Dr. Ronita Nag Chaudhuri

Assistant Professor

Post-Graduate Department of Biotechnology

St. Xavier's College, Kolkata.

INDIA

Year of joining: 2010

Ph.D in Molecular Biology, Biophysics and Genetics: Department of Biochemistry, University of Calcutta (2005).

Post-Doctoral training: School of Molecular Biosciences, Washington State University, USA (2005-2009)

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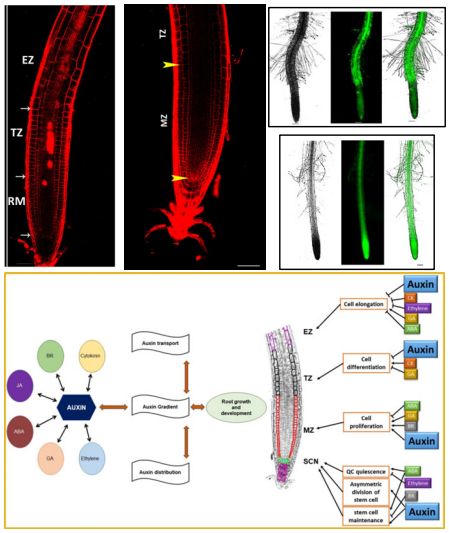
Specialization: Molecular and Cell Biology

Teaching in the Department: Plant Physiology and Biochemistry, Epigenetics and chromatin regulation, Molecular Biology, Recombinant DNA Technology, DNA damage and Repair Mechanisms, Post-transcriptional Gene Regulation.

Research interest:

- ***Investigating genetic and epigenetic regulatory mechanisms involved in developmental and environmental signaling***

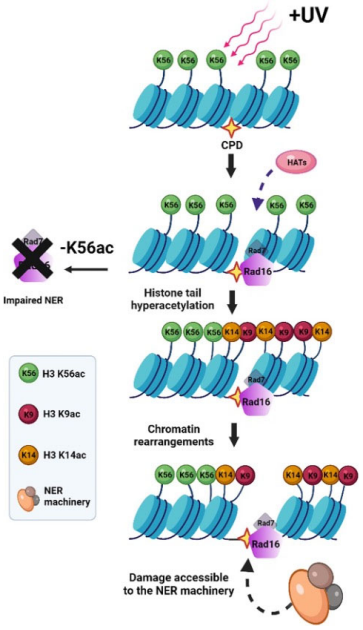


Cell signalling during modulation of Root System Architecture

Plants being sessile organisms counteract the plethora of unfavorable environmental conditions through a sophisticated repertoire of stress response mechanisms. Central to such stress signalingpathway is reprogramming of gene expression. Regulation of gene expression in response to an environmental cue or associated developmental changes is functionally controlled by transcription factors. Ability of the transcription factors to control gene expression is again dependent on chromatin regulation that may render a genomic landscape conducive or non- conducive for transcription. ***Our lab works towards***

understanding the interplay of transcription factors and hormonal crosstalk during reprogramming of gene expression in response to stress signals and developmental cues **(Bedi et al., 2016, 2018; Sengupta et al.,2020; Sengupta and Nag Chaudhuri, 2020; Mandal et al., 2022; Mandal et al., 2024; Datta et al., 2024**).

- ***Epigenetic regulation during DNA damage response and gene expression***



Genome of all living organisms faces constant assault from various endogenous and exogenous DNA damaging agents. The DNA damage repair mechanisms play a crucial role in prevention ofboth spontaneous and environmentally induced damages at the molecular level. Defects in DNA damage repair in mammalian cells may lead to increased cancer frequency, neurological abnormalities as well as growth and developmental defects, among others. Organization of DNA into nucleosomes and the higher order chromatin architecture affects regulation of nuclear functions, like DNA damage repair, transcription, etc. The dynamic nature of chromatin plays an important role in modulating the access of these regulatory factors to the genetic template and maintenance of genomic stability. DNA damage repair pathway is no exception to this general rule. Regulated chromatin accessibility during start of the process followed by restoration of the chromatin structure at the end of the process is the underlying key for successful removal of DNA lesions. ***Our lab works towards understanding the role of chromatin modifications and remodeling during DNA damage response and transcription regulation through analyses of histone structural mutants*** **(Ray et al., 2018, 2020; Khan and Nag Chaudhuri, 2022; Khan et al., 2023)**

Publications:

From Research work at St. Xavier's College, Kolkata

- ***ABI3 regulates ABI1 function to control cell length in primary root elongation zone.*** Saptarshi Datta, Drishti Mandal, Sicon Mitra, Swarnavo Chakraborty and Ronita Nag Chaudhuri*.
  The Plant Journal (2024) DOI: 10.1111/tpj.17121.
- ***ABSCISIC ACID INSENSITIVE 3 promotes auxin signaling by regulating SHY2 expression to control primary root growth in response to dehydration stress.***
  Drishti Mandal, Saptarshi Datta, Sicon Mitra and Ronita Nag Chaudhuri*.
  Journal of Experimental Botany (2024) doi: 10.1093/jxb/erae237

- ***RNA Polymerase II dependent crosstalk between H4K16 deacetylation and H3K56 acetylation promotes transcription of constitutively expressed gene.***
  Preeti Khan, Priyabrata Singha and Ronita Nag Chaudhuri*.
  Molecular and Cellular Biology (2023) doi: 10.1080/10985549.2023.2270912

- ***RAV1 mediates cytokinin signalling for regulating primary root growth in Arabidopsis.***
  Drishti Mandal, Saptarshi Datta, Giridhar Raveendar, Pranab Kumar Mondal and Ronita Nag Chaudhuri*. **The Plant Journal (2022)** doi: **10.1111/tpj.16039.** THE ARTICLE WAS A "FEATURED ARTICLE OFTHE ISSUE".

- ***Acetylation of H3K56 orchestrates UV-responsive chromatin events that generate DNA accessibility during Nucleotide Excision Repair.***
  Preeti Khan and Ronita Nag Chaudhuri*.
  DNA Repair (2022), DOI: https://doi.org/10.1016/j.dnarep.2022.103317

- ***DNA methylation and regulation of gene expression: Guardian of our health.***
  Invited Review as a part of Special Thematic Issue
  Gaurab Aditya Dhar, Shagnik Saha, Parama Mitra and Ronita Nag Chaudhuri*.
  The Nucleus (2021), DOI: 10.1007/s13237-021-00367-y

- ***Deacetylation of H4 lysine16 affects acetylation of lysine residues in histone H3and H4 and promotes transcription of constitutive genes.***
  Anagh Ray, Preeti Khan and Ronita Nag Chaudhuri*.
  Epigenetics (2020), DOI: 10.1080/15592294.2020.1809896

- ***ABI3 plays a role in de-novo root regeneration from Arabidopsis thaliana callus cells.***
  Sourabh Sengupta and Ronita Nag Chaudhuri*.
  Plant Signaling & Behavior (2020)
  DOI:10.1080/15592324.2020.1794147

- ***ABI3 mediated repression of RAV1 gene expression promotes efficient dehydration stress response in Arabidopsis thaliana.***
  Sourabh Sengupta, Anagh Ray, Dristhi Mandal and Ronita Nag Chaudhuri*.
  BBA Gene Regulatory Mechanism (2020), 1863(9):194582
  DOI: 10.1016/j.bbagrm.2020.194582

- ***Regulated acetylation and deacetylation of H4 K16 is essential for efficient NERin Saccharomyces cerevisiae.***
  Anagh Ray, Preeti Khan and Ronita Nag Chaudhuri*.
  DNA Repair (2018), Vol. 72; Pg: 39-55. DOI: 10.1016/j.dnarep.2018.09.009

- ***Transcription factor ABI3 autoactivates its own expression during dehydration stress response.***
  Sonia Bedi and Ronita Nag Chaudhuri*.
  FEBS Letters (2018), Vol. 592 (15); Pg: 2594-2611**.** DOI: 10.1002/1873- 3468.13194
  THE ARTICLE WAS SELECTED AS "FEATURED ARTICLE OFTHE ISSUE".

- ***ABI3 mediates dehydration stress recovery response in Arabidopsis thaliana by regulating expression of downstream genes.***

Sonia Bedi, Sourabh Sengupta, Anagh Ray and Ronita Nag Chaudhuri*.
Plant Science (2016), Vol. 250; Pg: 125-140.
DOI: 10.1016/j.plantsci.2016.06.006

- ***Rad26, the Transcription-Coupled Repair Factor in yeast, is required for removalof stalled RNA Polymerase-II following UV irradiation.***
  Sounak Ghosh-Roy, Dhiman Das, Debarati Chowdhury, Michael J. Smerdon and Ronita Nag Chaudhuri*. **PLOS ONE (2013)**, Vol. 8 (8): e72090.
  DOI:10.1371/journal.pone.0072090

From Post-Doctoral and Ph.D research

- ***A cassette of N-terminal amino acids of histone H2B are required for efficient cell survival, DNA repair and Swi/Snf binding in UV irradiated yeast.***
  Ronita Nag, McKenna Kyriss, John Smerdon John Wyrick and Michael J. Smerdon. **Nucleic Acids Research (2010)** Vol. 38:1450-1460**.**
  DOI: 10.1093/nar/gkp1074

- ***Altering the chromatin landscape for Nucleotide Excision Repair.***
  Ronita Nag and Michael J. Smerdon. **Mutation Research Reviews (2009),** Vol. 682(1):13-20. DOI: 10.1016/j.mrrev.2009.01.002

- ***A single amino acid change in histone H4 enhances UV survival and DNA repair in yeast.*** Ronita Nag, Feng Gong, Deirdre Fahy and Michael J. Smerdon.
  Nucleic Acids Research (2008), Vol. 36 (11): 3857-66. DOI: 10.1093/nar/gkn311

- ***Protein turnover in response to transient exposure to exogenous auxin is necessary for restoring auxin autotrophy in a stressed Arachis hypogea cell culture.***
  Ronita Nag, Manas Kanti Maity, Anindita Seal, Amit Hazra and MaitrayeeDasGupta. **Plant Cell Tissue Organ Culture (2006),** Vol. 84, pg 17-26.

- ***Dual DNA binding property of ABA insensitive 3 like factors targeted to promoters responsive to ABA and auxin.***
  Ronita Nag, Manas Kanti Maity, and Maitrayee DasGupta.
  Plant Molecular Biology (2005), Vol. 59. DOI: 10.1007/s11103-005-1387-z

- ***Exogenous auxin depletion renders an Arachis hypogea suspension culture sensitive to water loss without affecting cell growth.***
  Anindita Seal, Amit Hazra,Ronita Nag, Subho Chaudhuri and Maitrayee DasGupta.
  Plant Cell Reports(2001) Vol 20 pg 567-573.

Extramural Research Grants:

- **ONGOING**

1. **5-year** DBT, India sponsored project entitled **"DBT-BUILDER- St. Xavier's College (Autonomous), Kolkata, Department of Microbiology & Biotechnology - Interdisciplinary Life Science Programme for Advance Research and Education"**. Co-PI and Program leader.
2. **Role of B3 domain transcription factor in regulating root growth during dehydration stress response** under SERB (DST, India) Grant # SPG/2021/002264.
3. **Development and leveraging small-scale fluidic Platform towards understanding the plant root system: A Convergence of Engineering and Biology** under SERB (DST, India) Grant # CRG/2022/000762.

- **COMPLETED**

1. **Investigating the role of histone acetylation during UV-induced Nucleotide Excision Repair** under SERB (DST, India) Grant # CRG/2018/000461.
2. **Investigating the mechanism of RAV1-mediated desiccation stress signaling and significance of ABI3-RAV1 crosstalk** under Department of Biotechnology, Government of West Bengal [569(sanc)/BT-56/2014].
3. **Understanding the mechanism of ABI3 gene regulation during desiccation stress response** under CSIR Grant #38 (1411)/ 15/EMR-II.
4. **Mechanism of ABI3 mediated desiccation tolerance in plants: Genetic and Epigenetic Regulation** under CSIR Grant [38 (1283)/ 11/EMR-II].
5. **Chromatin Regulation during DNA Damage Repair** under SERB -Fast Track Scheme of Department of Science and Technology [SR/FT/LS-145/2009].

LAB MEMBERS:

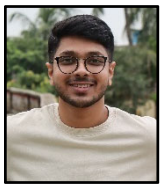
PRESENT:

Drishti Mandal (CSIR Direct SRF)

Project: Cross talk between hormone signaling pathways in modulation of root system architecture.

Saptarshi Datta (CSIR-Net Fellow, SRF)

Project: Genetic and epigenetic regulation of root system architecture and its dynamism in response to abiotic stress signals.



Priyabrata Singha (DBT Project Fellow)

Project: Elucidating the significance of crosstalk between histone methylation and histone acetylation in gene expression regulation.

Sicon Mitra (SERB Project Fellow)

Project: Transgenic approach to improve quality traits for better adaptation to stress conditions

Swarnavo Chakraborty (CSIR-NET Fellow, JRF)

Project: Understanding the overlapping molecular mechanism of lateral root development and nodule organogenesis mediated by B3 domain transcription factors

ALUMNI

Dr. Sonia Bedi:
Genomic Informatics coordinator · Dartmouth Hitchcock Medical Center and Clinics Bellevue, Washington, USA

Dr. Anagh Ray:

Post-Doctoral Fellow, Centre for Cancer Research, National Cancer Institute, NIH, Bethesda, MD, USA

Dr. Sourabh Sengupta

Post-Doctoral Fellow, University of Texas Southwestern Medical Centre, USA.

Dr. Preeti Khan

Post-Doctoral Fellow, University of Texas Southwestern Medical Centre, USA.

Invited Talks/Papers presented in conferences/seminars

International Conferences

- **International Conference on Current Trends and Future Prospects of Plant Biology (CTFPPB), 2023, organized by Department of Plant Sciences, University of Hyderabad, India.** Oral presentation of paper titled "The AP2/ERF family transcription factor RAV1 functions at a crucial nodal point to determine primary root meristem size in Arabidopsis". Drishti Mandal,

Saptarshi Datta and Ronita Nag Chaudhuri. Ms Drishti Mandal won the third best prize for her talk.

- **ASBMB - The Interplay Between Epigenetic Regulation and Genome Stability 2022, Seattle, Washington State, USA.** Oral Presentation of Paper Titled: Acetylation of H3 K56 aids chromatin accessibility during UV-induced Nucleotide Excision Repair in Saccharomyces cerevisiae. Preeti Khan and Ronita Nag Chaudhuri. Ms. Preeti Khan received ASBMB, 2022 travel grant award.

- **Cancer International Webinar 2022, organized by Unite Scientific Explores, USA.** Oral Presentation of Paper Titled: Acetylation of H3 K56 aids chromatin accessibility during UV-induced Nucleotide Excision Repair in Saccharomyces cerevisiae. Preeti Khan and Ronita Nag Chaudhuri.

- **ASPB Plant Biology 2019 meeting, held in San Jose, California, USA.** Presentationtitled "Decoding ABI3 gene regulation and its novel role in dehydration stress and recovery response in *Arabidopsis thaliana"*. Sonia Bedi, Sourabh Sengupta and RonitaNag Chaudhuri; ASPB, 2019 travel grant awardee.

- **INDO-US conference 2018 on "Transcription, Chromatin structure, DNA repair and Genomic instability".** Anagh Ray and Ronita Nag Chaudhuri

- **"Epigenetics and Human Disease", Indo-Japan International Conference (2018), organized by Bose Institute, India.** Invited oral presentation of paper entitled "Loss of regulated acetylation and deacetylation of H4 K16 residue affects chromatin accessibility and DNA damage repair efficiency". Anagh Ray, Preeti Khan and Ronita Nag Chaudhuri

- **International Conference on "Insight to Plant Biology in Modern Era", Bose Institute Centenary Celebration, India (2017).** Presentation of paper entitled "Decoding the genetic and epigenetic regulation of ABI3 in desiccation stress response". Sonia Bedi, Sourabh Sengupta and Ronita Nag Chaudhuri.

- **VISCEA (Vienna International Scientific Conference and Events Association) (2015),** International conference on Plant Abiotic Stress III held in Vienna. Presentationof paper entitled- "ABI3-mediated abiotic stress tolerance in *Arabidopsis thaliana*".Sonia Bedi, Sourabh Sengupta and Ronita Nag Chaudhuri.

- **Keystone Symposia on "Chromatin Mechanisms and Cell Physiology" organized by Keystone in association with German Ministry (2014)**, held in Oberstdorf, Germany. Presentation of paper entitled- "Significance of genetic & epigenetic control in understanding the mechanism of ABI3-mediated desiccation stress response". Sonia Bedi, Anagh Ray, Sourabh Sengupta and Ronita Nag Chaudhuri.

- **Washington State University, Academic Showcase (2008)**, held at Pullman, Washington State, USA. Presentation of paper entitled –"A Single Amino Acid Changein a DNA Packaging Protein Improves Cell Survival and DNA Repair in Yeast." Ronita Nag, John M. Hinz and Michael J. Smerdon.

- **Gordon Research Conference on Mammalian DNA Repair held at Ventura, California, USA (2007).** Presentation of paper entitled - "Nucleotide Excision Repair in SWI/SNF-Independent

(SIN) Histone mutants in *Saccharomyces cerevisiae*." Ronita Nag, Feng Gong, Deirdre Fahy and Michael J. Smerdon.

- **The 37th Annual Meeting of Environmental Mutagenesis Society (EMS) held at Vancouver BC, Canada (2006).** Presentation of paper entitled - "Nucleotide Excision Repair in SWI/SNF-Independent (SIN) Histone mutants in *Saccharomyces cerevisiae*." Ronita Nag, Feng Gong, Deirdre Fahy and Michael J Smerdon.

National Conferences

- **"The world of Microbes: pathogenesis, environment and evolution"- 100 years commemoration, Bose Institute, India (2016).** Presentation of paper entitled "Mutation of histone residue H4 K16 affects dynamism of chromatin structure-function in *Saccharomyces cerevisiae*." Anagh Ray and Ronita Nag Chaudhuri. ***Best Presentation Award- First Prize.***

- **National Conference organized by WAST (West Bengal Academy of Science and Technology), India 2016.** Presentation of paper entitled "Understanding the mechanism of ABI3 regulation during desiccation stress response". Sonia Bedi and Ronita Nag Chaudhuri. ***Best Presentation Award- First Prize.***

- **Interdisciplinary Approach to Biological Sciences, IABS (2015)** organised by Indian Association of Cultivation of Sciences. Presentation of paper entitled- "Role of H4 K16 acetylation status in affecting chromatin structure during Nucleotide Excision Repair." Anagh Ray and Ronita Nag Chaudhuri.

- **National Symposium on Plant Physiology & Biochemistry in Transgenic Era and Beyond, held at Bose Institute, Calcutta (2001).** Invited for oral presentation of paper entitled- "Molecular mechanism of auxin mediated stress tolerance in Arachis hypogea cell suspension culture." Ronita Nag, Anindita Seal, Shubho Chaudhuri and Maitrayee DasGupta.

- **The XXV All India Cell Biology Conference held at the Indian Institute of Science, Bangalore (2001).** Invited for oral presentation of paper entitled- "Molecular analysis of auxin mediated stress tolerance in Arachis hypogea cell suspension culture". Ronita Nag, Anindita Seal, Shubho Chaudhuri and Maitrayee DasGupta.

Awards /Fellowships/Honours

- Fellow of West Bengal Science Academy (FWAST) (Year of Election-2025).
- Received American Society of Plant Biologists (ASPB) Travel Grant Award, 2019.
- Received DST Fast-Track Young Scientist award in 2012.
- Junior & Senior Research Fellowship (2000-2005), CSIR, India.
- University Merit Fellowship for excellent performance in B.Sc examination (1997).
- Associate Editor, International peer-reviewed journal "The Nucleus" - Springer Nature Publication (2021 onwards).