964, **South Africa** 2009/01273, **Canada** 2658801.

Invited talks: More than 45 seminar/symposia/workshop lectures within India (1997-2017) and abroad (Steroid Hormones Section of LMCB, NIH, Bethesda, USA in June, 1999; GBF, Braunschweig, Germany in the 'Indo-German Workshop on Tuberculosis' as a member of the team of Indian delegation in September, 2000; Dept. of Cell Biology, UMDNJ, Newark, New Jersey, USA in October, 2004; Dept. of Microbiology, Colorado State University, Fort Collins, USA in September, 2008); Division of Infectious Diseases, University of British Columbia, Vancouver, Canada in September, 2008; 8th International Congress of the NDP Kinase/Nm23/awd family – from Basic Science to Clinical Application. University of Heidelberg, Heidelberg, Germany in October, 2010).