

Supplementary information

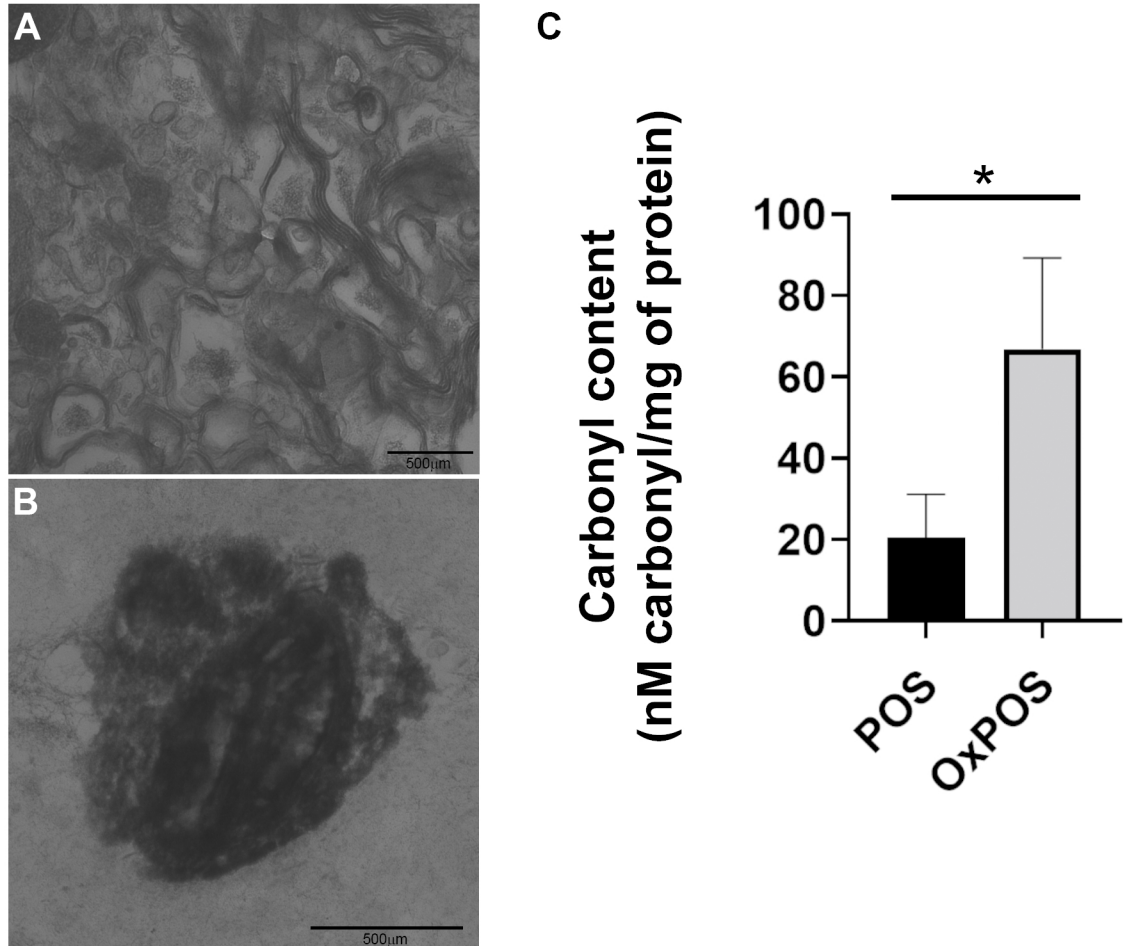


Figure S1 Ultrastructural and biochemical characterization of photoreceptor outer segments and modifications by UV-irradiation. Photoreceptor outer segments (POS) and modified POS (OxPOS) preparations were analyzed *in-vitro* by transmission electron microscopy. Representative electron micrographs show (A) the regular organization of outer segment membranes, which (B) when oxidatively modified coalesced into an electron-dense aggregate. Scale bars correspond to 500nm. (C) The carbonyl content of POS and OxPOS preparations were assessed *in-vitro*, prior to incubation with cultured RPE cells. An assay that tags DNP hydrazones to carbonyl groups was carried out, the readouts of which can be quantified by a spectrophotometer set at 375nm. Data from n=3 independent experiments. Statistical comparisons using a student's t-test, where a significant difference between POS vs. OxPOS is indicated as $p < 0.05$ (*).

Supplementary Table 1

Data from initial screen												Data from initial screen combined with data from experiments focused on late time points																																																				
	12 Hours								18 Hours								24 Hours								Extent of co-localization								36 Hours								48 Hours								60 Hours								72 Hours							
	POS				OxPOS				POS				OxPOS				POS				OxPOS				POS				OxPOS				POS				OxPOS				POS				OxPOS																			
	Mean		SD		Mean		SD		Mean		SD		Mean		SD		Mean		SD		Mean		SD		Mean		SD		Mean		SD		Mean		SD		Mean		SD																									
Lamp 1	0.61	0.20	0.82	0.15	0.78	0.13	0.84	0.15	0.72	0.17	0.87	0.12	0.66	0.20	0.81	0.13	0.73	0.17	0.88	0.12	0.50	0.24	0.89	0.10	0.39	0.19	0.93	0.05																																				
Lamp 2	0.81	0.11	0.87	0.12	0.86	0.10	0.89	0.08	0.88	0.11	0.91	0.11	0.76	0.14	0.84	0.13	0.73	0.16	0.88	0.11	0.55	0.23	0.89	0.09	0.30	0.17	0.92	0.06																																				
LC3b	0.77	0.20	0.91	0.11	0.73	0.18	0.90	0.09	0.78	0.14	0.92	0.07	0.76	0.17	0.81	0.15	0.81	0.12	0.88	0.14	0.75	0.19	0.94	0.06	0.62	0.23	0.92	0.07																																				

Note: Extent of co-localization where 1.0 = 100%. SD: Standard deviation

Supplementary Table 2

Lamp 1					Lamp 2					LC3b					
	No POS	POS	No OxPOS	OxPOS		No POS	POS	No OxPOS	OxPOS		No POS	POS	No OxPOS	OxPOS	
36 Hrs	No POS	Mean = 0.7996 ± 0.18	p = 0.7412	p = 0.8375	p = 0.8898	No POS	Mean = 0.7961 ± 0.17	p = 0.7692	p = 0.9997	p = 0.9870	No POS	Mean = 0.6746 ± 0.13	p = 0.9135	p = 0.9795	p = 0.9947
	POS	p = 0.7412	Mean = 0.8707 ± 0.26	p = 0.2549	p = 0.9909	POS	p = 0.7692	Mean = 0.8712 ± 0.23	p = 0.8216	p = 0.9221	POS	p = 0.9135	Mean = 0.7237 ± 0.14	p = 0.7223	p = 0.9768
	No OxPOS	p = 0.8375	p = 0.2549	Mean = 0.7355 ± 0.11	p = 0.4089	No OxPOS	p = 0.9997	p = 0.8216	Mean = 0.8037 ± 0.20	p = 0.9953	No OxPOS	p = 0.9795	p = 0.7223	Mean = 0.6452 ± 0.11	p = 0.9197
	OxPOS	p = 0.8898	p = 0.9909	p = 0.4089	Mean = 0.8490 ± 0.19	OxPOS	p = 0.9870	p = 0.9221	p = 0.9953	Mean = 0.8222 ± 0.21	OxPOS	p = 0.9947	p = 0.9768	p = 0.9197	Mean = 0.6930 ± 0.12
48 Hrs	No POS	Mean = 0.7225 ± 0.11	p = 0.9503	p = 0.9911	p = 0.7481	No POS	Mean = 0.6847 ± 0.13	p = 0.6886	p = 0.8902	p = 0.5965	No POS	Mean = 0.6502 ± 0.13	p = 0.5538	p = 0.9075	p = 0.0543
	POS	p = 0.9503	Mean = 0.7616 ± 0.16	p = 0.8405	p = 0.9660	POS	p = 0.6886	Mean = 0.7704 ± 0.12	p = 0.9804	p = 0.9989	POS	p = 0.5538	Mean = 0.7513 ± 0.16	p = 0.9057	p = 0.6144
	No OxPOS	p = 0.9911	p = 0.8405	Mean = 0.7010 ± 0.14	p = 0.5667	No OxPOS	p = 0.8902	p = 0.9804	Mean = 0.7405 ± 0.17	p = 0.9510	No OxPOS	p = 0.9075	p = 0.9057	Mean = 0.7006 ± 0.13	p = 0.2339
	OxPOS	p = 0.7481	p = 0.9660	p = 0.5667	Mean = 0.7958 ± 0.20	OxPOS	p = 0.5965	p = 0.9989	p = 0.9510	Mean = 0.7819 ± 0.16	OxPOS	p = 0.0543	p = 0.6144	p = 0.2339	Mean = 0.8429 ± 0.28
60 Hrs	No POS	Mean = 0.7182 ± 0.11	p = 0.6411	p = 0.9993	p = 0.0021	No POS	Mean = 0.6636 ± 0.10	p = 0.9175	p = 0.7746	p < 0.0001	No POS	Mean = 0.6525 ± 0.12	p = 0.7502	p = 0.3752	p < 0.0001
	POS	p = 0.6411	Mean = 0.8044 ± 0.16	p = 0.7172	p = 0.0689	POS	p = 0.9175	Mean = 0.7136 ± 0.13	p = 0.9894	p < 0.0001	POS	p = 0.7502	Mean = 0.7274 ± 0.11	p = 0.9276	p < 0.0001
	No OxPOS	p = 0.9993	p = 0.7172	Mean = 0.7273 ± 0.12	p = 0.0032	No OxPOS	p = 0.7746	p = 0.9894	Mean = 0.7379 ± 0.14	p < 0.0001	No OxPOS	p = 0.3752	p = 0.9276	Mean = 0.7734 ± 0.15	p = 0.0002
	OxPOS	p = 0.0021	p = 0.0689	p = 0.0032	Mean = 0.9853 ± 0.15	OxPOS	p < 0.0001	p < 0.0001	p < 0.0001	Mean = 1.143 ± 0.12	OxPOS	p < 0.0001	p < 0.0001	p = 0.0002	Mean = 1.009 ± 0.17
72 Hrs	No POS	Mean = 0.6571 ± 0.12	p = 0.6386	p = 0.8228	p < 0.0001	No POS	Mean = 0.6069 ± 0.10	p = 0.4176	p = 0.9369	p < 0.0001	No POS	Mean = 0.6130 ± 0.11	p = 0.2665	p = 0.8728	p < 0.0001
	POS	p = 0.6386	Mean = 0.7436 ± 0.12	p = 0.9888	p < 0.0001	POS	p = 0.4176	Mean = 0.7265 ± 0.15	p = 0.7927	p < 0.0001	POS	p = 0.2655	Mean = 0.7498 ± 0.11	p = 0.7107	p < 0.0001
	No OxPOS	p = 0.8228	p = 0.9888	Mean = 0.7204 ± 0.13	p < 0.0001	No OxPOS	p = 0.9369	p = 0.7927	Mean = 0.6548 ± 0.12	p < 0.0001	No OxPOS	p = 0.8728	p = 0.7107	Mean = 0.6698 ± 0.14	p < 0.0001
	OxPOS	p < 0.0001	p < 0.0001	p < 0.0001	Mean = 1.255 ± 0.20	OxPOS	p < 0.0001	p < 0.0001	p < 0.0001	Mean = 1.336 ± 0.24	OxPOS	p < 0.0001	p < 0.0001	p < 0.0001	Mean = 1.355 ± 0.28

Note: SD = Standard deviation

Supplementary Table 3

Distance from apical the RPE membrane																							
36 Hrs	None/Early				Intermediate/ Advacned				Aggregating			48 Hrs	None/Early				Intermediate/ Advacned				Aggregating		
		POS	OxPOS			POS	OxPOS			POS	OxPOS			POS	OxPOS			POS	OxPOS			POS	OxPOS
		Mean = 0.70 ± 0.47	p = 0.9993			Mean = 1.8 ± 0.53	p = 0.5584			Mean = 4.57 ± 0			Mean = 0.72 ± 0.19	p = 0.9999			Mean = 1.7 ± 0.38	p = 0.9999			Mean = 5.93 ± 0		
	OxPOS	p = 0.9993	Mean = 0.85 ± 0.26		OxPOS	p = 0.5584	Mean = 2.12 ± 0.26		OxPOS		Mean = 2.86 ± 0.44		OxPOS	p = 0.9999	Mean = 0.66 ± 0.25		OxPOS	p = 0.9999	Mean = 1.7 ± 0.64		OxPOS		Mean = 3.61 ± 1.13
60 Hrs	None/Early				Intermediate/ Advacned				Aggregating			72Hrs	None/Early				Intermediate/ Advacned				Aggregating		
		POS	OxPOS			POS	OxPOS			POS	OxPOS			POS	OxPOS			POS	OxPOS			POS	OxPOS
		Mean = 0.726 ± 0.19	p = 0.9948			Mean = 2.1 ± 0.30	p = 0.0055			Mean = 3.12 ± 0			Mean = 0.38 ± 0.13	p = 0.9828			Mean = 1.62 ± 0.26		Mean = 2.6 ± 0				
	OxPOS	p = 0.9948	Mean = 0.66 ± 0.21		OxPOS	p = 0.0055	Mean = 1.6 ± 0.30		OxPOS		Mean = 3.13 ± 0.48		OxPOS	p = 0.9828	Mean = 0.56 ± 0		OxPOS		Mean = 1.76 ± 0		OxPOS		Mean = 3.66 ± 1.45

Note: Only mean values are shown were data points in at least one group contained n=1. SD = Standard deviation

Supplementary Table 4

Autofluorescence data																													
2 Hours					6 Hours					12 Hours					24 Hours					48 Hours					72 Hours				
	No POS (control)	POS	OxPOS			No POS (control)	POS	OxPOS			No POS (control)	POS	OxPOS			No POS (control)	POS	OxPOS			No POS (control)	POS	OxPOS			No POS (control)	POS	OxPOS	
No POS (control)	Mean = 59.66 ± 11.7	p = 0.3302	p = 0.0075		No POS (control)	Mean = 61.95 ± 27.7	p = 0.6215	p = 0.8003		No POS (control)	Mean = 41.73 ± 22.5	p = 0.6675	p = 0.0008		No POS (control)	Mean = 43.24 ± 14.8	p = 0.875	p < 0.0001		No POS (control)	Mean = 31.87 ± 7.5	p = 0.8446	p < 0.0001		No POS (control)	Mean = 30.85 ± 6.5	p = 0.9994	p < 0.0001	
POS	p = 0.3302	Mean = 44.24 ± 21.4	p = 0.2238		POS	p = 0.6215	Mean = 50.59 ± 13.5	p = 0.2649		POS	p = 0.6675	Mean = 55.89 ± 24.8	p = 0.0114		POS	p = 0.875	Mean = 35.24 ± 12.2	p < 0.0001		POS	p = 0.8446	Mean = 23.46 ± 9.1	p < 0.0001		POS	p = 0.9994	Mean = 31.28 ± 11.6	p < 0.0001	
OxPOS	p = 0.0075	p = 0.2238	Mean = 26.26 ± 11.04		OxPOS	p = 0.8003	p = 0.2649	Mean = 42.83 ± 17.7		OxPOS	p = 0.0008	p = 0.0114	Mean = 104.6 ± 26.5		OxPOS	p < 0.0001	p < 0.0001	Mean = 122.7 ± 29.8		OxPOS	p < 0.0001	p < 0.0001	Mean = 124.6 ± 20.6		OxPOS	p < 0.0001	p < 0.0001	Mean = 98.85 ± 34.3	

Note: SD = Standard deviation