

E X R N A - A G

# बैक्टीरियल बाह्यकोशिकीय RNA-मध्यस्थित गेहूँ (*Triticum aestivum*) बीज अंकुरण का पुनर्क्रमादेशन

लक्ष्य विश्लेषण, यांत्रिकी मॉडल, और सत्यापन रणनीति

प्रतिवेदन तैयारकर्ता

**Sarthak Tiwary**

ExRNA-Ag

फरवरी 2026

गोपनीय

इस दस्तावेज़ में स्वामित्व अनुसंधान निष्कर्ष सम्मिलित हैं।  
अनधिकृत वितरण सख्ती से निषिद्ध है।

## Bibliography [गोपनीय]

---

1. Finch-Savage, W.E. & Leubner-Metzger, G. (2006). Seed dormancy and the control of germination. *New Phytologist*, 171(3), 501–523.
2. Nonogaki, H. (2014). Seed dormancy and germination—emerging mechanisms and new hypotheses. *Frontiers in Plant Science*, 5, 233.
3. Bewley, J.D. et al. (2013). *Seeds: Physiology of Development, Germination and Dormancy*. 3rd ed. Springer.
4. Weiberg, A. et al. (2013). Fungal small RNAs suppress plant immunity by hijacking host RNA interference pathways. *Science*, 342(6154), 118–123.
5. Cai, Q. et al. (2018). Plants send small RNAs in extracellular vesicles to fungal pathogen to silence virulence genes. *Science*, 360(6393), 1126–1129.
6. Harris, D. et al. (1999). On-farm seed priming in semi-arid agriculture. *Experimental Agriculture*, 35(1), 15–29.
7. Mahmood, A. et al. (2016). Seed biopriming with plant growth promoting rhizobacteria. *FEMS Microbiology Ecology*, 92(8), ffw112.
8. Shahid, S. et al. (2018). MicroRNAs from the parasitic plant *Cuscuta campestris* target host messenger RNAs. *Nature*, 553(7686), 82–85.
9. Buck, A.H. et al. (2014). Exosomes secreted by nematode parasites transfer small RNAs to mammalian cells and modulate innate immunity. *Nature Communications*, 5, 5488.
10. Flemming, H.C. & Wingender, J. (2010). The biofilm matrix. *Nature Reviews Microbiology*, 8(9), 623–633.
11. Whitchurch, C.B. et al. (2002). Extracellular DNA required for bacterial biofilm formation. *Science*, 295(5559), 1487.
12. Costa, O.Y.A. et al. (2018). Microbial extracellular polymeric substances: ecological function and impact on soil aggregation. *Frontiers in Microbiology*, 9, 1636.
13. De Block, M. et al. (2005). Poly(ADP-ribose) polymerase in plants affects energy homeostasis, cell death and stress tolerance. *The Plant Journal*, 41(1), 95–106.
14. Vanderauwera, S. et al. (2007). Silencing of poly(ADP-ribose) polymerase in plants alters abiotic stress signal transduction. *PNAS*, 104(38), 15150–15155.

15. Schulz, P. et al. (2012). Chemical PARP inhibition enhances growth of Arabidopsis and reduces anthocyanin accumulation and the activation of stress protective mechanisms. *PLoS ONE*, 7(5), e37287.
16. Fujii, H. & Zhu, J.K. (2009). Arabidopsis mutant deficient in 3 abscisic acid-activated protein kinases reveals critical roles in growth, reproduction, and stress. *PNAS*, 106(20), 8380–8385.
17. Yu, Z. et al. (2020). The important role of SnRK2 in plant abiotic stress tolerance and ABA signaling. *Plant Cell Reports*, 39, 1403–1414.
18. Anderberg, R.J. & Walker-Simmons, M.K. (1992). Isolation of a wheat cDNA clone for an abscisic acid-inducible transcript with homology to protein kinases. *PNAS*, 89(21), 10183–10187.
19. Alcazar, R. et al. (2010). Polyamines: molecules with regulatory functions in plant abiotic stress tolerance. *Planta*, 231(6), 1237–1249.
20. Pieruzzi, F.P. et al. (2011). Polyamines promote ABA biosynthesis and radicle protrusion in angiosperms. *BMC Plant Biology*, 11, 175.
21. Sinska, I. & Lewandowska, U. (1991). Polyamines and ethylene in the removal of embryonal dormancy in apple seeds. *Physiologia Plantarum*, 81(1), 59–64.
22. Xia, N. et al. (2019). Characterization of the NAC gene family in wheat and its potential roles in abiotic stress tolerance. *PLoS ONE*, 14(8), e0221430.
23. Jeddeloh, J.A. et al. (1999). Maintenance of genomic methylation requires a SWI2/SNF2-like protein. *Nature Genetics*, 22(1), 94–97.
24. IWGSC (2018). Shifting the limits in wheat research and breeding using a fully annotated reference genome. *Science*, 361(6403), eaar7191.
25. Ramírez-González, R.H. et al. (2018). The transcriptional landscape of polyploid wheat. *Science*, 361(6403), eaar6089.
26. Pfeifer, M. et al. (2014). Genome interplay in the grain transcriptome of hexaploid bread wheat. *Science*, 345(6194), 1250091.
27. Liu, S. et al. (2013). A 3BS locus controlling pre-harvest sprouting in wheat. *Genetics*, 195(1), 263–272.
28. Tuttle, K.M. et al. (2022). Functional analysis of TaMFT homoeologs in controlling wheat seed dormancy. *Plant Cell & Environment*, 45(3), 755–770.
29. Fu, X. et al. (2002). Gibberellin-mediated proteasome-dependent degradation of the barley DELLA protein SLN1 repressor. *Plant Cell*, 14(12), 3191–3200.

30. Gubler, F. et al. (2002). Gibberellin signaling in barley aleurone cells. *Plant Physiology*, 129(1), 191–200.
31. Bailly, C. et al. (2008). From intracellular signaling networks to cell death: the dual role of reactive oxygen species in seed physiology. *Comptes Rendus Biologies*, 331(10), 806–814.
32. Bai, B. et al. (2020). Seed-stored mRNAs that are specifically associated to monosomes are translationally regulated in germinating wheat embryos. *Plants*, 9(1), 68.
33. Essigmann, B. et al. (1998). Phosphate availability affects the thylakoid lipid composition and the expression of SQD1, a gene required for sulfolipid biosynthesis in *Arabidopsis thaliana*. *PNAS*, 95(5), 1950–1955.
34. Mulichak, A.M. et al. (1999). The structure of SQD1, the first committed enzyme in sulfolipid biosynthesis. *PNAS*, 96(13), 3137–3142.
35. Yu, B. et al. (2002). Loss of plastidic lysophosphatidic acid acyltransferase causes embryo-lethality in *Arabidopsis*. *PNAS*, 99(15), 10191–10196.
36. Yin, G. et al. (2024). Alternative oxidase pathway mitigates salt stress during seed germination. *Environmental and Experimental Botany*, 218, 105612.
37. Saha, B. et al. (2015). Alternative oxidase and plant stress tolerance. *Journal of Plant Physiology*, 172, 1–12.
38. Rissel, D. et al. (2019). The nuclear protein Poly(ADP-ribose) polymerase 3 (AtPARP3) is required for seed storability in *Arabidopsis thaliana*. *BMC Plant Biology*, 19, 488.
39. Wang, M. et al. (2019). Genome-wide identification of class III peroxidases in wheat. *BMC Genomics*, 20, 862.
40. Han, X. et al. (2024). TaPer12-3A promotes wheat germination through ROS scavenging. *BMC Plant Biology*, 24, 178.
41. Gubler, F. et al. (1995). Gibberellin-regulated expression of a *myb* gene in barley aleurone cells. *Plant Cell*, 7(11), 1879–1891.
42. Luo, L. et al. (2023). TOR signaling in GA-dependent alpha-amylase synthesis. *Plant Signaling & Behavior*, 18(1), e2160017.
43. Torada, A. et al. (2016). A causal gene for seed dormancy on wheat chromosome 4A encodes a MAP kinase kinase. *Current Biology*, 26(6), 782–787.
44. Zhao, S. et al. (2022). Genome-wide identification and characterization of YABBY gene family in wheat. *PeerJ*, 10, e13139.