Sreemanta Pramanik

Personal Details

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Major Research Areas

- Toxicogenomics
- Environmental Health
- Human Genetics and Genomics
- Molecular Biology
- Biochemistry

Research Interests

- Assessment of health impacts of pollution in populations using biochemical and genomic tools
- Development of biomarkers and gene-based markers for assessing toxicological effects of environmental agents/stressors/toxicants at the molecular level in populations
- Population-based studies to understand genetic susceptibility to environmentally induced disease/phenotype risk

Professional Research Experience

June 17, 2019-Present: Principal Scientist, Kolkata Zonal Center, CSIR-National Environmental Engineering Research Institute, Kolkata, India.

R&D Projects:

- Co-PI (DBT, Delhi, Project No. GAP-1-2381: Risk assessment from multi-metal exposure for the population in arsenic affected areas of West Bengal, India and possible mitigation strategy) (2018-2021)
- Principal Investigator (DBT, Delhi, Project No. GAP-1-2099: Understanding the genetic basis of susceptibility in fluorosis in Indian Populations) (2015-2018)
- Activity Leader (CSIR-800, Project No. RSP-4018: A biomarker study on fluorosis affected individuals in a population) (2015-2016)
- Co-PI (DBT, Delhi, Project No. GAP-1-1878: CO_2 Sequestration from flue gas vis-a-vis carbonate and microalgae mediated biofuel precursor production: Algal Strain and High Performance Photobioreactor System development) (2011-2014)
- Co-Project Leader (MLP-52: Selected persistent organic pollutants in settled dust and assessment of health effects– a pilot project) (2012-2013)
- Team Member (XII 5 Yr Plan Project, Project No. BSC0111: Integrated NextGen approaches in health, disease and environmental toxicity (INDEPTH) (2012-2017)

- Co-Investigator (Indo-Italian CSIR-CNR collaborative project, Project No. P-80102: Structural and functional analysis of positive and detrimental effects of SNPs in miRNA and target proteins involved in xenobiotic metabolism and focal adhesion) (2012-2014)
- Involved in other Consultancy Projects and Training Programs of CSIR-NEERI as Project Leader/Team Leader/Team Member

December 13, 2011-June 16, 2019: Principal Scientist & Head, Kolkata Zonal Laboratory, CSIR-National Environmental Engineering Research Institute, Kolkata, India.

- Managed and coordinated Administrative and R&D and Consultancy activities of the Kolkata Zonal Center of CSIR-NEERI as Scientist & Head from December, 2011 to June, 2019
- Recognized as Ph.D. guide in the Dept. of Biochemistry, University of Calcutta, Kolkata
- Involved in R&D, Consultancy and Court-related Projects and Training Program of CSIR-NEERI as Principal Investigator/Co-PI/Project Leader/Activity Leader/Team Leader/Team Member

Students Guided for Master's Dissertation:

- Ms. Sushmita Ghosal [M.Tech (Biotechnology), School of Biotechnology and Bioinformatics, D. Y. Patil Deemed to be University, Navi Mumbai, 2017-2018]
- Ms. Ishita Debnath [M.Tech (Biotechnology), School of Biotechnology and Bioinformatics, D. Y. Patil Deemed to be University, Navi Mumbai, 2017-2018]

October 7, 2011-December 12, 2011: Principal Scientist, Kolkata Zonal Laboratory, CSIR-National Environmental Engineering Research Institute, Kolkata, India.

March, 2008-March, 2011: CSIR Scientist Fellow (Range IV, under quick hire scheme) Environmental Health Division, National Environmental Engineering Research Institute, Nagpur, India.

- Project Leader (NEERI In-house Project No. OLP-024: A study of single nucleotide polymorphisms in DNA repair genes in VOC/PAH exposed Indian populations)
- Mentored four students for their Masters (M.Sc) Dissertations in NEERI (Mr. Avinash P. Chandanshe, Mr. Shekhar Gitaye, Ms. Sanghamitra Chowdhury and Mr. A. Sathish Kumar)

January, 2007-January, 2008: Postdoctoral Research Scientist, Department of Medicine, Columbia University, New York, US.

- Supervisors: Dr. Jane H. Morse & Dr. Wendy K. Chung
- Project: The identification of genes that cause pulmonary arterial hypertension funded by the National Institutes of Health, US
- Familial pulmonary arterial hypertension (FPAH) is a rare, autosomal-dominant, inherited disorder of the pulmonary vasculature with low penetrance. Mutations in the bone morphogenetic protein receptor, type II gene (BMPR2) have been identified in at least 70% of FPAH patients; however, the lifetime penetrance of these mutations is only 10% to 20%. My work focused on identifying genetic loci that may influence FPAH expression in BMPR2-mutation carriers by performing a genome-wide linkage scan with 500,000 SNPs (using Affymetrix GeneChip microarray) in 15 FPAH families segregating for BMPR2 mutations.
- We observed linkage in four regions including 3q22 and found strong evidence that BMPR2 and the 3q22 locus interact epistatically.

January, 2005-December, 2006: Research Teaching Specialist, Department of Biochemistry, UMDNJ-Robert Wood Johnson Medical School, Piscataway, US.

- Supervisor: Dr. Yuh-Hwa Wang
- Project: The role of fragile sites in generation of RET/PTC rearrangements in human thyroid cells funded by the National Institutes of Health, US
- We provided structural and biochemical evidence that RET, CCDC6 and NCOA4 genes participating in two major types of RET/PTC rearrangements, are located in common fragile sites FRA10C and FRA10G and undergo DNA breakage after exposure to fragile site-inducing chemicals. Also, exposure of human thyroid cells to these chemicals results in the formation of cancer-specific RET/PTC rearrangements.

April, 2000-December, 2004: Postdoctoral Fellow/Research Teaching Specialist, Department of Molecular Genetics, Microbiology and Immunology/The Cancer Institute of New Jersey, UMDNJ-Robert Wood Johnson Medical School, New Brunswick, US.

- Supervisor: Dr. Honghua Li
- Project: Gene organization in the V_H region of the human immunoglobulin gene complex funded by the National Institutes of Health, US
- Research focused on understanding the extent of genetic variability in the human immunoglobulin V_H region starting from single sperm samples of different donors.
- Successfully applied multiplex PCR technique to simultaneously amplify and detect 32 marker sequences from single sperm samples of nine different donors and in the process, precisely identify and locate an indel (spanning ~35-46-kb and affecting three V_H gene segments, 2-10P, 3-9 and 1-8) in the human immunoglobulin V_H region. A region of ~200-kb near the 3'end of the V_H region was covered in the study.
- For a detailed study of this region, a large number of unique DNA sequence tags (n=132) evenly distributed with an average spacing of 5-kb over the whole V_H region, were amplified from single sperm samples of six donors by multiplex PCR followed by microarray detection. Five polymorphic regions with multiple tags and one polymorphic region with a single tag were identified in this manner. These types of haplotype structures could be critical for understanding the extent of genetic contribution to antibody diversity as the polymorphic blocks may affect the number and composition of gene segments.
- Designing primer and probe sequences by using public databases and bioinformatics tools
- Preparation and presentation of research work for group meetings and conferences
- Review of relevant literature pertaining to research and writing manuscripts and grant applications

1998-2000: Research Associate, Crystallography & Molecular Biology Division, Saha Institute of Nuclear Physics, Calcutta, India.

- Supervisor: Prof. Nitai P. Bhattacharyya
- Project: Genome Diversity in Indian Populations-investigations through biotechnological tools in Eastern Indian Populations, funded by the Department of Biotechnology, Government of India
- Studied Y-chromosomal DNA polymorphisms using eight markers (two biallelic and six microsatellite) from DNA samples of individuals belonging to ten ethnic groups inhabiting the eastern and northern regions of India. The haplotype distribution among the groups showed that different ethnic groups harbor nearly disjoint sets of haplotypes indicating virtually no male gene flow among ethnic groups.
- Also, studied CAG and adjacent CCG repeat distributions in the huntingtin gene in Huntington's disease (HD) patients and normal individuals belonging to different ethnic groups of India. Identified six CCG alleles from a total of 380 normal chromosomes that were pooled across

different ethnic populations of India, $(CCG)_7$ and $(CCG)_{10}$ being the predominant of them. No statistically significant preponderance of expanded HD alleles was found on either $(CCG)_7$ or $(CCG)_{10}$ backgrounds.
- Review of literature pertaining to research and writing manuscripts for publications

1997-1998: Research Associate, Department of Microbiology & Cell biology, Indian Institute of Science, Bangalore, India.

- Supervisor: Prof. G. Lakshmi Sita
- Project: Agrobacterium mediated genetic transformation in Capsicum funded by Monsanto (United States)

Technical Skills

- Microarray (starting from immobilization of probes on glass surfaces to hybridization of probes with PCR products, washing, labeling by single base extension on solid phase using two color fluorescent dye labeled ddNTP system, detection of signal on microarray by scanning, analyzing microarray images and microarray data using software etc)
- Affymetrix GeneChip Microarray, Human Mapping 500K Array Set (Experienced in carrying out all the experimental steps in the process including handling of Affymetrix GeneChip Fluidics Station 450 and Affymetrix GeneChip Scanner 3000)
- Polymerase Chain Reaction (PCR), Nested PCR, Multiplex PCR
- Single Sperm Typing using a high throughput multiplex genotyping system combining the techniques of Multiplex PCR and Microarray
- MLPA (Multiplex Ligation-dependent Probe Amplification) to detect deletions/duplications of one or more exons of the genes
- Breaksite Batch Mapping to accurately identify breaksites in a defined region of genomic DNA through Ligation-mediated PCR (LM-PCR) and Sequencing
- Laser Microdissection
- Flow Cytometry
- Chromatin Immunoprecipitation
- Gel Electrophoresis (Agarose, Polyacrymide, Denaturing Urea-Polyacrylamide)
- Isolation of genomic DNA from blood, tissue culture cells
- Purification of DNA fragments from PCR and other enzymatic reactions, Cloning of PCR products of genomic DNA, DNA Ligation, Transformation, Miniprep Plasmid Isolation, Midiprep Plasmid Isolation, Extraction and Purification of DNA fragments from Agarose gels, Restriction Digestion, DNA Sequencing, Isolation of Biotinylated DNA fragments through Streptavidin coupled Dynabeads using Magnetic Particle Concentrator, and all routine techniques of Molecular Biology
- Southern Hybridization, Radiolabeling of Probes for Hybridization, Autoradiography
- Human cell culture and associated techniques including metaphase chromosome preparation
- Plant tissue culture and associated techniques and Agrobacterium-mediated genetic transformation in plants

Education and Research Achievements

1992-1997: Ph.D. in Biophysics, Molecular Biology & Genetics, University of Calcutta, Calcutta, India

- Supervisor: Dr. Sarmistha Sen Raychaudhuri
- Dissertation Title: Cytochemical, Cytological and Biochemical Studies on *Plantago ovata* Forssk in tissue culture under normal and gamma irradiated conditions.

- Regenerated the whole plant from hypocotyl explants of *Plantago ovata*, an economically important medicinal plant, through callus culture.
- For the very first time, the plant species clonally propagated by *in vitro* shoot tip multiplication.
- Studied changes in esterase and superoxide dismutase isozyme patterns in relation to plant regeneration from callus culture of *P. ovata*.
- Studied the effects of gamma rays on plant regeneration, shoot tip multiplication and esterase (which is known to change in the course of plant development) and superoxide dismutase (whose activity is enhanced or induced by stresses in plants) isozyme systems following seed and seedling irradiation of *P. ovata* with a view to establish a relationship between phenotypic alterations and isozyme expression induced by gamma rays *in vitro*.

1989-1991: M.Sc (Biochemistry), University of Calcutta, Calcutta, India

1985-1988: B.Sc (Chemistry Honours), University of Calcutta, Calcutta, India

International Meetings/Conferences/Workshops Attended

- The American Society of Human Genetics, 50th Annual Meeting, Philadelphia, US, October 2000.
- Annual Research Day of University of Medicine & Dentistry of New Jersey-Robert Wood Johnson Medical School, New Brunswick, US, March 2001, Poster Presentation.
- Annual Retreat on Cancer Research in New Jersey, Princeton, US, April 2001, Poster Presentation.
- Annual Research Day of University of Medicine & Dentistry of New Jersey-Robert Wood Johnson Medical School, New Brunswick, US, March 2002, Poster Presentation.
- Annual Retreat on Cancer Research in New Jersey, Princeton, US, April 2002, Poster Presentation.
- Departmental Retreat organized by Department of Molecular Genetics, Microbiology & Immunology, UMDNJ-Robert Wood Johnson Medical School, New Brunswick, US, August 2002, Oral Presentation.
- The American Society of Human Genetics, 52nd Annual Meeting, Baltimore, US, October 2002, Poster Presentation.
- DIMACS Short Course: A Field Guide to GenBank and NCBI Molecular Biology Resources, Rutgers University, Piscataway, US, March 2005.
- Fourth Workshop on Genetic Epidemiological Methods for Dissection of Complex Human Traits, jointly organized by TCG-ISI Centre for Population Genomics, Kolkata, India & University of Pittsburgh, Pittsburgh, USA at Kolkata, India, February 23-28, 2009.
- International Conference on Molecular Tools in Environmental Toxicology organized by NEERI, Nagpur at Nagpur, India, September 23-24, 2009, Poster Presentation.

Invited Talks

- October, 2004: Department of Molecular Genetics, Albert Einstein College of Medicine, Bronx, NY, US
- December, 2004: Department of Biochemistry, University of Texas Health Science Center, San Antonio, TX, US
- May, 2006: Centre for Human Genetics, Bangalore, India
- May, 2006: Amrita Institute of Medical Sciences, Kochi, India
- June, 2006: National Environmental Engineering Research Institute, Nagpur, India

Membership in Professional Bodies

- Life Member, Environmental Mutagenesis Society of India

Awards/Honors

- Biographical Profile selected for inclusion in Marquis Who's Who in Science and Engineering, 2016-2017 (12th Edition)
- Biographical Profile selected for inclusion in Marquis Who's Who in the World, 2014 (31st Edition)
- Biographical Sketch selected for inclusion in Marquis Who's Who in the World, 2013 (30th Pearl Anniversary Edition)
- National Institutes of Health, USA, Postdoctoral Fellowship: April, 2000-January, 2008
- Research Achievement Award for contributions to Research Day of University of Medicine & Dentistry of New Jersey-Robert Wood Johnson Medical School, New Brunswick, US, March 30, 2001
- Qualified GATE' 1992 (National level entrance test for selection of M.Tech and Ph.D students by the Ministry of Education, Government of India) with more than 80 percentile score

Computer Skills

- Operating Systems: Microsoft Windows 2000 Professional, Microsoft Windows XP Home, Microsoft Windows XP professional, Windows 8, Windows 10, DOS
- Development Tools: Microsoft Office 2000, Microsoft Office 2003, Microsoft Office 2007
- Bioinformatics Tools: NCBI Blast, Vector NTI, Axon GenePix, Leica Laser Microdissection LMD, GeneMachines OmniGrid Accent Microarrayer, Affymetrix GeneChip Operting Software (GCOS), Affymetrix GeneChip Genotyping Analysis Software (GTYPE), Lilab Software to check interactions between primers, probes for Multiplex PCR, Adobe Photoshop, EndNote.

Publications

- Subhamoy Bhowmick, **Sreemanta Pramanik**, Payel Singh, Priyanka Mondal, Debashis Chatterjee, Jerome Nriagu. Arsenic in groundwater of West Bengal, India: A review of human health risks and assessment of possible intervention options. *Science of The Total Environment*. 2018, **612**: 148-169.
- **Sreemanta Pramanik***, Depanwita Saha. The genetic influence in fluorosis. *Environmental Toxicology and Pharmacology* December 2017, 56: 157-162 (Published Online September 15, 2017) (*Corresponding Author)
- **Pramanik S***, Surendran ST, Arumugam S, Devi S, Krishnamurthi K, Chakrabarti T. Polymorphisms in DNA repair and multidrug resistance genes among Sindhis of Central India. *Environmental Toxicology and Pharmacology* September 2015, **40**(2): 480-485. (*Corresponding Author)
- **Pramanik S***, Surendran ST, Devi S, Krishnamurthi K, Chakrabarti T. Frequency and genotype distribution of ABCB1 gene polymorphisms among Maharashtrian population of Central India. *Xenobiotica* June 2014, **44**(6): 579-582. (*Corresponding Author)
- Rinella ES, Shao Y, Yackowski L, **Pramanik S**, Oratz R, Schnabel F, et al. Genetic variants associated with breast cancer risk for Ashkenazi Jewish women with strong family histories but no identifiable BRCA1/2 mutation. *Human Genetics* May 2013, **132**(5): 523-536.
- **Pramanik S**, Cui X, Wang H-Y, Chimge NO, Hu G, Shen L, Gao R, Li H. Segmental duplication as one of the driving forces underlying the diversity of the human immunoglobulin heavy chain variable gene region. *BMC Genomics* December 2011, **12**: 78 (Article accessed more than 2700 times at Biomed Central).
- **Pramanik S***, Devi SS, Chowdhary S, Surendran ST, Krishnamurthi K, Chakrabarti T. DNA Repair Gene Polymorphisms at XRCC1, XRCC3, XPD, and OGG1 Loci in Maharashtrian Population of Central India. *Chemosphere* February 2011, **82**(7): 941-946. (*Corresponding Author)

- Vinayagamoorthy N, Krishnamurthi K, Devi SS, Naoghare PK, Biswas R, Biswas AR, **Pramanik S**, Shende AR, Chakrabarti T. Genetic polymorphism of CYP2D6*2C→T2850, GSTM1, NQO1 genes and their correlation with biomarkers in manganese miners of Central India. *Chemosphere* November 2010, **81**(10): 1286-1291.
- Gandhi M, Dillon LW, **Pramanik S**, Nikiforov YE, Wang YH. DNA breaks at fragile sites generate oncogenic RET/PTC rearrangements in human thyroid cells. *Oncogene* April 2010, **29**(15): 2272-2280.
- Rodriguez-Murillo L*, Subaran R*, Stewart WCL*, **Pramanik S***, Marathe S, Barst RJ, Chung WK, Greenberg DA. Novel loci interacting epistatically with bone morphogenetic protein receptor 2 cause familial pulmonary arterial hypertension. *The Journal of Heart and Lung Transplantation* February 2010, **29**(2): 174-180 (*Contributed equally to this work).
- Chimge NO, **Pramanik S**, Hu G, Lin Y, Gao R, Shen L, Li H. Determination of gene organization in the human IGHV region on single chromosomes. *Genes and Immunity* May 2005, **6**(3): 186-193.
- Li H, Cui X, **Pramanik S**, Chimge NO. Genetic diversity of the human immunoglobulin heavy chain V_H region. *Immunological Reviews* December 2002, **190**: 53-68.
- **Pramanik S**, Li H. Direct detection of insertion/deletion polymorphisms in an autosomal region by analyzing high-density markers in individual spermatozoa. *American Journal of Human Genetics* December 2002, **71**(6): 1342-1352.
- **Pramanik S**, Basu P, Gangopadhaya PK, Sinha KK, Jha DK, Sinha S, Das SK, Maity BK, Mukherjee SC, Roychoudhuri S, Majumder PP, Bhattacharyya NP. Analysis of CAG and CCG repeats in Huntingtin gene among HD patients and normal populations of India. *European Journal of Human Genetics* September 2000, **8**(9): 678-682.
- Bhattacharyya NP, Basu P, Das M, **Pramanik S**, Banerjee R, Roy B, Roychoudhury S, Majumder PP. Negligible male gene flow across ethnic boundaries in India, revealed by analysis of Y-chromosomal DNA polymorphisms. *Genome Research* August 1999, **9**(8): 711-719.
- **Pramanik S**, Sen Raychaudhuri S. DNA content, chromosome composition and isozyme patterns in *Plantago* L. *The Botanical Review* April-June 1997, **63**(2): 124-139.
- **Pramanik S**, Sen Raychaudhuri S, Chakraborty S. Changes in esterase and superoxide dismutase isozymes during *in vitro* morphogenesis in *Plantago ovata* Forssk. *Plant Cell, Tissue and Organ Culture* 1996; **44**: 123-127.
- Sah NK, **Pramanik S**, Sen Raychaudhuri S. Peroxidase changes in barley induced by ionizing and thermal radiation. *International Journal of Radiation Biology* 1996 January; **69**(1): 107-111.
- **Pramanik S**, Chakraborty S, Sen Raychaudhuri S. *In vitro* clonal propagation and characterization of clonal regenerants of *Plantago ovata* Forssk by isozyme analysis. *Cytobios* 1995; **82**: 123-130.
- **Pramanik S**, Chakraborty S, Sen Raychaudhuri S. Nuclear DNA content and chromosomal variation in relation to callus growth during *in vitro* regeneration in *Plantago ovata*. *Cytobios* 1994; **80**: 101-108.

Book Chapters

- Li H, Cui X, Greenawalt DM, Hu G, Chimge NO, **Pramanik S**, Luo M, Wang H-Y, Tereshchenko IV, Azaro MA, Lin Y, Yang Q, Li JY, Chu Y, Lin Z, Gao R, Shen L, Decoste CJ, and Shih WJ. Microarray Analysis of a Large Number of Single Nucleotide Polymorphisms in Individual Human Spermatozoa. *In: The Genetics of Male Infertility* D. T. Carrell (ed.), Totowa, New Jersey: Humana Press Inc., 2006: 55-76.

Dr. Sreemanta Pramanik
Principal Scientist
September 20, 2019

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