Electronic Supplementary Material (ESI) for Polymer Chemistry

Supporting Information

Water-Soluble BODIPY-Conjugated Glycopolymer as Fluorescent Probe for Live Cell Imaging

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1. Synthesis of BODIPYMA (**Scheme S1, Figures S1, S2** and **S3**).

2. Synthesis of AcGEMA (**Scheme S2, Figures S4** and **S5**).

3. The time-dependence of polymerization time and Ln (M_0/M) (**Figure S6**).

4. The content of BODIPYMA in copolymer (**Figure S7**).

5. GPC profile of p(AcGEMA-*co*-BODIPYMA) (**Figure S8**).

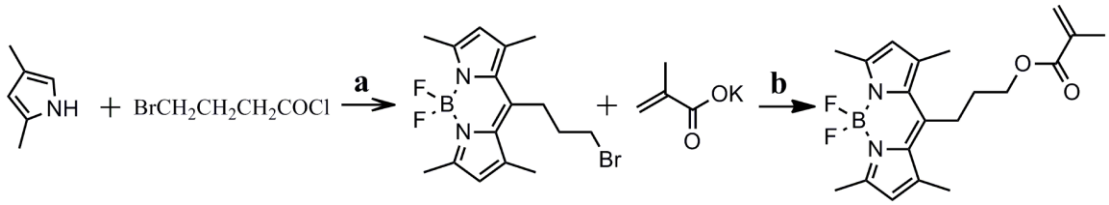
6. ^{13}C NMR spectrum of p(AcGEMA-*co*-BODIPYMA) (**Figure S9**).

7. ^{13}C NMR spectra of p(GEMA-*co*-BODIPYMA) (**Figures S10** and **S11**).

8. Synthesis of p(HEMA-*co*-BODIPYMA) (**Scheme S3, Figures S12 and S13**).

9. Cytotoxicity of p(HEMA-*co*-BODIPYMA) and BODIPYMA (Figures S14 and S15).

1. Synthesis of BODIPYMA



Scheme S1. Synthesis of BODIPYMA. Conditions: a) DCM, N_2, Et_3N, $BF_3{\cdot}Et_3O$, room temperature; b) DMF, N_2, tetrabutylammonium bromide, 60 ^{o}C, 16 h.

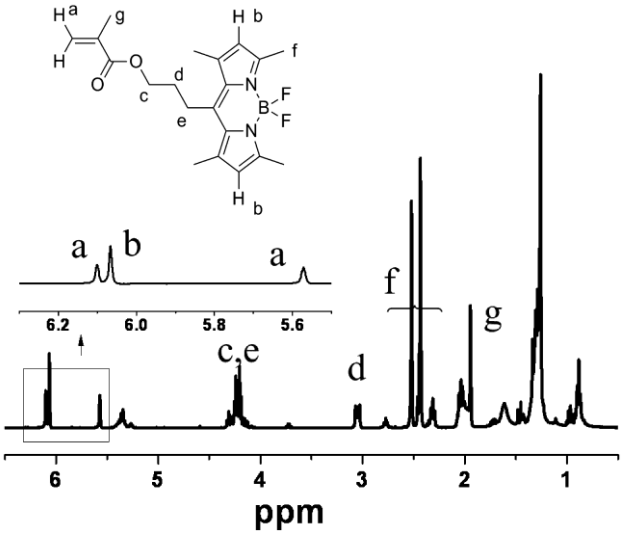


Figure S1. ^{1}H NMR spectrum of BODIPYMA ($CDCl_3$ as solvent).

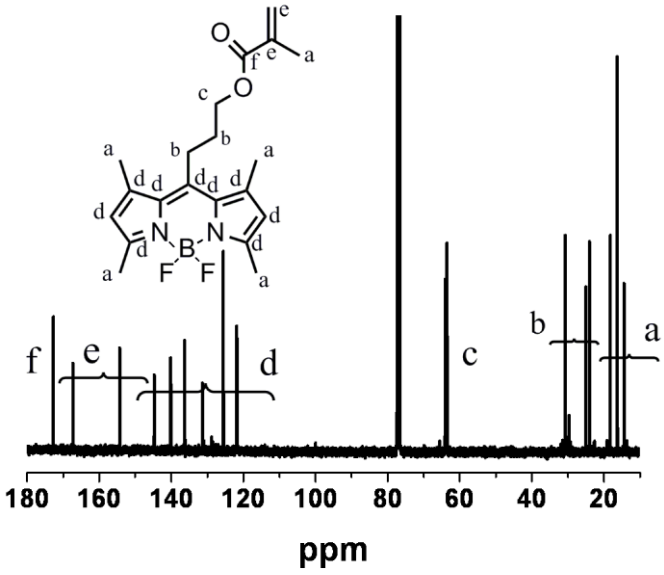


Figure S2. ^{13}C NMR spectrum of BODIPYMA ($CDCl_3$ as solvent).

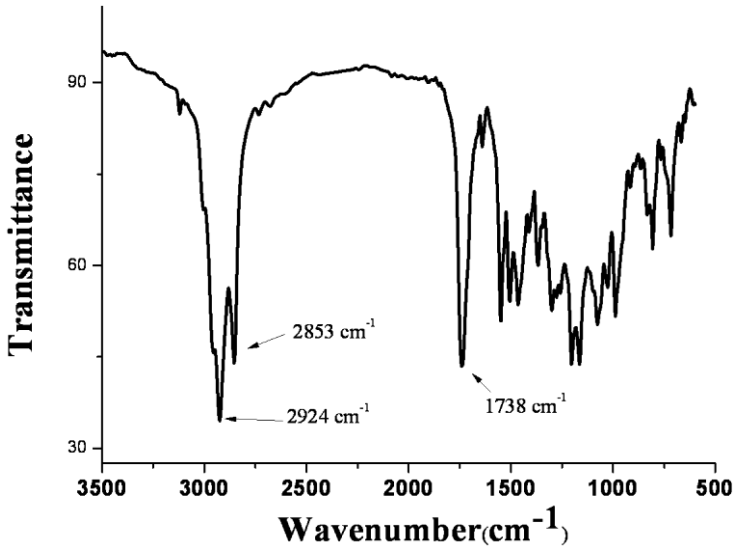
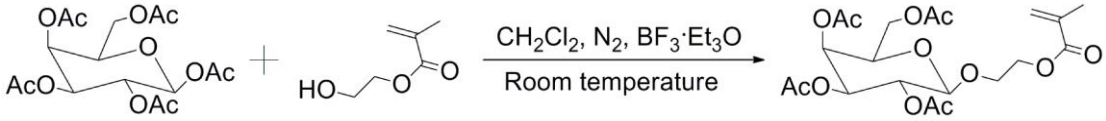


Figure S3. FT-IR spectrum of BODIPYMA.

The peaks at 2853 and 2924 cm^{-1} were assigned to C-H stretching vibrations of $=CH_2$. The peak at 1738 cm^{-1} represented C=O stretching vibrations. The result proved the introduction of methylacrylate unit.

2. Synthesis of AcGEMA



Scheme S2. Synthesis of AcGEMA.

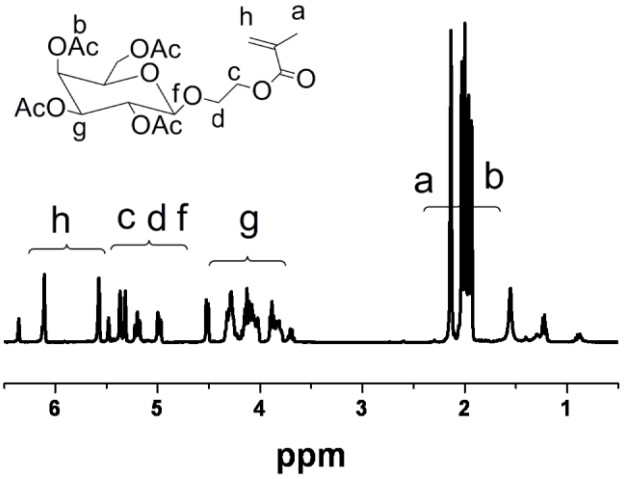


Figure S4. ^1H NMR spectrum of AcGEMA ($CDCl_3$ as a solvent).

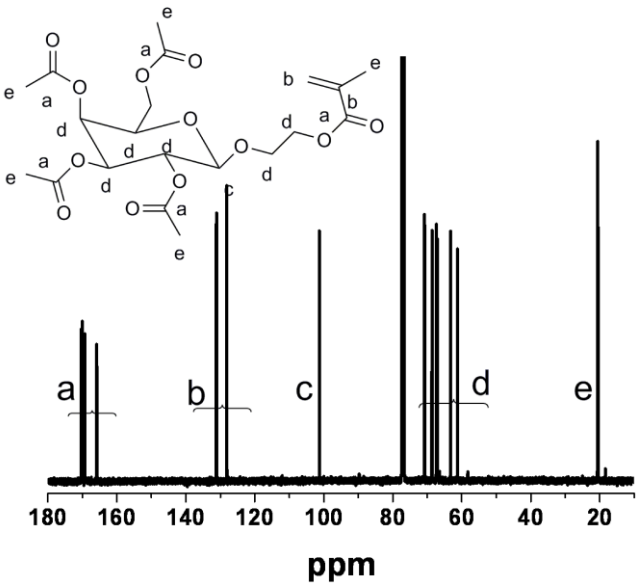


Figure S5. ^{13}C NMR spectrum of AcGEMA ($CDCl_3$ as a solvent).

3. The time-dependence of polymerization time and Ln (M_0/M)

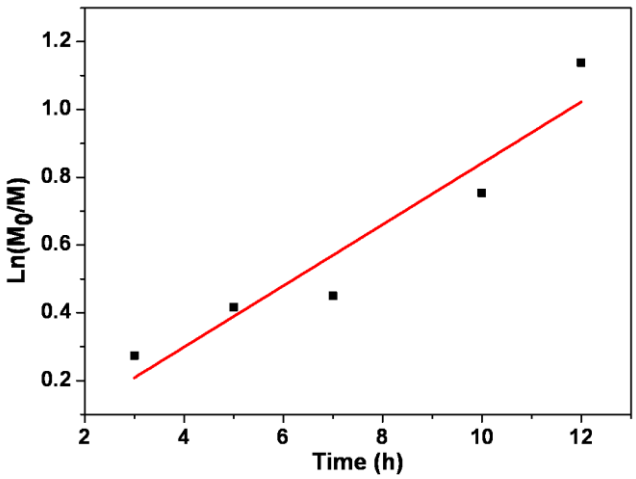


Figure S6. The time-dependence of polymerization time and Ln (M_0/M).

The polymers showed a typical linear variation of Ln (M_0/M) with polymerization time, which was inherent in living free radical polymerizations. The intersection of the fitting straight line and the X axis was not at the origin, showing that the polymerization needed an induction period.

4. The content of BODIPYMA in copolymer

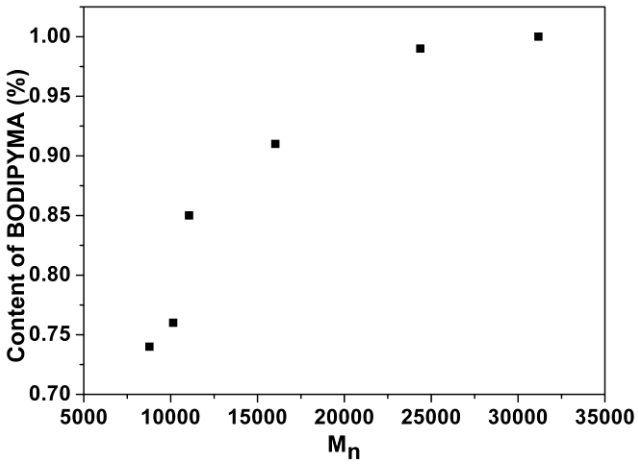


Figure S7. The BODIPYMA content as a function of the molecular weight of copolymer.

The results in Figure S7 show that there was a positive correlation nonlinearly between the BODIPYMA content and the molecular weight of copolymer, and the content of BODIPYMA increased from 0.74% to 1% as the molecular weight enhanced from 8.8 to 31.2 kDa.

5. GPC profiles of p(AcGEMA-*co*-BODIPYMA)

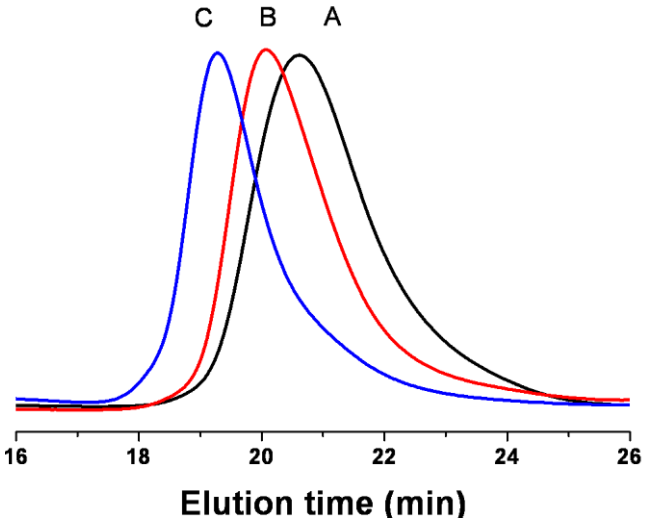


Figure S8. GPC profiles of p(AcGEMA-*co*-BODIPYMA): (A) M_n = 10.7 kDa, PDI = 1.32; (B) M_n = 20.8 kDa, PDI = 1.18; and (C) M_n = 31.2 kDa, PDI = 1.13. THF as an

eluent and polystyrene as a calibration standard.

6. ^{13}C NMR spectrum of p(AcGEMA-*co*-BODIPYMA)

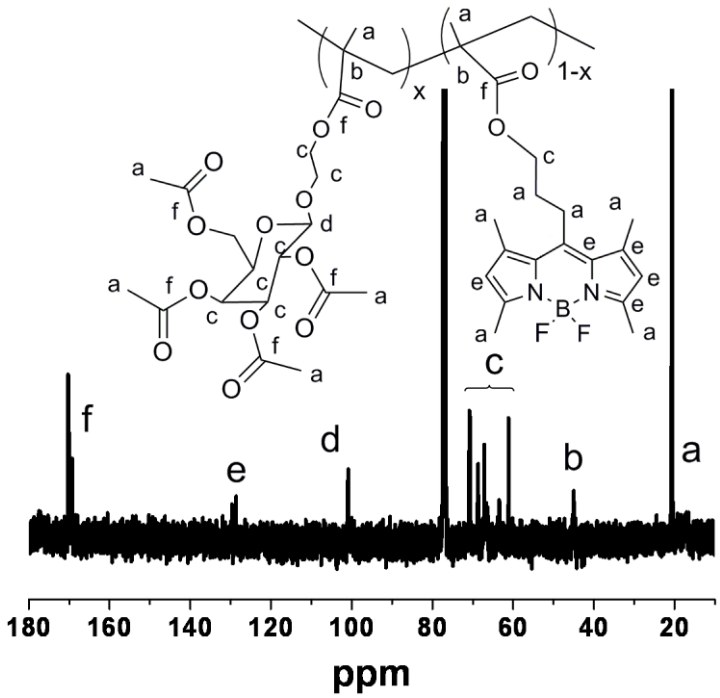


Figure S9. ^{13}C NMR spectrum of p(AcGEMA-*co*-BODIPYMA) (CD_3Cl as solvent).

7. ^{13}C NMR spectra of p(GEMA-*co*-BODIPYMA)

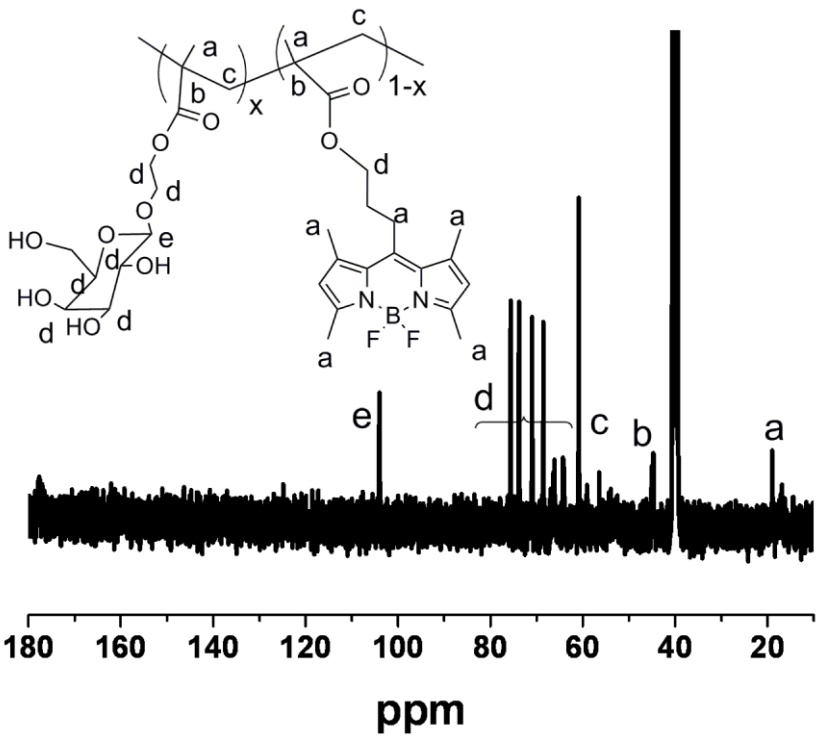


Figure S10. ^{13}C NMR spectrum of p(GEMA-*co*-BODIPYMA) (DMSO as solvent).

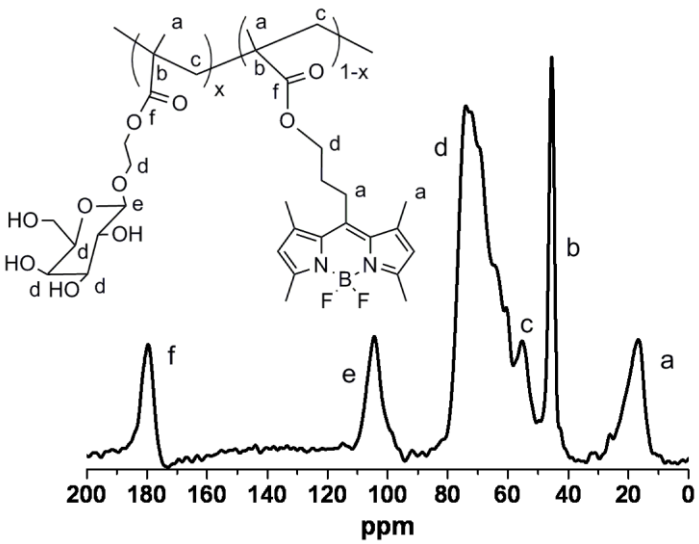
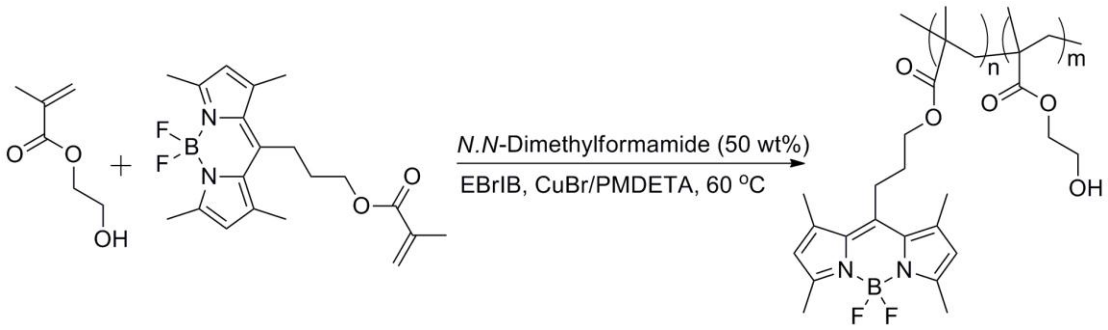


Figure S11. ^{13}C NMR spectrum of p(GEMA-*co*-BODIPYMA) in solid.

8. Synthesis of of p(HEMA-*co*-BODIPYMA)



Scheme S3. Scheme for the synthesis of p(HEMA-*co*-BODIPYMA).

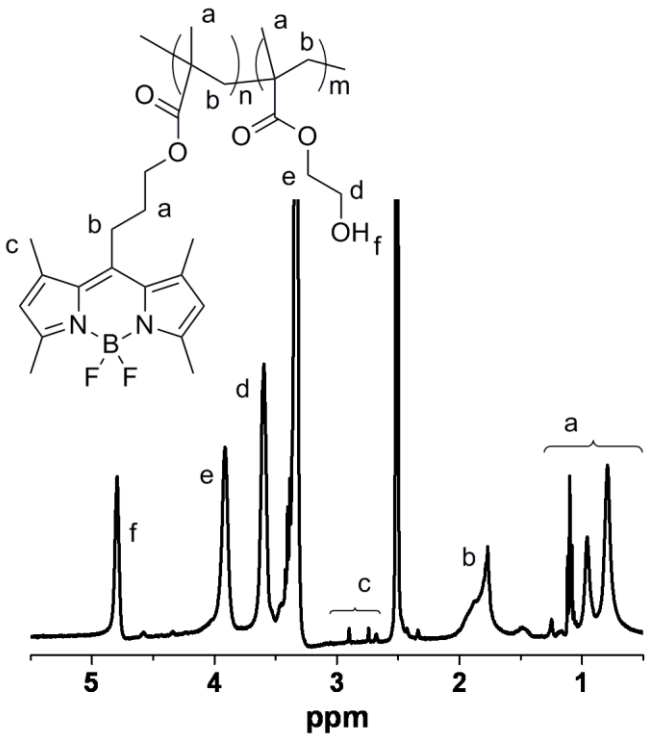


Figure S12. ^{1}H NMR of p(HEMA-*co*-BODIPYMA) (DMSO as solvent).

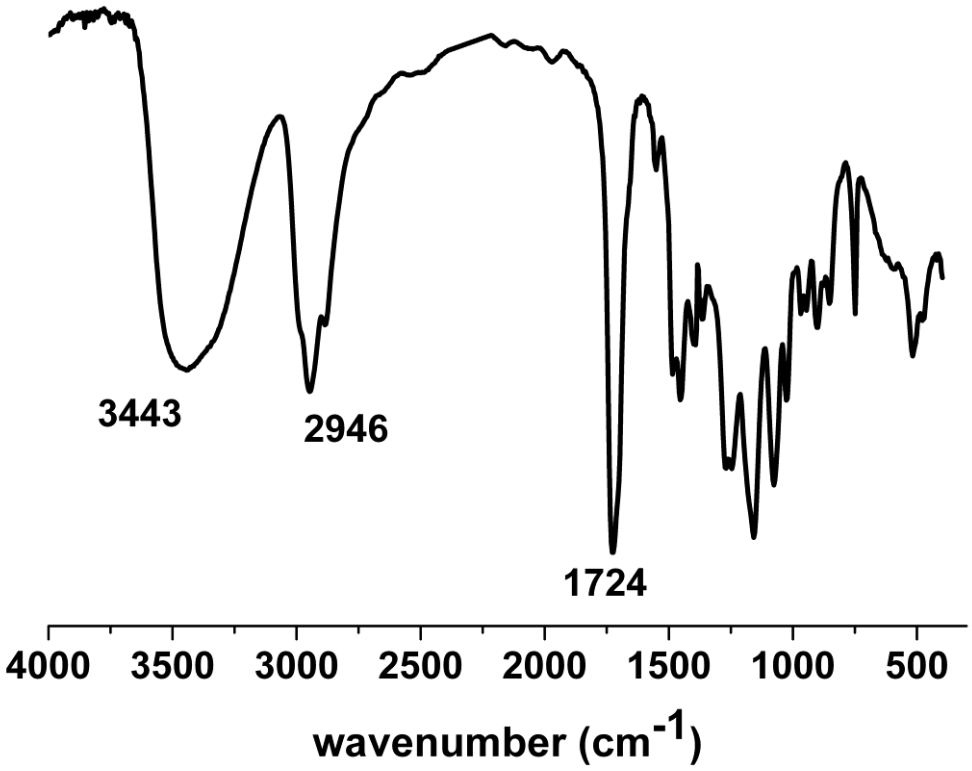
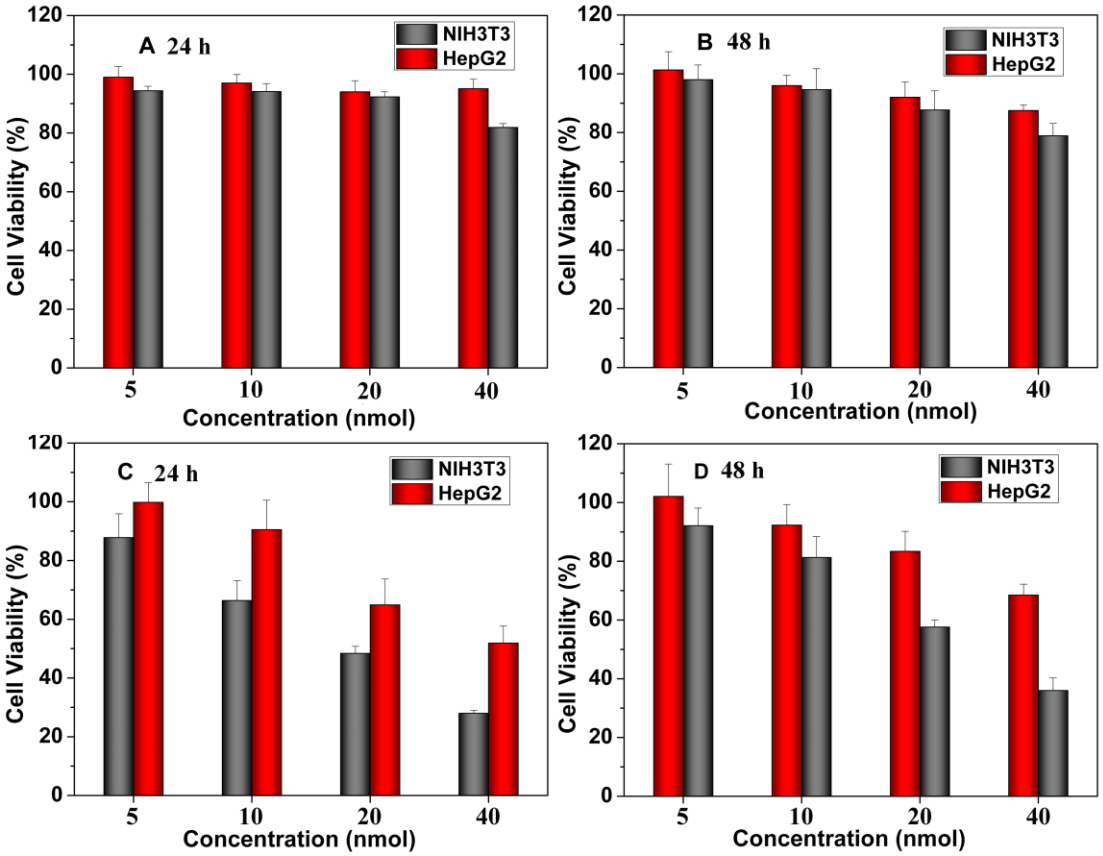


Figure S13. FT-IR spectrum of p(HEMA-*co*-BODIPYMA).

9. Cytotoxicity of p(HEMA-*co*-BODIPYMA) and BODIPYMA (Figures S14 and S14).



Figures S14. Cell viability of HepG2 and NIH3T3 cells after the treatment with the p(HEMA-*co*-BODIPYMA) and BODIPYMA. p(HEMA-*co*-BODIPYMA) (A and B); and BODIPYMA (C and D). Each value represents the mean ± SD (n = 5).

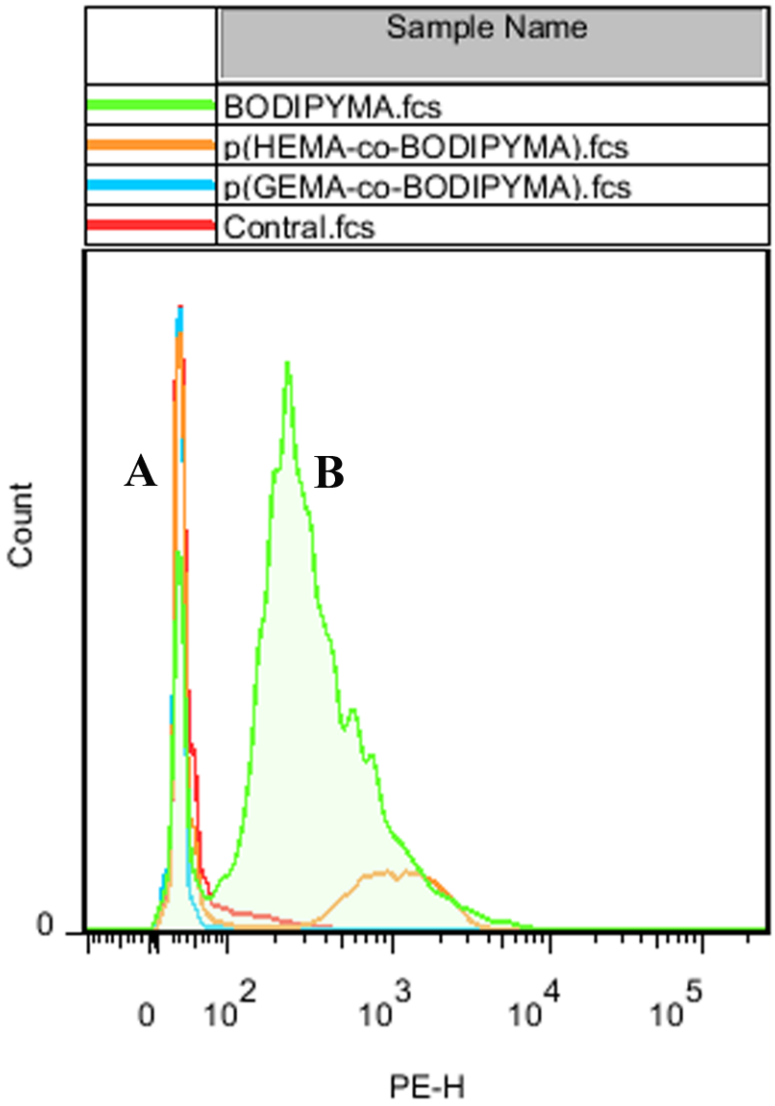


Figure S15. Histograms of ethidium bromide as an indicator of apoptosis in NIH3T3 cells treated with 40 nmol/ml of p(GEMA-*co*-BODIPYMA), p(HEMA-*co*-BODIPYMA) and BODIPYMA for 24 h, respectively. (A) viable cell population and (B) apoptotic cell population.