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Tryptophan-to-Tryptophan Energy Transfer in UV-B photoreceptor UVR8 XIANKUN LI, DONGPING ZHONG, The Ohio State University — UVR8 (UV RESISTANCE LOCUS 8) protein is a UV-B photoreceptor in high plants. UVR8 is a homodimer that dissociates into monomers upon UV-B irradiation (280 nm to 315 nm), which triggers various protective mechanisms against UV damages. Uniquely, UVR8 does not contain any external chromophores and utilizes the UV-absorbing natural amino acid tryptophan (Trp) to perceive UV-B. Each UVR8 monomer has 14 tryptophan residues. However, only 2 epicenter Trp (W285 W233) are critical to the light induced dimer-to-monomer transformation. Here, we revealed, using site-directed mutagenesis and spectroscopy, a striking energy flow network, in which other tryptophan chromophores serve as antenna to transfer excitation energy to epicenter Trp, greatly enhancing UVR8 light-harvesting efficiency. Furthermore, Trp-to-Trp energy transfer rates were measured and agree well with theoretical values.

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