

Building an Understanding of Epoxidase Enzymes in Xanthophyll Cycles

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Photoprotection is an essential counterbalance to light harvesting to avoid damage from excess absorbed light energy and is regulated by two different cycles. While the violaxanthin (VAZ) cycle is well-studied, the lutein epoxide (LxL) cycle is less understood due to its absence in model species. Previous studies have shown that the LxL cycle has the potential to improve photosynthetic efficiency when transgenically engineered into Arabidopsis. Our work focuses on characterizing the genes involved in these cycles – zeaxanthin epoxidase (ZEP) and lutein epoxidase (LEP) – from *Glycine max* (soybean) and examining whether the molecular interactions between these proteins influence substrate specificity. Additionally, we are exploring what effect swapping protein domains, e.g., the forkhead-associated (FHA) domain, will have on enzyme function to further uncover the function of these genes and their xanthophyll cycles in agriculturally significant plants.

Figure. ##. A descriptive figure may be included. If including a figure, please add a figure caption here.