Supporting Information

Remarkable Amplification of Polyethylenimine-Mediated Gene Delivery Using Cationic Poly(phenylene ethynylene)s as Photosensitizers

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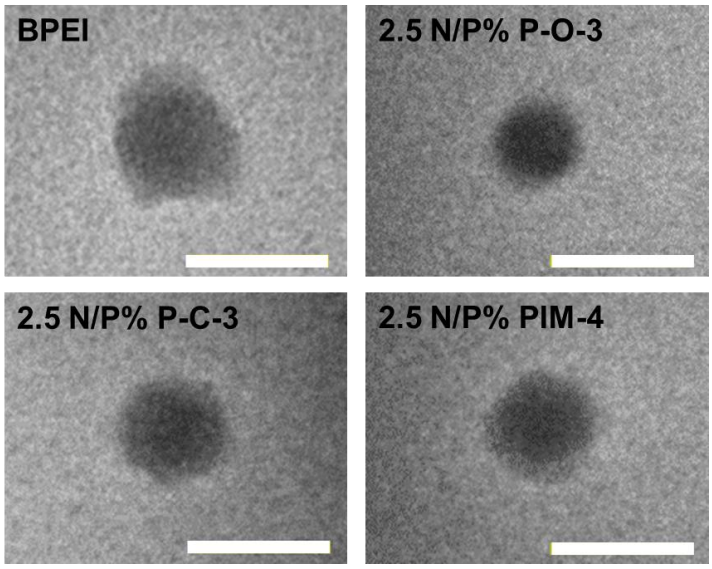

Figure S1. TEM images of BPEI/DNA complex and 2.5 N/P% cPPE-containing BPEI/DNA polyplexes (N/P 8) prepared by the sequential mix method. The scale bars indicate 100 nm.

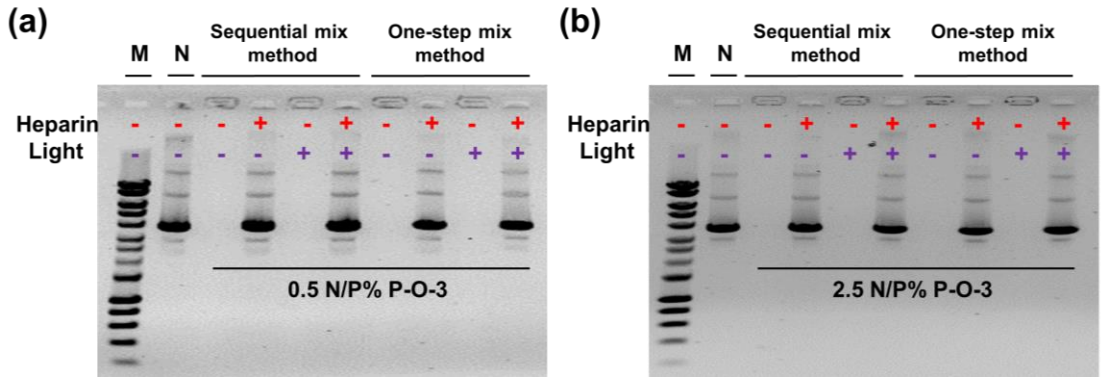

Figure S2. Agarose gel analysis for (a) 0.5 N/P% and (b) 2.5 N/P% P-O-3-containing BPEI/DNA polyplexes (N/P 8) prepared by sequential mix method or one-step mix method. "+" and "-" in red denote the presence and absence of heparin treatment, respectively. "+" and "-" in purple denote the presence and absence of light irradiation, respectively. "M" and "N" represent 10 kb DNA ladder and naked plasmid, respectively.

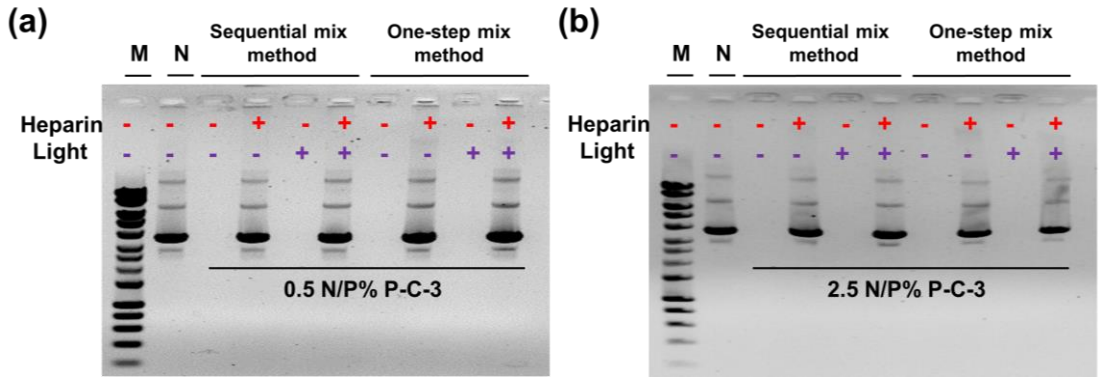

Figure S3. Agarose gel analysis for (a) 0.5 N/P% and (b) 2.5 N/P% P-C-3-containing BPEI/DNA polyplexes (N/P 8) prepared by sequential mix method or one-step mix method. "+" and "-" in red denote the presence and absence of heparin treatment, respectively. "+" and "-" in purple denote the presence and absence of light irradiation, respectively. "M" and "N" represent 10 kb DNA ladder and naked plasmid, respectively.

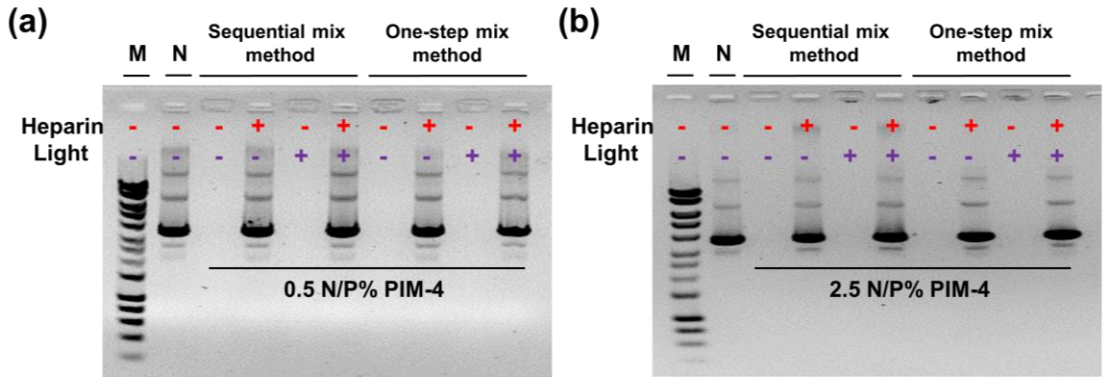

Figure S4. Agarose gel analysis for (a) 0.5 N/P% and (b) 2.5 N/P% PIM-4-containing BPEI/DNA polyplexes (N/P 8) prepared by sequential mix method or one-step mix method. "+" and "-" in red denote the presence and absence of heparin treatment, respectively. "+" and "-" in purple denote the presence and absence of light irradiation, respectively. "M" and "N" represent 10 kb DNA ladder and naked plasmid, respectively.

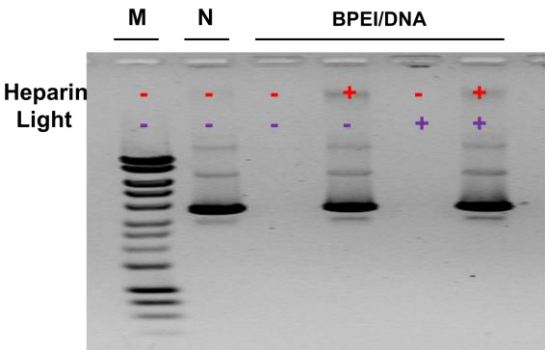

Figure S5. Agarose gel analysis for BPEI/DNA complex (N/P 8). "+" and "-" in red denote the presence and absence of heparin treatment, respectively. "+" and "-" in purple denote the presence and absence of light irradiation, respectively. "M" and "N" represent 10 kb DNA ladder and naked plasmid, respectively.

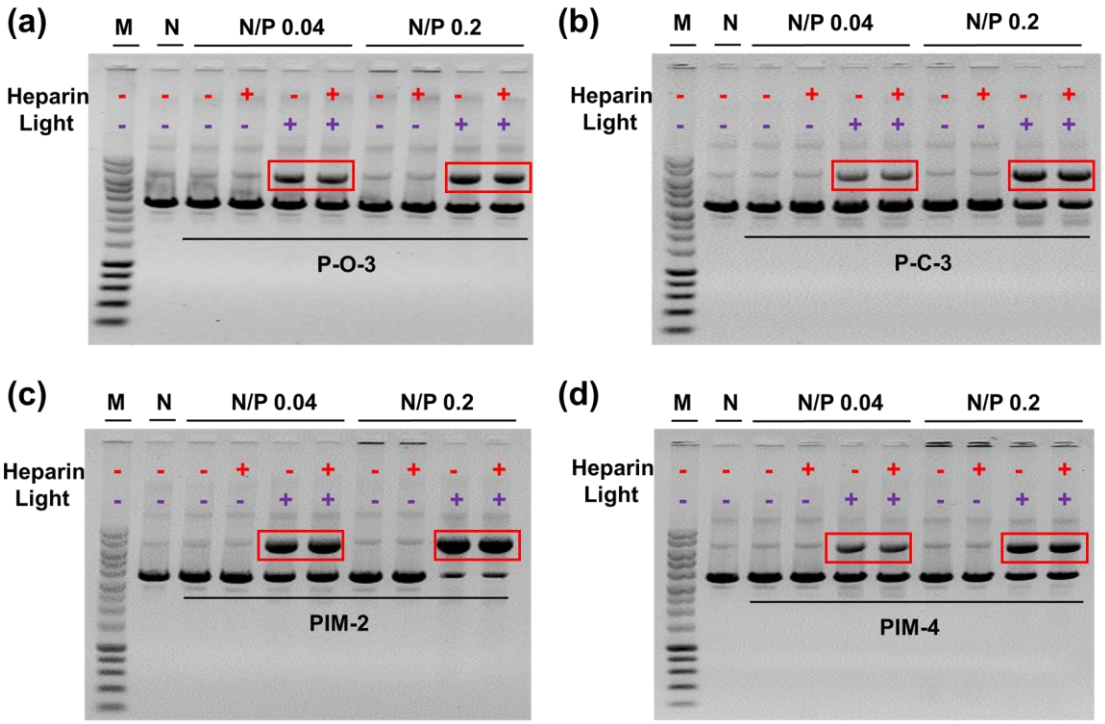

Figure S6. (a-d) Agarose gel analysis for cPPE/DNA polyplexes (N/P 0.04 and N/P 0.2). "+" and "-" in red denote the presence and absence of heparin treatment, respectively. "+" and "-" in purple denote the presence and absence of light irradiation, respectively. "M" and "N" represent 10 kb DNA ladder and naked plasmid, respectively. The red squares indicate the appearance of unwound DNA.

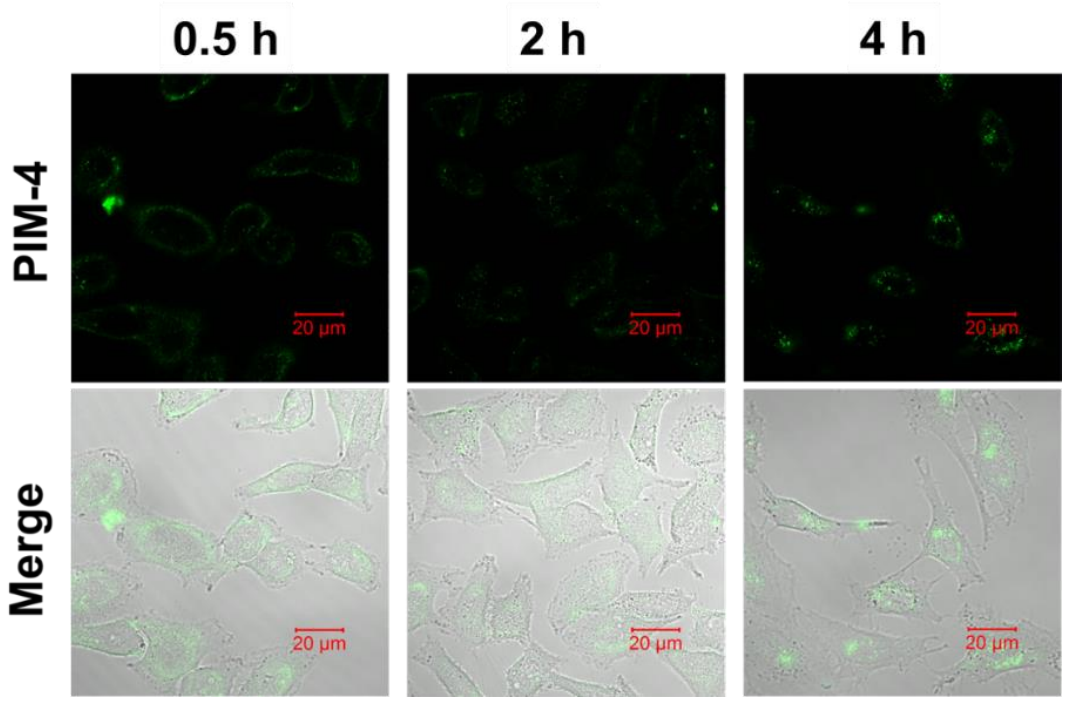

Figure S7. CLSM images for HeLa cells incubated with PIM-4 over a period of 0.5, 2, and 4 h, respectively. The excitation was at 488 nm.

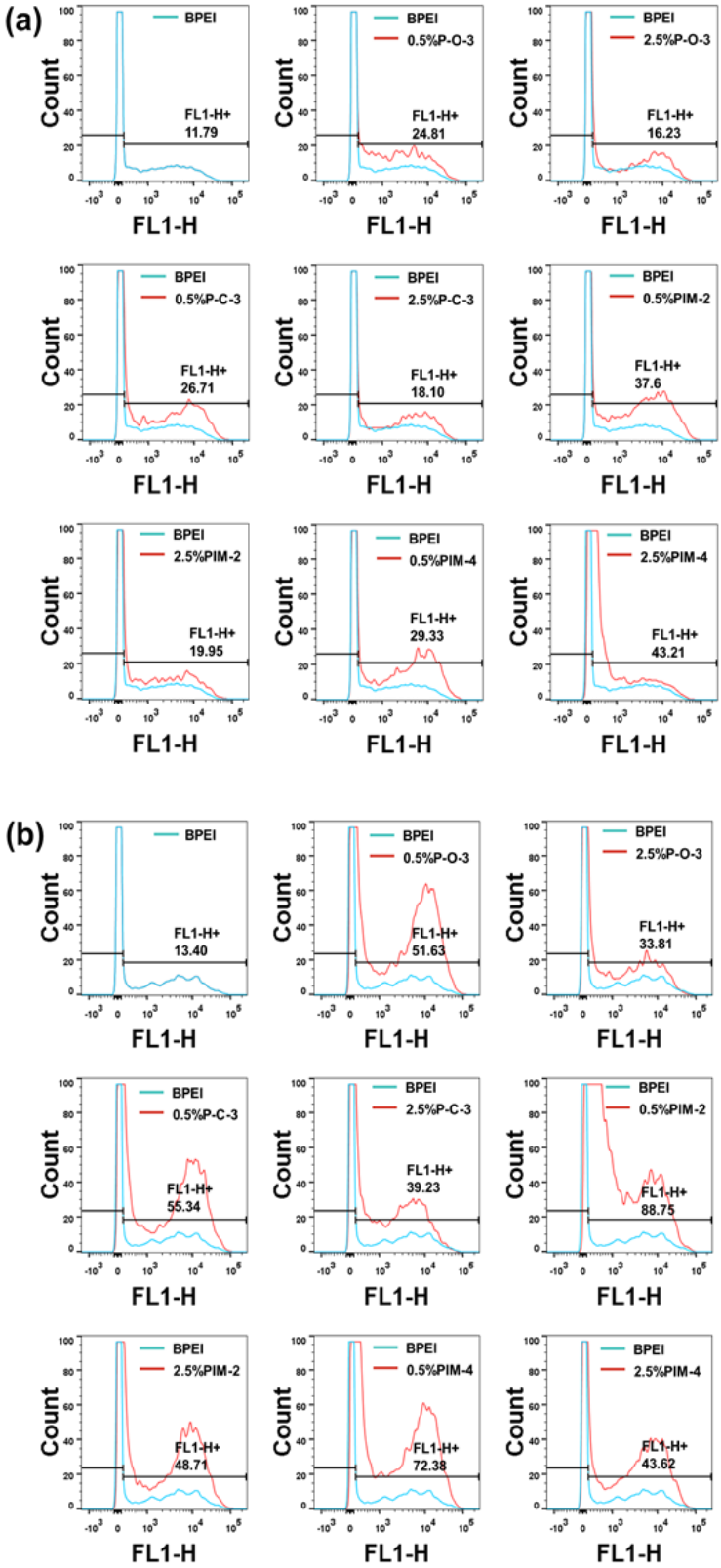

Figure S8. Flow cytometric analysis for HeLa cells after (a) nonPCI-assisted and (b) PCI-assisted transfection by different cPPE-containing BPEI/pGFP polyplexes prepared by the sequential mix method. BPEI/pGFP complexes were used as control.

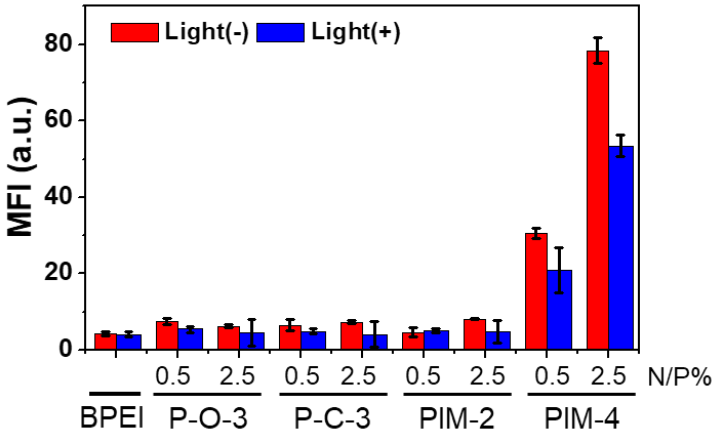

Figure S9. Mean fluorescence intensity (MFI) of HeLa cells after transfection by cPPE-containing BPEI/pLuc polyplexes, determined by flow cytometric analysis. Transfection by BPEI/pLuc was used as control.

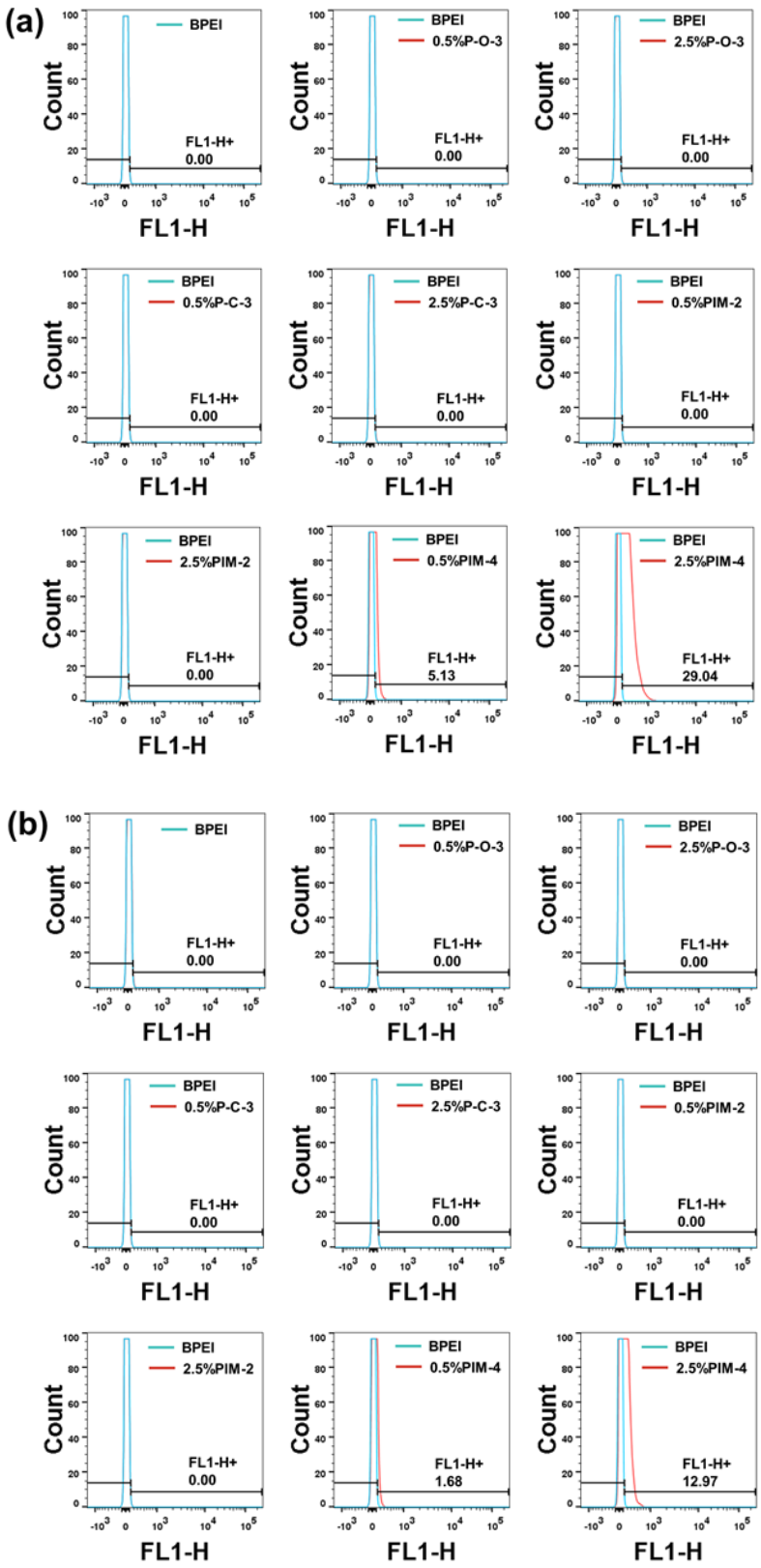

Figure S10. Flow cytometric analysis for HeLa cells after (a) nonPCI-assisted and (b) PCI-assisted transfection by different cPPE-containing BPEI/pLuc polyplexes prepared by the sequential mix method. BPEI/pLuc complexes were used as control.

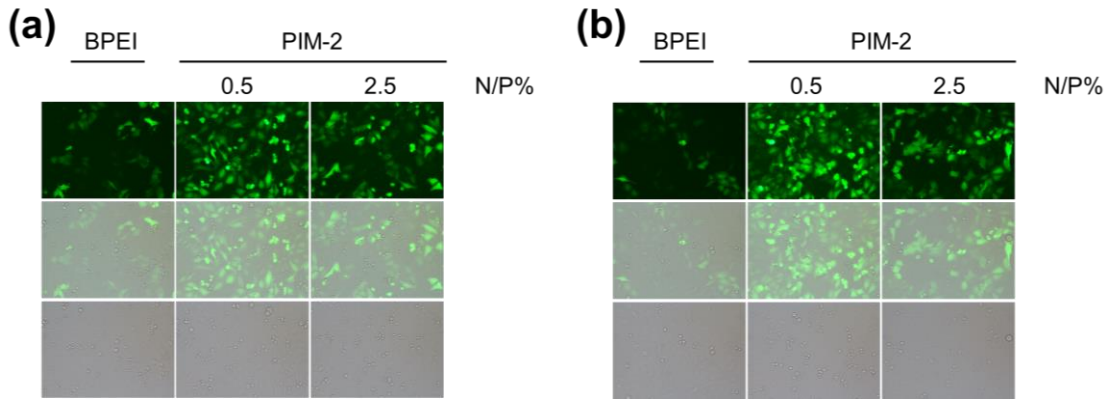

Figure S11. Fluorescence of HeLa cells expressing GFP after (a) nonPCI-assisted and (b) PCI-assisted transfection by PIM-2 containing polyplexes (2 μg/mL pGFP) in 96-well plates. The polyplexes were pre-irradiated by LED light (100 mW/cm^2, 3 min) before transfection.

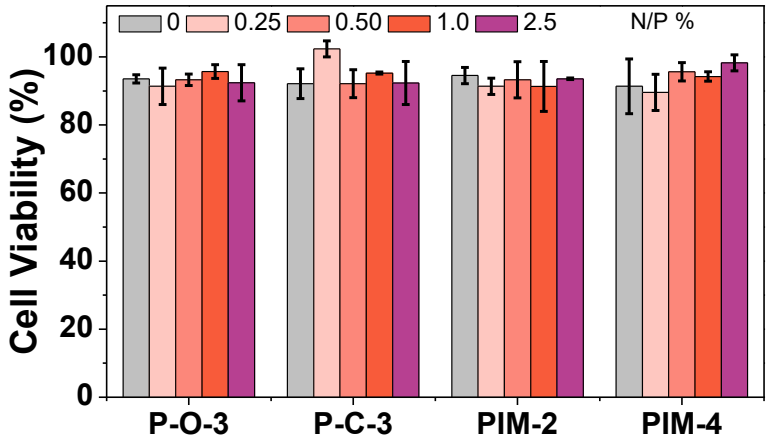

Figure S12. MTT assay results for cell viabilities of HeLa cells treated by LED light (the excitation wavelength were 405, 385, 435 and 435 nm for P-O-3, P-C-3, PIM-2 and PIM-4, respectively. 100 mW/cm^2, 1 min).

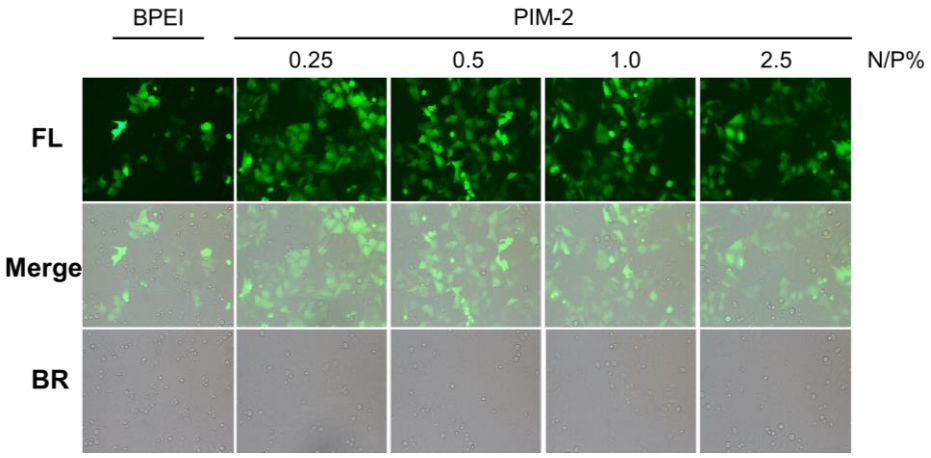

Figure S13. Fluorescence of HeLa cells expressing GFP after PCI-assisted transfection by PIM-2-containing BPEI/pGFP polyplexes (2 μg/mL pGFP). The N/P% of PIM-2 was in a range of 0.25% to 2.5%. Light irradiation was applied for 1 min at 100 mW/cm^2.

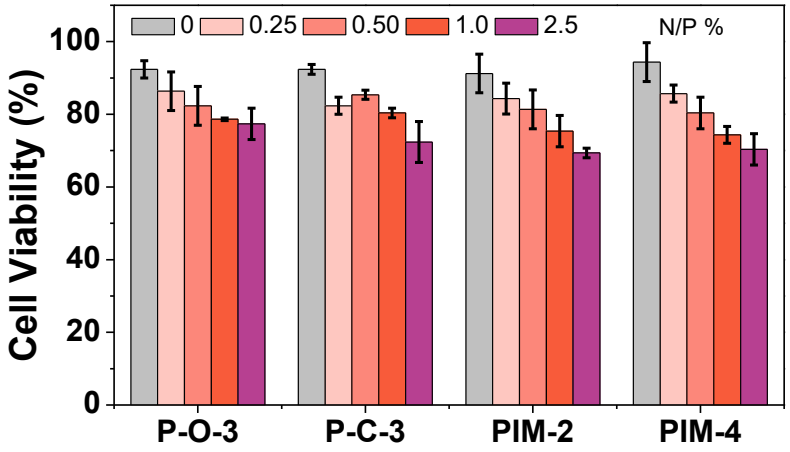

Figure S14. MTT assay results for cell viabilities of HeLa cells treated by LED light (the excitation wavelength were 405, 385, 435 and 435 nm for P-O-3, P-C-3, PIM-2 and PIM-4, respectively. 100 mW/cm^2, 5 min).