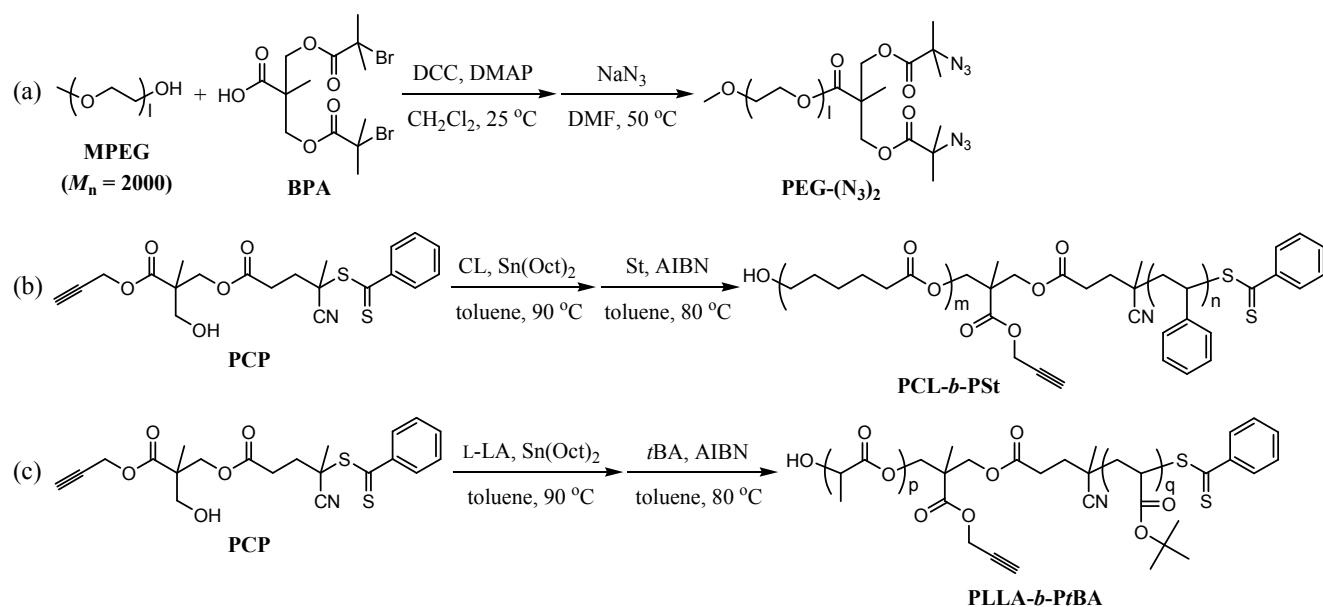


Supporting Information

Synthesis of an amphiphilic PEG-PCL-PSt-PLLA-PAA star quintopolymer and its self-assembly for pH-sensitive drug delivery

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Scheme S1. Synthetic routes to PEG-(N₃)₂ (A) and alkyne-mid-functionalized PCL-*b*-PSt (BC) and PLLA-*b*-PtBA (DE') diblock copolymers

Table S1. Solubility of ABCDE star and its precursors (A = PEG; B = PCL; C = PSt; D = PLLA, E' = PtBA; E = PAA) in various solvents

Sample	hexane	toluene	ether	methanol	acetone	water	THF	chloroform	dioxane	DMSO
ABCDE	–	+	–	–	+	–	+	+	+	+
DE	–	+	–	–	+	–	+	+	+	+
ABCDE'	–	+	–	–	±	–	+	+	+	+
ABCDE	–	+	–	–	±	–	±	–	±	+

+: soluble; ±: partly soluble; -: insoluble.

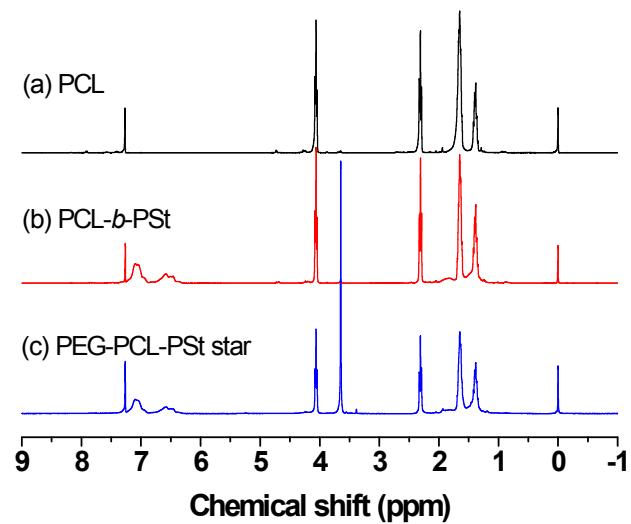


Fig. S1 ¹H NMR spectra of alkyne-functionalized PCL (a) and PCL-*b*-PSt (b) and one-azide-functionalized ABC star (c).

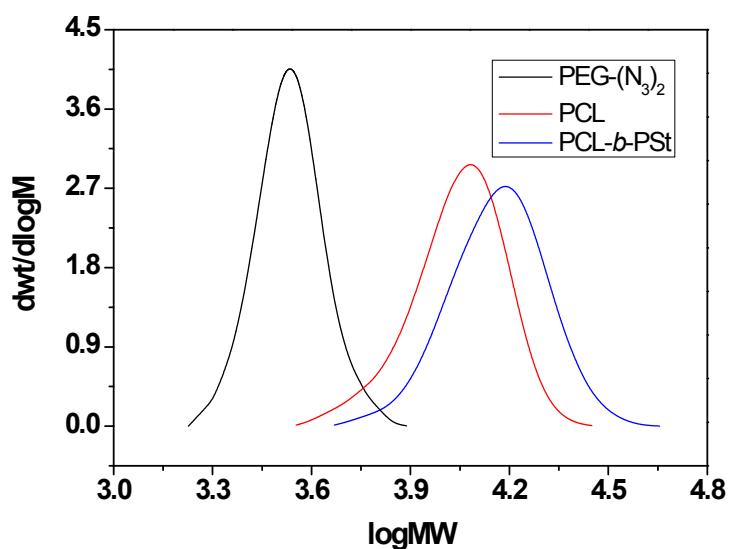


Fig. S2 GPC traces of PEG- $(N_3)_2$ ($M_{n, GPC} = 3380$, PDI = 1.08), PCL ($M_{n, GPC} = 10900$, PDI = 1.11) and PCL-*b*-PSt ($M_{n, GPC} = 14200$, PDI = 1.12).

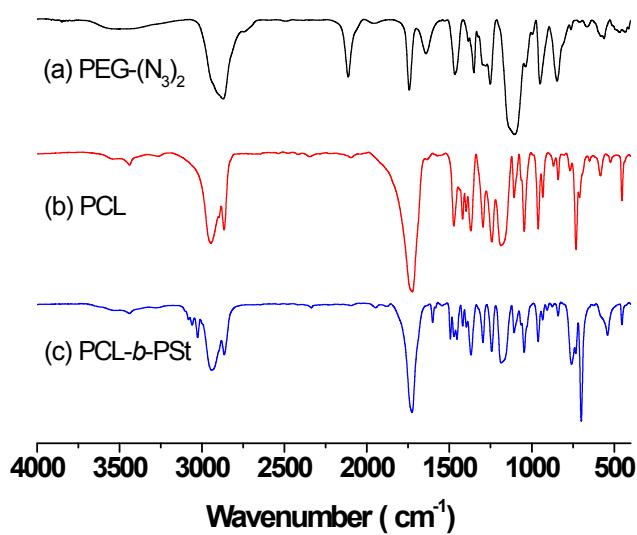


Fig. S3 IR spectra of PEG-(N₃)₂, PCL and PCL-*b*-PSt.

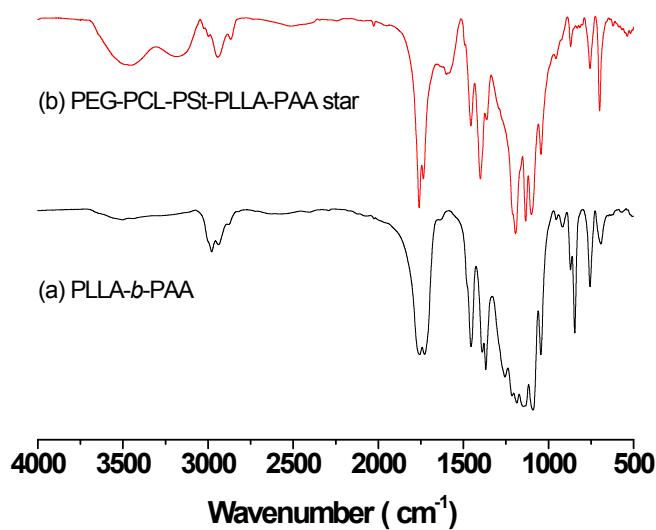


Fig. S4 IR spectra of DE (a) and S2 (b) copolymers obtained by hydrolysis.

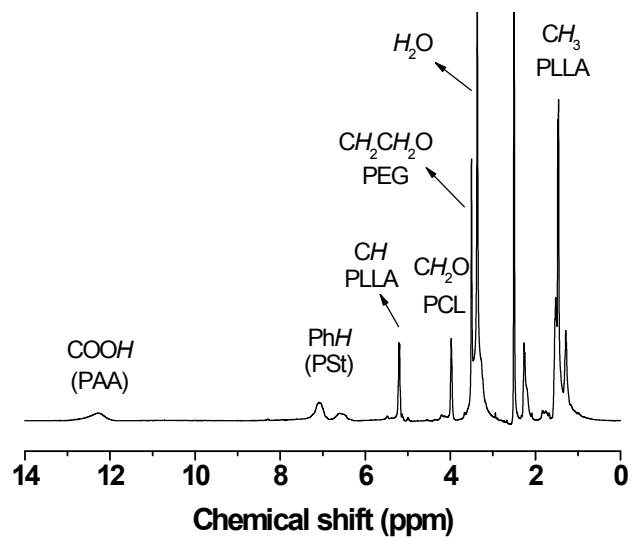


Fig. S5 ^1H NMR spectrum of PEG-PCL-PSt-PLLA-PAA (S2) star in $\text{DMSO}-d_6$.

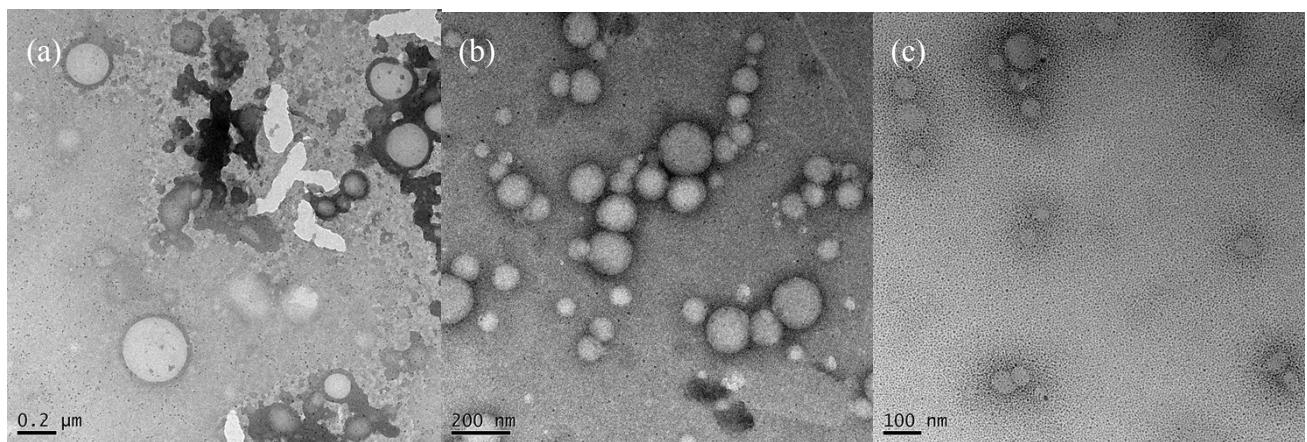


Fig. S6 TEM image of self-assembled nanostructures formed by PEG-PCL-PSt (a), PLLA-*b*-PAA (b), and PEG-PCL-PSt-PLLA-PAA (S2, c) copolymers in aqueous solution ($c = 0.50 \text{ mg mL}^{-1}$).

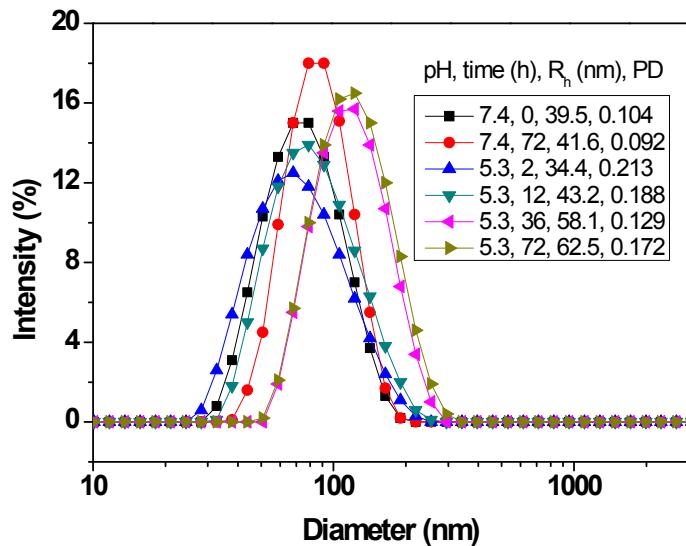


Fig. S7 DLS plots of PEG-PCL-PSt-PLLA-PAA (S2, $c = 0.50 \text{ mg mL}^{-1}$) aggregates in PBS solution (pH 7.4 or 5.3, 50 mM) at 37 °C for different time periods ($t = 0, 2, 12, 36$ and 72 h).

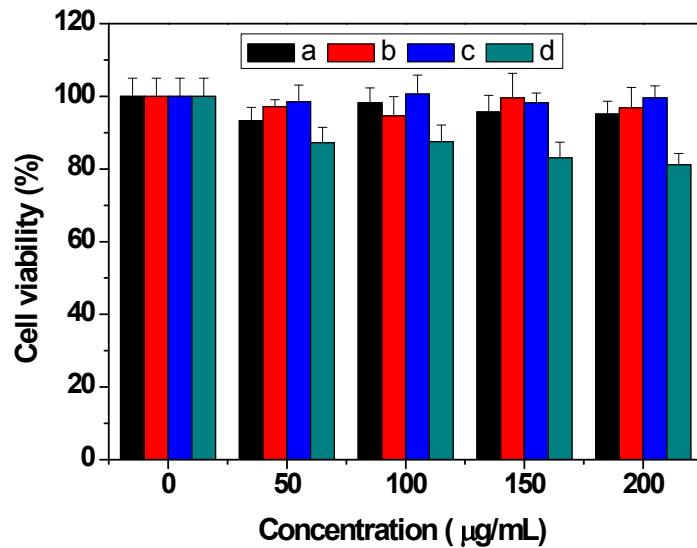


Fig. S8 Cytotoxicity of blank (a-c) and DOX-loaded (d) S2 vesicles on L02 cells as measured by MTT assay, in which L02 cells were exposed to different concentrations of copolymer aggregates at 37 °C for 12 (a), 24 (b), and 48 h (c and d).