Differential Expression of *Arabidopsis* EJC Core Proteins under Short-Day and Long-Day Conditions

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Abstract

Exon junction complexes (EJCs) associate with mRNAs, mediate the pre-mRNA splicing and eventually gets displaced by ribosomes during the initial phase of translation. EJCs are involved in several critical physiological pathways. The functional nature of EJCs and the underlying molecular mechanism(s) still needs to be elucidated particularly in case of plants. Here, we report that the putative core protein factors of the EJC differentially express under short-day and long-day conditions. Since, plants are constantly exposed to biotic and abiotic factor(s), it would be significant to see how the EJCs respond to different stress inducing conditions. The protein levels of EJC core proteins under short-day conditions were 1.25 times higher relative to the protein levels under long-day conditions. Similar results were observed for the mRNA transcripts of the EJC core protein factors as evident from the semi-quantitative reverse transcriptase polymerase chain reaction (sq-RT PCR). These results signify that under short-day conditions, the EJC proteins are more activated and might be involved in few events which are yet to be revealed.

Keywords: Exon junction complexes, splicing, short-day, long-day, transcripts.

Introduction

The exon junction complex (EJC) comprising of three core protein factors is a multi-protein complex and interacts with the spliced messenger RNA (mRNA) to form mRNA-ribonucleoproteins (mRNPs). EJC manipulates the post-transcriptional events (Woodward *et al*., 2017, Boehm and Gehring 2016, Le Hir *et al*., 2016, Panigrahi and Sahoo 2016). Several associating proteins bind to the core EJC factors, depending on the cellular event that they will mediate. Essentially in a sequence-independent manner the EJCs assemble and bind to the mRNAs in the region of 20-24 nucleotides (nts) upstream of exon-exon junctions (Obrdlik *et al*., 2019, Saulière *et al*., 2012). EJCs remain bound to the mRNA throughout their life cycle (Bono *et al*., 2006, Andersen *et al*., 2006). The central dogma is regulated by the EJC proteins, but the underlying molecular mechanism(s) in which they still remains blurred. The role of EJC in the splicing process is highly regarded and thought to play a central role in determining the fate of the mature mRNA (Nott *et al*., 2003). The EJC increases the fidelity, efficiency and productivity of the translation event (Le