WIU CENTENNIAL HONORS COLLEGE
Thomas E. Helm Undergraduate Research Day 2022

Abstract

Poster

Major Biology

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Quantification of Jasmonates in a Mutant of Arabidopsis that is Defective in a Major Chloroplast Receptor

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Jasmonic acid (JA) is a lipid-derived plant hormone that plays a role in plant defense mechanisms (Chung et al. 2001; Koo et al. 2009). The pathway to form JA begins in the chloroplast where linolenic acid (18:3), a fatty acid, is released from the chloroplast lipids (Li et al. 2001). The acid is converted into 12-oxo-phytodienoic acid (OPDA) by three enzymes that are encoded by genes in the nucleus and synthesized in the cytoplasm. One of these enzymes, allene oxide synthase (AOS), catalyzes the controlling step in the pathway that results in the synthesis of OPDA, the first stable intermediate in the JA pathway. The OPDA is exported into the cytoplasm where it is conjugated with isoleucine (Ile) to form JA-Isoleucine (JA-Ile), a biologically active jasmonate. The mutant of Arabidopsis called plastid protein import 2 (ppi2), lacks a major chloroplast receptor that imports photosynthetic proteins (Afitlhile et al. 2021; Jarvis and Lõpez 2013). Previous gene expression experiments in the laboratory have shown that this ppi2 mutant has reduced expression of several genes that encode for the enzymes that initiate the synthesis of JA. It is hypothesized that the ppi2 mutant will accumulate low levels of the AOS protein and low levels of jasmonates (OPDA, JA, and JA-Ile) when compared to wildtype which would suggest that a major chloroplast receptor is required in the import of enzymes of the JA pathway.