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A NEW PHOTOCYCLE MODEL FOR PHOTOACTIVE YELLOW PROTEIN

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Photoactive yellow protein (PYP) is a photoreceptor containing a unique thioester-linked *p*-coumaric acid (*p*CA) chromophore. This water soluble protein is a structural prototype for the PAS domain superfamily of receptor and regulatory proteins from all three kingdoms of life. The *trans* to *cis* photoisomerization of the chromophore activates a photocycle in PYP that resembles those of the sensory rhodopsins. Time-resolved FTIR spectroscopy at 5 μ s time resolution and 4 cm^{-1} spectral resolution has been performed on both wild type and mutant strains of PYP. A new intermediate, pB'₃₅₅, is identified from time-resolved FTIR data. The pB' to pB transition is spectrally silent in the UV/vis absorption, but is prominent in the FTIR data. We report kinetic modeling of the PYP photocycle on both time-resolved FTIR and time-resolved UV/vis data using nonlinear least square fitting techniques.