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Emp16 is required for mitochondrial nad2 intron 4 cis-splicing and seed development in maize

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The chloroplast and mitochondrial genomes in higher plants contain a number of group II introns that are required to be precisely spliced before translating into functional proteins. Different from prokaryotes, splicing of these introns requires novel nuclear factors. By analyzing a seed mutant in maize, here we report the identification of EMP16 that is required for nad2 intron splicing in mitochondria. Disruption of Emp16 function causes embryo and endosperm development arrest, giving rise to an empty pericarp phenotype in maize. Differentiation of the basal endosperm transfer layer cells is severely affected. Molecular cloning indicates that Emp16 encodes a P-type PPR protein with 11 PPR motifs and is localized in the mitochondrion. Transcript analysis revealed that the mitochondrial nad2 intron 4 splicing is completely abolished in the null mutants which leads to severely reduced Complex I assembly and the NADH dehydrogenase activity. In response, the mutant dramatically increases the expression of alternative oxidase 2 (Aox2). These results indicate that EMP16 is required for the mitochondrial nad2 intron 4 cis-splicing and essential to embryogenesis and endosperm development in maize.

Biography

Zhihui Xiu has completed his Bachelor's degree from China Agricultural University and started his PhD study from The Chinese University of Hong Kong. He is currently in final year of his Post-graduate study. He has published several papers about maize seeds development.

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