Supplemental Figures:

**Figure S1:** Consecutive UV and blue light illumination reversibly switches the trans/cis isomer equilibrium of ABDM bound to the F₁ double cysteine mutant αA380C/βV409C. A absorption spectra of ABDM-αA380C/βV409C 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 F₁ αA380C/βV409C. Absorption spectra of ABDM-αA380C/βV409C 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:

αS338C
forward: cagccccgtgacgtttGtgcgttc
reverse: ggtcggagacgaacgcAaaccgtacccgctg

βQ324C
forward: gtggtactgcggttTGCatcgcgtctcttggt
reverse: acccaagacgcgtGCAacggctcgtaccac

αN369C
forward: attcgctcgggttTGcccgggtatttcgta
reverse: tacggaaataccgggCAacccgcaggacgaat

βS327C
forward: agccgtcagcgttcgtGtctgggtatctaccg
reverse: cgggtagataccccagaCacgcgtctgcagggct

αG379C
forward: gatcccggtgtggtTgtgcagcacagaccaag
reverse: ctttgctgtcgcacAaccaacacgggatac

βE412C
forward: gcagaagtattcaccTgttctccgggttaatcac
reverse: gttattcgcgggtcAggtgaatatttctgc

αA380C
forward: tccggtggtggttgcacagaccaagatc
reverse: gatcttggtcgtgcacAaccaacacgggatac

βV409C
forward: ttcttcgacagaatgtcctccaggtgtctccg
reverse: cggagacgcgggaacatttctgcacgaagaa