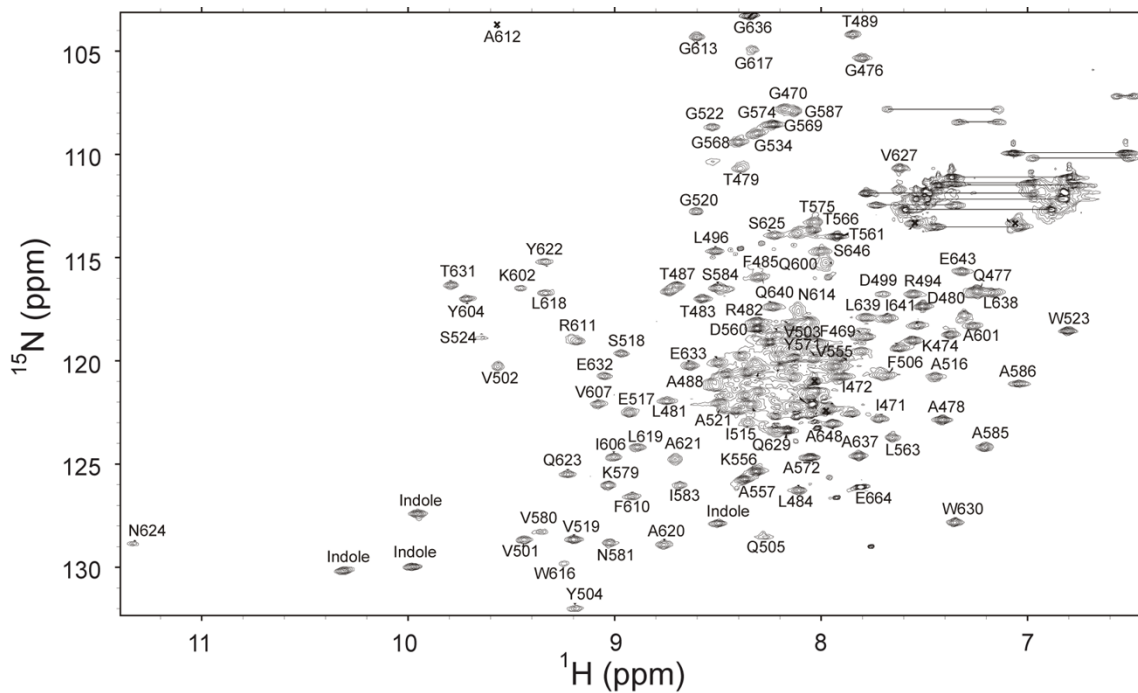
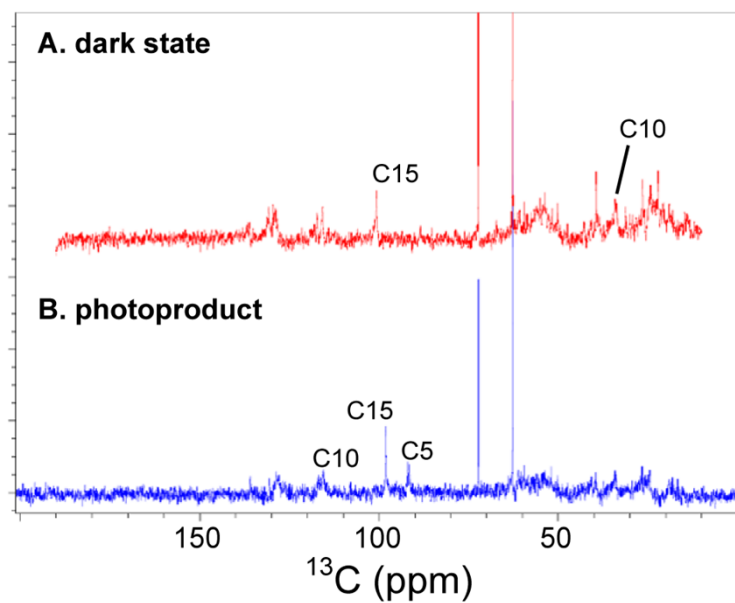


Supplementary Information:



**Fig. S1** Two-dimensional  $^{15}\text{N}$ - $^1\text{H}$  HSQC NMR spectra (amide region) of  $^{15}\text{N}$ -labeled NpF2164g3 in the violet-absorbing dark state recorded at 600 MHz proton frequency. Side chain amide resonances of Asn and Gln are connected with solid lines. Representative assignments are indicated; complete assignments are available as BMRB accession no. 19629.



**Fig S2.**  $^{13}\text{C}$ - $^1\text{H}$  INEPT NMR spectra of NpF2164g3 with attached bilin chromophore containing  $^{13}\text{C}$ -H labeling (at C5, C10, and C15) in the dark-adapted violet state (A) and light-activated orange state (B).