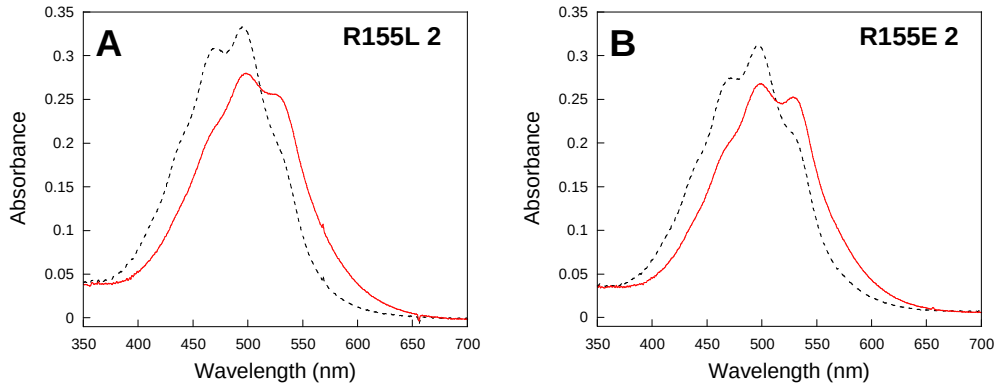
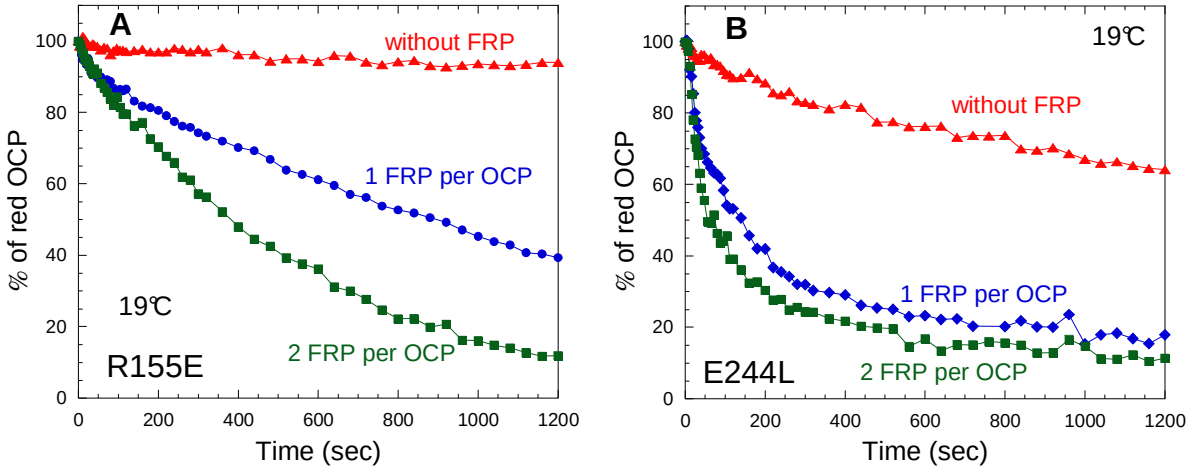
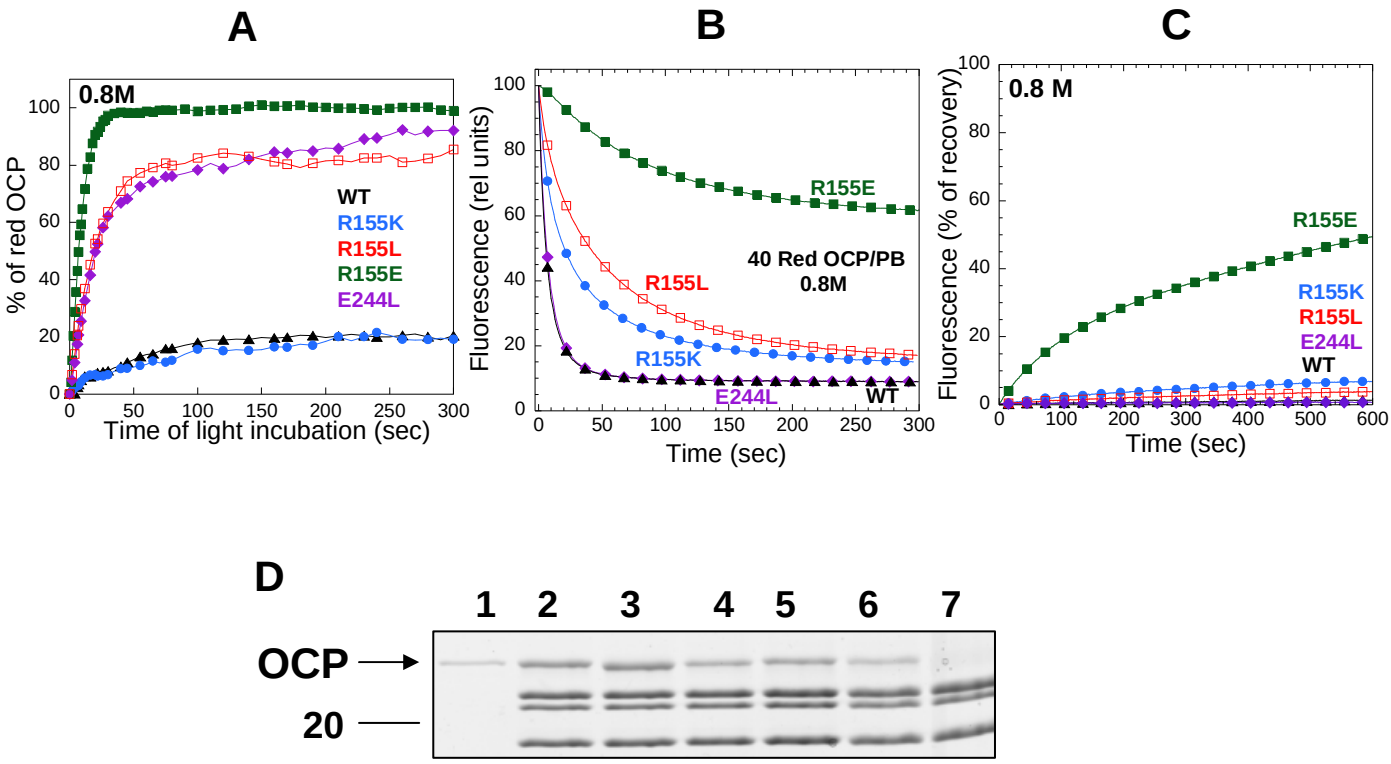


Supplemental Figure 1. Absorbance spectra of OCP^o and OCP^r forms of minor fractions of R155L (A) and R155E (B). To obtain the red form, OCP was illuminated 5 min with 5000 µmol photons m^{-2} s^{-1} white light.



Supplemental Figure 2. Dark Kinetics of OCP^r to OCP^o conversion of R155E OCP and E244L OCP in the absence (red triangles) and in the presence of FRP at 19 °C. The ratio FRP to OCP was 1 (blue rhomboids) and 2 (green squares).



Supplemental Figure 3. Effect of mutations on OCP binding at 0.8M phosphate.

A) the effect of 0.8M phosphate on OCP^r accumulation is shown. The WT (triangle), R155K (circle), R155E (filled square), E244L (rhomboid) and R155L (empty square) OCPs were illuminated with white light (5000 µmol photons m^{-2} s^{-1}) at 19°C. The same symbols were used in B and C.

(B) The phycobilisomes (0.013 µM) were illuminated in the presence of an excess of OCP^r (0.53 µM (40 OCP per PB)) with strong blue-green light at 0.8M phosphate. The OCP was first illuminated (5000 µmol photons m^{-2} s^{-1}, white light, 10°C) in 0.08 M phosphate buffer and completely converted to OCP^r and then the phycobilisomes in 0.8M were added and the mixture illuminated at 15°C.

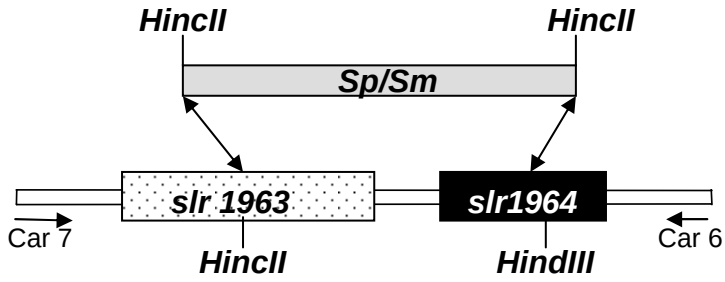
(C) Kinetics of dark PB fluorescence recovery. "Quenched" whole WT PBs were incubated in darkness at 0.8M phosphate. The decrease and increase of fluorscence was followed using a PAM fluorimeter.

(D) Detection of WT and mutated OCPs attached to PBs after illumination at 0.8M phosphate. Phycobilisomes were incubated in the presences of excess OCP under strong illumination, then loaded in a sucrose gradient just after illumination and re-isolated. In the figure is shown the polypeptide composition of the blue band obtained in the sucrose gradient after illumination of WT-PBs in the presence of WT-OCP (2) or E244L-OCP (3) or R155L (4) or R155K (5) or R155E (6). Lane 1: OCP alone and lane 7 PBs without OCP. In each lane was loaded 10µl of a solution containing 0.5 µM phycobilisomes. The OCP is shown by an arrow. Only the central part of the gel containing the OCP is shown.

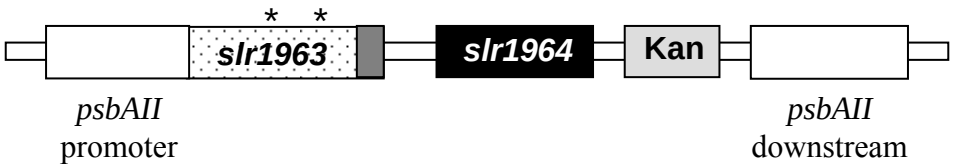
Primer name	Primer sequence
R 155 K (**cgt** → **aag**) R 155 K reverse	5'-CAAATTACCGTATTG**AAG**AATGCCGTGGTGG-3' 5'-CCACCACGGCATTTTCCAATACGGTAATTTG-3'
R 155 L (c**gt** → c**tg**) R 155 L reverse	5'-CAAATTACCGTATTG**CTG**AATGCCGTGGTGG-3' 5'-CCACCACGGCATTCAGCAATACGGTAATTTG-3'
R 155 E (**cgt** → **gag**) R 155 E reverse	5'-CAAATTACCGTATTG**GAG**AATGCCGTGGTGG-3' 5'-CCACCACGGCATTCTCCAATACGGTAATTTG-3'
E 244 L (**ga**g → **ct**g) E 244 L reverse	5'-CGCTTTTTCCGGGAA**CTG**TGCCAAAACCTG-3' 5'-CAGGTTTTGGCACAGTTCCCGGAAAAAGCG-3'
XhoI creating primer Car7 SpeI creating primer Car6	5'-CGGCCGCTCGAGTGACTATTGTCGCGACTAGGGA-3' 5'-CACCGGACTAGTCAAAAACTATCTGCTGGCGATCG-3'
Psba1 Psba2	5'-ACGCCCTCTGTTTACCCATGGAA-3' 5'-CCAGGCCTCAACCCGGTACAGAG-3'

Supplemental Figure 4. Sequence of the primers used in this study.

A ***The ΔOCPFRP mutant construction*** (*Slr1963* locus)



B ***Overexpressing OCP mutants*** (*psbAII* locus)



Supplemental Figure 5. Organisation of the genomic DNA at the *slr1963* and *psbAII* in the different strains. (A) Gene arrangement of the *slr1963* and the *slr1964* genes encoding respectively for the OCP and the FRP (B) Gene arrangement in the *psbAII* region of the mutant overexpressing the C-terminal His-tagged OCP. The stars indicate the position of mutations, Arg155 and Glu244.