Ashis Kumar Nandi, FNAsc

Professor
School of Life Sciences
Jawaharlal Nehru University
New Delhi -110067, India.
Room no. : 415
Off. Phone : 2670-4152
E-mail : ashis_nandi@mail.jnu.ac.in ashis_nandi@yahoo.com

Ongoing Research Projects

1. **MoE-STAR Project 2023-2026**: miR159 and miR319-regulated architecture and immunity development in plants
2. **CSIR project 2021-2024:** AtOZF1-mediated defense activation in plants
3. **SERB Project 2020-2023:** Revealing the mechanism of LDL2- and PAO5 mediated infection memory development in *Arabidopsis thaliana*

Completed Research Projects

4. **DBT Project 2018-2021:** Mechanism of Infection memory Development in *Arabidopsis thaliana*
5. **UGC Indo-Israel: 2017-2020:** Interconnection between thermal acquired tolerance and systemic acquired resistance in plants.
6. **DBT Project 2017-2020:** Integrated approach to understand Agarwood formation and value addition of Agarwood (*Aqualaria malaccensis*)
7. **UPE-II 2014-2018:** Epigenetic regulation of infection memory development in plants
8. **DBT Project 2015-2017:** Investigation of the interconnecting roles of ZBF1/MYC2 and HY5 in Arabidopsis seedling development and disease resistance
9. **DST Project 2013-2016:** Role of MEDEA, a polycomb repressor of Arabidopsis in pathogenesis.
10. **CSIR Project 2013-2016:** Identification of genes involved in fine tuning of plant defense using cdd1 mutant of *Arabidopsis* as genetic tool.
11. **DBT Project 2011-2014:** Chromatin remodeling for activation of systemic acquired resistance in Arabidopsis.
12. **UGC Project 2011-2014.** Role of ZFD1 a zinc finger domain containing protein from Arabidopsis thaliana in plant disease resistance.

13. **DBT Project 2008-2012:** Functional analysis of rice MYC2 transcription factor family in rice.
14. **DBT Project 2007-2010:** Cloning and characterization of EHY1, a regulatory gene of light signaling from *Arabidopsis thaliana* (as PI of the Collaborating Institute)
15. **DST project 2007-2010**: Role of serpin, a conserved protease inhibitor in regulating rice disease defense response
16. **CSIR project 2006-2009**: Generation of broad-spectrum disease resistant transgenic rice plants through over-expression of Arabidopsis NPR1 gene
17. **DBT Project 2006-2009**: Molecular characterization of a novel Arabidopsis mutant that modulates disease resistance and salicylic acid signaling

Publications

1. Singh, D., Patil, V., Kumar, R., Gautam, J.K., Singh, V., and Nandi, A.K. (2023). RSI1/FLD and its epigenetic target RRTF1 are essential for the retention of infection memory in Arabidopsis thaliana. **Plant J.** 115**,** 662-677; doi: 10.1111/tpj.16252
2. Patil, V., and Nandi, A.K. (2022). POWERDRESS positively regulates systemic acquired resistance in Arabidopsis. **Plant Cell Rep.** 41**,** 2351-2362; doi: 10.1007/s00299-022-02926-2
3. Singh, A., Sharma, A., Singh, N., and Nandi, A.K. (2022). MTO1-RESPONDING DOWN 1 (MRD1) is a transcriptional target of OZF1 for promoting salicylic acid-mediated defense in Arabidopsis. **Plant Cell Rep.** 41**,** 1319-1328; doi: 10.1007/s00299-022-02861-2
4. Singh, N., and Nandi, A.K. (2022). AtOZF1 positively regulates JA signaling and SA-JA cross-talk in Arabidopsis thaliana. **J. Biosci.** 47**,** 8; doi: 10.1007/s12038-021-00243-6
5. Gautam, J.K., Giri, M.K., Singh, D., Chattopadhyay, S., and Nandi, A.K. (2021). MYC2 influences salicylic acid biosynthesis and defense against bacterial pathogens in Arabidopsis thaliana. **Physiol. Plant.** 173**,** 2248-2261; doi: 10.1111/ppl.13575
6. Singh, P., Sharma, A., Nandi, A.K., and Nandi, S.P. (2021). Endophytes from Argemone mexicana and Datura metel activate induced-systemic resistance in multiple hosts and show host- and pathogen-specific protection. **J Plant Biochem. Biotechnol.** 30**,** 1016-1019; doi: 10.1007/s13562-021-00734-5
7. Gupta, P., and Nandi, A.K. (2020). Long-chain base kinase1 promotes salicylic acid-mediated stomatal immunity in Arabidopsis thaliana. **J. Plant Biochem. Biotechnol.** 29**,** 796–803; doi: 10.1007/s13562-020-00608-2
8. Gupta, P., Roy, S., and Nandi, A.K. (2020). MEDEA-interacting protein LONG-CHAIN BASE KINASE 1 promotes pattern-triggered immunity in Arabidopsis thaliana. **Plant Mol. Biol.** 103**,** 173-184; doi: 10.1007/s11103-020-00982-4
9. Kumar, R., Barua, P., Chakraborty, N., and Nandi, A.K. (2020). Systemic acquired resistance specific proteome of Arabidopsis thaliana. **Plant Cell Rep.** 39**,** 1549-1563; doi: 10.1007/s00299-020-02583-3
10. Roy, S., Saxena, S., Sinha, A., and Nandi, A.K. (2020). DORMANCY/AUXIN ASSOCIATED FAMILY PROTEIN 2 of Arabidopsis thaliana is a negative regulator of

local and systemic acquired resistance. **J. Plant Res.** 133**,** 409-417; doi: 10.1007/s10265-020-01183-2

11. Chakraborty, J., Ghosh, P., Sen, S., Nandi, A.K., and Das, S. (2019). CaMPK9 increases the stability of CaWRKY40 transcription factor which triggers defense response in chickpea upon Fusarium oxysporum f. sp. ciceri Race1 infection. **Plant Mol. Biol.** 100**,** 411-431; doi: 10.1007/s11103-019-00868-0
12. Singh, V., Singh, D., Gautam, J.K., and Nandi, A.K. (2019). RSI1/FLD is a positive regulator for defense against necrotrophic pathogens. **Physiol. Mol. Plant Pathol.** 107**,** 40-45; doi: 10.1016/j.pmpp.2019.04.005
13. Banday, Z.Z., and Nandi, A.K. (2018). Arabidopsis thaliana GLUTATHIONE-S-TRANSFERASE THETA 2 interacts with RSI1/FLD to activate systemic acquired resistance. **Mol Plant Pathol** 19**,** 464-475; doi: 10.1111/mpp.12538
14. Gautam, J.K., and Nandi, A.K. (2018). APD1, the unique member of Arabidopsis AP2 family influences systemic acquired resistance and ethylene-jasmonic acid signaling. **Plant Physiol. Biochem.** 133**,** 92-99; doi: 10.1016/j.plaphy.2018.10.026
15. Roy, S., Gupta, P., Rajabhoj, M.P., Maruthachalam, R., and Nandi, A.K. (2018). The Polycomb-Group Repressor MEDEA Attenuates Pathogen Defense. **Plant Physiol.** 177**,** 1728-1742; doi: 10.1104/pp.17.01579
16. Singh, N., Swain, S., Singh, A., and Nandi, A.K. (2018). AtOZF1 Positively Regulates Defense Against Bacterial Pathogens and NPR1-Independent Salicylic Acid Signaling. **Mol Plant Microbe Interact** 31**,** 323-333; doi: 10.1094/MPMI-08-17-0208-R
17. Bhattacharjee, L., Singh, D., Gautam, J.K., and Nandi, A.K. (2017). Arabidopsis thaliana serpins AtSRP4 and AtSRP5 negatively regulate stress-induced cell death and effector-triggered immunity induced by bacterial effector AvrRpt2. **Physiol. Plant.** 159**,** 329-339; doi: 10.1111/ppl.12516
18. Giri, M.K., Gautam, J.K., Rajendra Prasad, V.B., Chattopadhyay, S., and Nandi, A.K. (2017). Rice MYC2 (OsMYC2) modulates light-dependent seedling phenotype, disease defence but not ABA signalling. **J. Biosci.** 42**,** 501-508; doi: 10.1007/s12038-017-9703-8
19. Giri, M.K., Singh, N., Banday, Z.Z., Singh, V., Ram, H., Singh, D., Chattopadhyay, S., and Nandi, A.K. (2017). GBF1 differentially regulates CAT2 and PAD4 transcription to promote pathogen defense in Arabidopsis thaliana. **Plant J.** 91**,** 802-815; doi: 10.1111/tpj.13608
20. Roy, S., and Nandi, A.K. (2017). Arabidopsis thaliana methionine sulfoxide reductase B8 influences stress-induced cell death and effector-triggered immunity. **Plant Mol. Biol.** 93**,** 109-120; doi: 10.1007/s11103-016-0550-z
21. Sardar, A., Nandi, A.K., and Chattopadhyay, D. (2017). CBL-interacting protein kinase 6 negatively regulates immune response to Pseudomonas syringae in Arabidopsis. **J. Exp. Bot.** 68**,** 3573-3584; doi: 10.1093/jxb/erx170
22. Singh, S., Singh, A., and Nandi, A.K. (2016). The rice OsSAG12-2 gene codes for a functional protease that negatively regulates stress-induced cell death. **J. Biosci.** 41**,** 445-453; doi: 10.1007/s12038-016-9626-9
23. Singh, V., Singh, P.K., Siddiqui, A., Singh, S., Banday, Z.Z., and Nandi, A.K. (2016). Over-expression of Arabidopsis thaliana SFD1/GLY1, the gene encoding plastid localized glycerol-3-phosphate dehydrogenase, increases plastidic lipid content in transgenic rice plants. **J. Plant Res.** 129**,** 285-293; doi: 10.1007/s10265-015-0781-0

24. Bhattacharjee, L., Singh, P.K., Singh, S., and Nandi, A.K. (2015). Down-regulation of rice serpin gene OsSRP-LRS exaggerates stress-induced cell death. **J. Plant Biol.** 58**,** 327-332; doi: 10.1007/s12374-015-0283-6
25. Swain, S., Singh, N., and Nandi, A.K. (2015). Identification of plant defence regulators through transcriptional profiling of Arabidopsis thaliana cdd1 mutant. **J. Biosci.** 40**,** 137-146; doi: 10.1007/s12038-014-9498-9
26. Giri, M.K., Swain, S., Gautam, J.K., Singh, S., Singh, N., Bhattacharjee, L., and Nandi, A.K. (2014). The Arabidopsis thaliana At4g13040 gene, a unique member of the AP2/EREBP family, is a positive regulator for salicylic acid accumulation and basal defense against bacterial pathogens. **J. Plant Physiol.** 171**,** 860-867; doi: 10.1016/j.jplph.2013.12.015
27. Singh, V., Banday, Z.Z., and Nandi, A.K. (2014). Exogenous application of histone demethylase inhibitor trans-2-phenylcyclopropylamine mimics FLD loss-of-function phenotype in terms of systemic acquired resistance in Arabidopsis thaliana. **Plant Signal Behav** 9**,** e29658; doi: 10.4161/psb.29658
28. Singh, V., Roy, S., Singh, D., and Nandi, A.K. (2014). Arabidopsis flowering locus D influences systemic-acquired-resistance- induced expression and histone modifications of WRKY genes. **J. Biosci.** 39**,** 119-126; doi: 10.1007/s12038-013-9407-7
29. Singh, S., Giri, M.K., Singh, P.K., Siddiqui, A., and Nandi, A.K. (2013). Down-regulation of OsSAG12-1 results in enhanced senescence and pathogen-induced cell death in transgenic rice plants. **J Biosci** 38**,** 583-592; doi: 10.1007/s12038-013-9334-7
30. Singh, V., Roy, S., Giri, M.K., Chaturvedi, R., Chowdhury, Z., Shah, J., and Nandi, A.K. (2013). Arabidopsis thaliana FLOWERING LOCUS D is required for systemic acquired resistance. **Mol Plant Microbe Interact** 26**,** 1079-1088; doi: 10.1094/MPMI-04-13-0096-R
31. Prasad, B.R., Kumar, S.V., Nandi, A., and Chattopadhyay, S. (2012). Functional interconnections of HY1 with MYC2 and HY5 in Arabidopsis seedling development. **BMC Plant Biol.** 12**,** 37; doi: 10.1186/1471-2229-12-37
32. Prasad, V.B., Gupta, N., Nandi, A., and Chattopadhyay, S. (2012). HY1 genetically interacts with GBF1 and regulates the activity of the Z-box containing promoters in light signaling pathways in Arabidopsis thaliana. **Mech Dev** 129**,** 298-307; doi: 10.1016/j.mod.2012.06.004
33. Swain, S., Roy, S., Shah, J., Van Wees, S., Pieterse, C.M., and Nandi, A.K. (2011). Arabidopsis thaliana cdd1 mutant uncouples the constitutive activation of salicylic acid signalling from growth defects. **Mol. Plant Pathol.** 12**,** 855-865; doi: 10.1111/j.1364-3703.2011.00717.x
34. Chaturvedi, R., Krothapalli, K., Makandar, R., Nandi, A., Sparks, A.A., Roth, M.R., Welti, R., and Shah, J. (2008). Plastid omega3-fatty acid desaturase-dependent accumulation of a systemic acquired resistance inducing activity in petiole exudates of Arabidopsis thaliana is independent of jasmonic acid. **Plant J.** 54**,** 106-117; doi: 10.1111/j.1365-313X.2007.03400.x
35. Nandi, A., Moeder, W., Kachroo, P., Klessig, D.F., and Shah, J. (2005). Arabidopsis ssi2-conferred susceptibility to Botrytis cinerea is dependent on EDS5 and PAD4. **Mol Plant Microbe Interact** 18**,** 363-370; doi: 10.1094/MPMI-18-0363
36. Nandi, A., Welti, R., and Shah, J. (2004). The Arabidopsis thaliana dihydroxyacetone phosphate reductase gene SUPPRESSSOR OF FATTY ACID DESATURASE

DEFICIENCY1 is required for glycerolipid metabolism and for the activation of systemic acquired resistance. **Plant Cell** 16**,** 465-477; doi: 10.1105/tpc.016907
37. Sekine, K., Nandi, A., Ishihara, T., Hase, S., Ikegami, M., Shah, J., and Takahashi, H. (2004). Enhanced resistance to Cucumber mosaic virus in the Arabidopsis thaliana ssi2 mutant is mediated via an SA-independent mechanism. **Mol Plant Microbe Interact** 17**,** 623-632; doi: 10.1094/MPMI.2004.17.6.623
38. Nandi, A., Krothapalli, K., Buseman, C.M., Li, M., Welti, R., Enyedi, A., and Shah, J. (2003). *Arabidopsis sfd* mutants affect plastidic lipid composition and suppress dwarfing, cell death, and the enhanced disease resistance phenotypes resulting from the deficiency of a fatty acid desaturase. **Plant Cell** 15**,** 2383-2398; doi: 10.1105/tpc.015529
39. Nandi, A.K., Kachroo, P., Fukushige, H., Hildebrand, D.F., Klessig, D.F., and Shah, J. (2003). Ethylene and jasmonic acid signaling affect the NPR1-independent expression of defense genes without impacting resistance to Pseudomonas syringae and Peronospora parasitica in the Arabidopsis ssi1 mutant. **Mol Plant Microbe Interact** 16**,** 588-599; doi: 10.1094/MPMI.2003.16.7.588
40. Shah, J., Kachroo, P., Nandi, A., and Klessig, D.F. (2001). A recessive mutation in the Arabidopsis SSI2 gene confers SA- and NPR1-independent expression of PR genes and resistance against bacterial and oomycete pathogens. **Plant J.** 25**,** 563-574; doi: 10.1046/j.1365-313x.2001.00992.x
41. Nandi, A.K., Kushalappa, K., Prasad, K., and Vijayraghavan, U. (2000). A conserved function for Arabidopsis SUPERMAN in regulating floral-whorl cell proliferation in rice, a monocotyledonous plant. **Curr. Biol.** 10**,** 215-218; doi: S0960-9822(00)00341-9 [pii]
42. Nandi, A.K., Basu, D., Das, S., and Sen, S.K. (1999). High level expression of soybean trypsin inhibitor gene in transgenic tobacco plants failed to confer resistance against damage caused by Helicoverpa armigera. **J Biosc** 24**,** 445-452; doi: 10.1007/BF02942655

BOOK Chapter

1. Vishal Patil and **Ashis Nandi** (2020) Role of MAPK cascade in local and systemic immunity. In Protein kinases and stress signaling in pants: Functional genomic perspective. John Wiley & Sons, UK. *In Press*

2. **Ashis Nandi (2016)** Application of anti-microbial proteins and peptides in developing disease resistant plants. In ***Biotechnology for Plant Disease Control***, Edited by David B. Collinge. John Wiley & Sons, Inc., of 111 River Street, Hoboken, NJ 07030. DOI: 10.1002/9781118867716.ch3; Pages 51-70

3. **Ashis Nandi (2015)** Plant immune system: from a layman's view. In **Accelerating Science,** Edited by D. Dhar Das and S. Chakraborty. ISBN 93-82661-24-7

4. Shah, J., **Nandi, A.**, Buseman, C.M., Li, M., Krothapalli, K., Pegadaraju, V., Buffington, R., Morton, J., Omoluabi, O., Baughman, E., and Welti, R. 2004. Salicylic acid signaling in plant defense: the lipid connection. In "*Biology of Molecular Plant-Microbe Interaction"*, Vol. 4, pp 391-393, ed. I. Tikhonovich, B. Lugetenberg, and N. Provorov, IS-MPMI, St Paul, MN.

M.Sc. Thesis supervision (Name, year passing out)

1. Mr. Praveen Kumar Singh (2007)
2. Mr Adnan Siddiqui (2008)
3. Ms. Oindrila Bhattacharya (2009)
4. Ms. Swati (2009)
5. Ms. Kaisa Kayina (2010)
6. Mr. Aviroop Sinha (2011)
7. Ms. Swati Singh (2012)
8. Mr. Rajkamal Choudhary (2012)
9. Ms. Pratibha Singh (2013)
10. Ms. Preeti Yadav (2014)
11. Mr. Purushottam Prajapati (2015)
12. Ms. Anu (2016)
13. Ms. Neelam Bhadana (2017)
14. Ms. Poulami Banik (2018)
15. Ms Apoorva (2019)
16. Ms. Rohima (2020)
17. Ms. Shivangi Mahawar (2021)
18. Ms. Kirti Tyagi (2021)
19. Ms. Uma Das (2022)
20. Ms. Muskan Agarwal (2023)

M.Phil thesis supervision

1. Mr. Sadan Sharma (2016)

Ph.D. thesis supervision (Name, year of submission, thesis title)

1. **Swadin Swain,** 2010. Molecular characterization of cdd1 mutant of Arabidopsis that modulates salicylic acid signaling and disease resistance.

2. **Subaran Singh**, 2013. Functional analysis of a

senescence associated rice cysteine protease
and development of disease resistant transgenic
plants.

3. **Mrunmay Kumar Giri**, 2013. Functional analysis of MYC2 like transcription factors in regulating plant defense and development.

4. **Lipika Bhattacharjee**, 2013. Physiological role of regulatory serine protease inhibitors (serpins) of rice and Arabidopsis.

5. **Vijayata Singh,** 2014. Genetic regulations of systemic acquired resistance in *Arabidopsis thaliana*

6. **Shweta Roy**, 2015 Genetic regulation of hypersensitive response in Arabidopsis

7. **Nidhi Singh**, 2015, Regulation of disease defense responses by a putative transcription factor ZFD1 in *Arabidopsis thaliana*

8. **Zeeshan Zahoor**, 2016. Role of GSTT2 and histone demethylase RSI1 in activating systemic acquired resistance in *Arabidopsis thaliana*

9. **Deepjyoti Singh** 2017 Mechanism of systemic acquired resistance induction in Arabidopsis

10. **Janesh Gautam** 2017 transcriptional regulation of plant immunity by salicylic acid and light signaling

11. **Priya Gupta** 2019 Role of *Arabidopsis thaliana* MEDEA protein in plant pathogen interaction

12. **Anupriya Singh** 2019 Mechanism of oxidation-related Zn-finger1 (OZF1)-mediated defense signaling in Arabidopsis thaliana

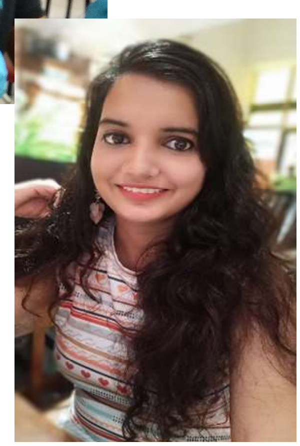
13. **Shobhita Saxena**, 2021Role of LDL2 and PAO5 in activation of systemic acquired resistance

14. **Vishal Patil**, 2023: Mechanism of RSI1 mediated systemic acquired resistance development in Arabidopsis

<u>Currently enrolled Ph.D. students (name, Area of research)</u>

15. Akash Sharma: Regulation SA signaling in plants

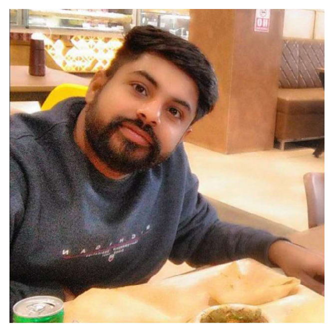
16. **Ranjan Singh**: Systemic acquired resistance



17. **Sonia Rani**: Role of MEDEA in local an systemic immunity

18. **Anand Nishad:** Interconnection between systemic acquired resistance and thermal acquired tolerance

19. **Mir Nasir**: Mechanism of LDL2-mediated systemic acquired resistance development in Arabidopsis



20. Uday Singh: Identification of regulators of systemic acquired resistance

21. Reena Saini: AtOZF1-medaited SA signaling in Arabidopsis

22. Sujata: MiRNA and FLD function for systemic acquired resistance

Lab Photos


May 2017


DEC 2015


Feb, 2016


Feb 2015;
With Prof. Usha Vijayraghavan


March, 2014

Dec, 2009


October-2009