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The nitrate inducible NAC transcription factor TaNAC2-5A controls nitrate response and increases wheat yield

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Nitrate is a major nitrogen resource for cereal crops, thus understanding nitrate signaling in cereal crops is valuable for engineering crops with improved nitrogen use efficiency. Although several regulators have been identified in nitrate sensing and signaling in Arabidopsis, the equivalent information in cereals is missing. Here, we isolated a nitrate inducible and cereal specific NAC transcription factor TaNAC2-5A from wheat (*Triticum aestivum*). CHIP-SEQ (Chromatin Immunoprecipitation based Sequencing) dates indicated that TaNAC2-5A could bind to the genes encoding nitrate transporter and glutamine synthetase and the genes involving auxin signaling pathway. And a RING Zinc-finger protein that was screened by yeast two-hybrid may regulate the response of TaNAC2-5A to nitrate. Overexpression of TaNAC2-5A in wheat enhanced root growth and nitrate influx rate and hence increase root ability to acquire nitrogen. Further, we found that TaNAC2-5A over-expressing transgenic wheat lines had higher grain yield and higher nitrogen accumulation in aerial parts and allocated more nitrogen in grains in a field experiment. These results suggest that TaNAC2-5A is involved in nitrate signaling and show that it is an exciting gene resource for breeding crops with more efficient use of fertilizer.

Biography

Xue He has completed her PhD from China Agriculture University in 2007 and joined the Tong Fellow at Center for Molecular Agrobiology, Institute of Genetics and Developmental Biology, Chinese Academy of Sciences. Her interest focuses on the genetic improvement of nitrogen use efficiency of wheat. She has published research results in *Plant Journal, Plant Physiology, New Phytologists*, etc.

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