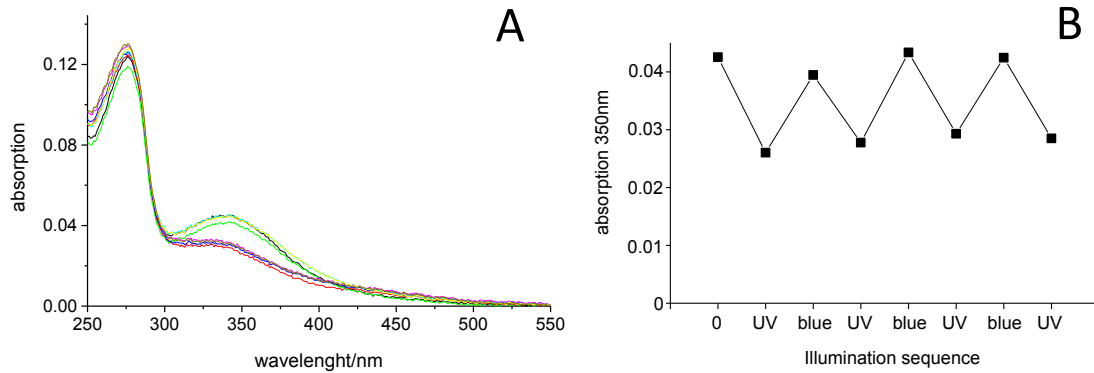
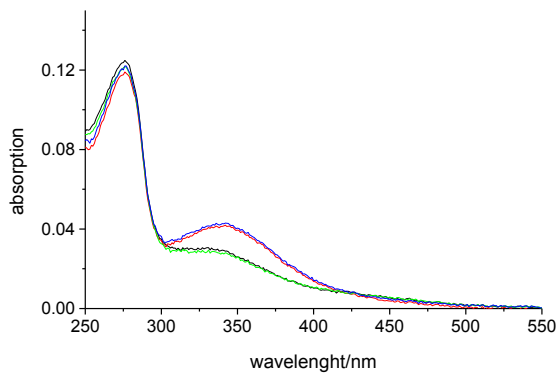


## Supplemental Figures:



**Figure S1:** Consecutive UV and blue light illumination reversibly switches the trans/cis isomer equilibrium of ABDM bound to the F<sub>1</sub> double cysteine mutant  $\alpha$ A380C/ $\beta$ V409C. **A** absorption spectra of ABDM- $\alpha$ A380C/ $\beta$ V409C before illumination (black) and after sequential illumination at 365nm (red) 450nm (green) 365nm (blue) 450nm (cyan) 365nm (magenta) 450nm (yellow) and 356nm light (dark yellow). **B** 350nm absorption of the samples shown at panel A.



**Figure S2:** Additional illumination with 365nm and 450nm does not change the cis/trans isomer equilibrium of ABDM conjugated F<sub>1</sub>  $\alpha$ A380C/ $\beta$ V409C. Absorption spectra of ABDM- $\alpha$ A380C/ $\beta$ V409C after sequential illumination with 3W LEDs for 10sec at 365nm (dark) for another 10 seconds at 365nm (green) for 10sec at 450nm (red) and another 10sec at 450nm (green).

## Supplemental Data:

Primer for site-directed Mutagenesis:

$\alpha$ S338C

forward: caggcgggtgacgttGtgcggtcgttccgacc

reverse: ggtcggaacgaacgcaCaaacgtcaccgcctg

$\beta$ Q324C

forward: gtggtactgagccgtTGCatcgcgtctctgggt

reverse: acccagagacgcgatGCAacggctcagtaccac

$\alpha$ N369C

forward: attcgtcctgcggtTGcccgggtattccgta

reverse: tacggaaataccgggCAaaccgcaggacgaat

$\beta$ S327C

forward: agccgtcagatcgcgtGtctgggtatctaccg

reverse: cgggtagataccagaCacgcgatctgacggct

$\alpha$ G379C

forward: gtatcccgttggTgtgcagcacagaccaag

reverse: cttggtctgtctgcacAaccaacacgggatac

$\beta$ G412C

forward: gcagaagtattcaccTgttctccgggtaaatac

reverse: gtattaccggagaacAggtgaatacttctgc

$\alpha$ A380C

forward: tcccgttgggtggtgcgcacagaccaagatc

reverse: gatctggctgtgcgaaccaccaacacggga

$\beta$ V409C

forward: ttctcgtggcagaatgcttcaccggttctccg

reverse: cggagaaccggtgaagcattctgccacgaagaa