

Functional characterization of Nuclear Factor -YB8 (NF-YB8) transcription factors in viral disease progression

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Transcription factors (TFs) are central to regulating plant growth, development, and stress responses, including defense against pathogens. This study explores the role of the CCAAT box-binding TF NF-YB8 in modulating host responses during infections by Cucumber Mosaic Virus (CMV) and Tomato Leaf Curl Palampur Virus (ToLCPalV). Transcriptomic analyses identified NF-YB8 as differentially regulated upon viral infection in both *Arabidopsis thaliana* and cucumber. The CMV-encoded 2b protein, but not ToLCPalV-AC4, was found to interact specifically with NF-YB8, as confirmed by BiFC and far-western blotting, suggesting a direct modulation of host transcriptional machinery by CMV. Functional characterization using NF-YB8 overexpression and knockout lines revealed a regulatory role for this TF in antiviral defense. Overexpression suppressed viral gene expression, while knockouts exhibited enhanced viral accumulation. These observations were consistent across both CMV and ToLCPalV infections, highlighting a conserved defensive role for NF-YB8. Further transcriptome profiling of infected and mock-treated lines revealed significant enrichment of stress and defense-related pathways associated with NF-YB8 expression levels. Taken together, the study demonstrates that NF-YB8 functions as a host susceptibility and regulatory factor, shaping the outcome of virus-host interactions. Its modulation by viral proteins suggests a potential strategy employed by viruses to subvert host defenses. Ongoing research aims to further elucidate the mechanistic basis of NF-YB8-mediated transcriptional reprogramming during plant-virus interactions.