The *Medicago truncatula* nitrate transporter LATD/NIP plays an important role in maintaining root and nodule meristem function and in mediating ABA signaling. In order to identify transcription factors (TFs) that function in the ABA-LATD/NIP signaling pathway, we performed a large-scale gene expression profiling by qRT-PCR on wild-type (WT) and *latd* roots grown with or without ABA. We found that the set of TFs regulated by ABA differs in WT and *latd* mutants with only 42 out of 192 genes (22%) regulated by ABA in both genotypes. Conversely, we found that the genes misexpressed in *latd* mutants change almost completely in the presence of exogenous ABA. The only gene whose expression is altered by ABA in both genotypes and by the *latd* mutation under both ABA treatments is the NODULATION SIGNALING PATHWAY 2 (NSP2) gene. The NSP2 gene encodes a transcription factor required for the formation of nitrogen-fixing symbiotic nodules. We show that *NSP2* and *preMIR171h*, which encodes a miRNA that targets *NSP2*, are both regulated by nitrate, indicating a role for NSP2 in root nitrate responses. We find that *preMIR171h* is also regulated by ABA and *LATD/NIP*, indicating that NSP2 is regulated by ABA at multiple levels, and that LATD/NIP is required for this process. NSP2 is also regulated by cytokinin signaling during nodulation. We found that Rhizobium inoculation failed to induce expression of NSP2 as well as that of two NSP2-regulated genes, *NIN* and *CLE13*, in *latd* roots, and that the regulation of these genes by the hormone cytokinin is altered as well, both in timing and in level of induction. Together, these findings indicate a distinct and critical role for LATD/NIP and ABA in the early nodulation signaling pathway, particularly in the regulation of NSP2, and in the crosstalk between cytokinin and Nod factor.