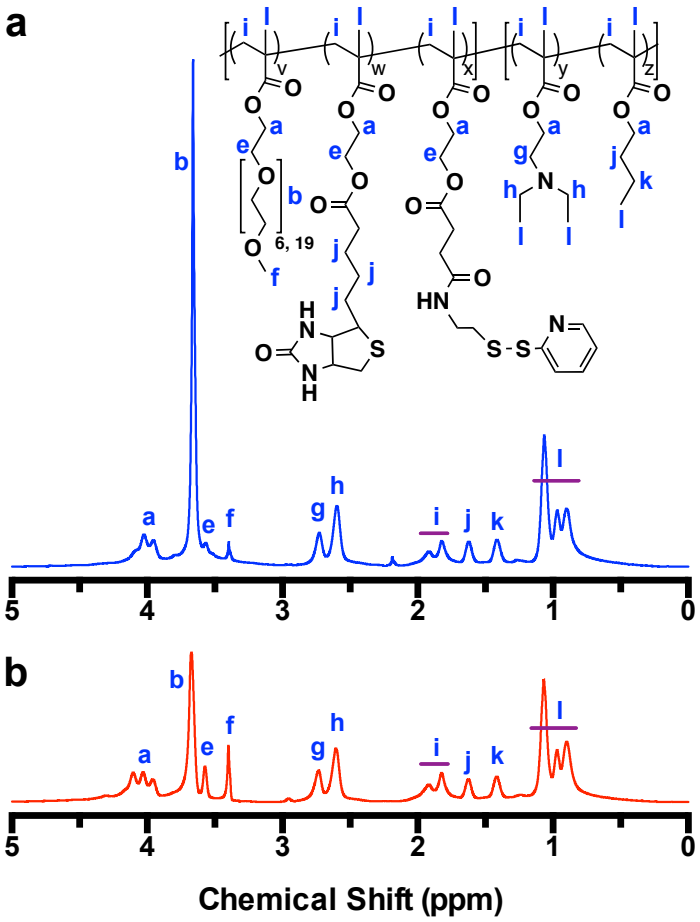

Fig. S1. ^{1}H-NMR spectrum of (a) Pol950 and (b) Pol300 confirms the chemical composition of the diblock copolymers. Scans were conducted in $CDCl_3$ at 500 MHz. Successful preparation of the indicated chemical structure was confirmed by the appearance of resonances associated with each of the comonomers.

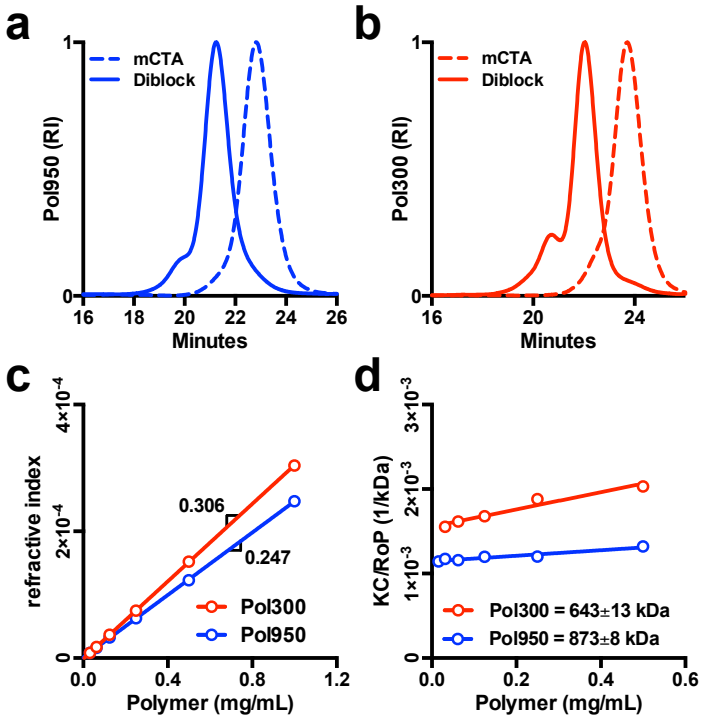

Fig. S2. GPC-SEC and SLS characterization of polymers. SEC-GPC chromatogram of the **(a)** Pol950 macroCTA (blue solid line) and diblock copolymer (blue dotted line), **(b)** Pol300 macroCTA (red solid line) and diblock copolymer (red dotted line) measured by refractive index detection. **(c)** The dn/dc of Pol950 and Pol300 micelles was quantified with serial dilutions of the polymers in PBS and measured by refractive index. The linear slope of the data sets was defined as the dn/dc. **(d)** SLS was used to measure the M_n of Pol950 and Pol300 micelles. Serial dilutions were measured and plotted as calculated KC/Rop values as a function of polymer concentration

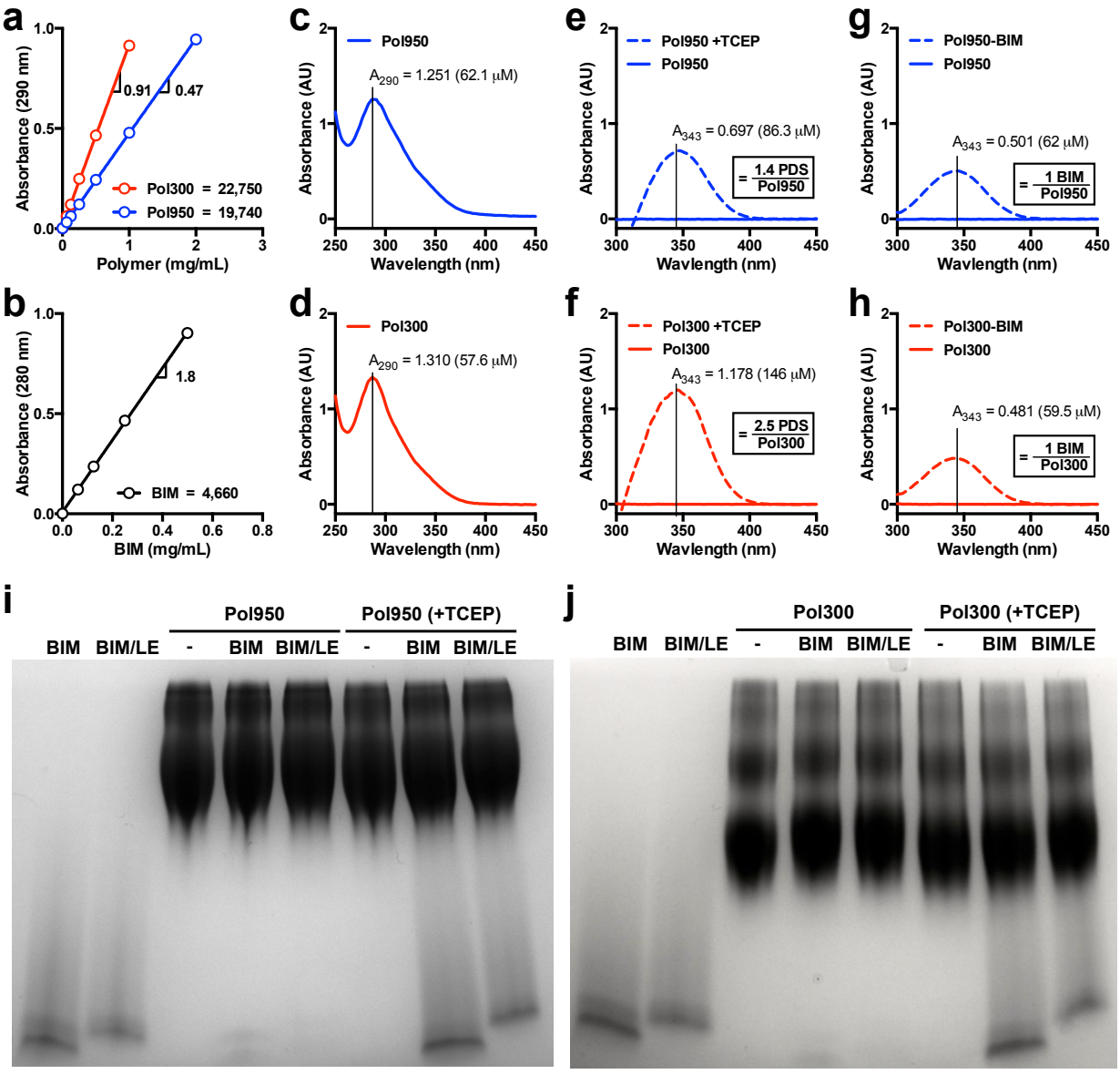

Fig. S3. Characterization of polymer-peptide loading. (a) Serial dilutions of Pol950 and Pol300 in PBS were measured by UV-Vis (290 nm), plotted and fit with a linear regression to determine the extinction coefficient (n = 3). **(b)** The extinction coefficient of BIM was quantified with serial dilutions in DMSO and determined by fitting a linear regression curve to the data set (n =3). The absorbance spectrum of **(c)** Pol950 and **(d)** Pol300 in PBS. **(e)** Pol950 and **(f)** Pol300 polymers were incubated with TCEP and measured by UV-Vis (343 nm) to quantify the number

of PDS groups per polymer chain. **(g)** Pol950 and **(f)** Pol300 were incubated overnight with a 1.1-molar excess of BIM peptide and the amount of peptide conjugated per polymer chain was quantified by UV-Vis (343 nm). In panels E through H, free polymer was blanked by UV-Vis before measured reduced polymer to obtain a clean absorbance spectrum. Conjugation of BIM and BIM/LE onto **(i)** Pol950 and **(j)** Pol300 and reduction with TCEP was also evaluated by SDS-PAGE. In all cases, 5 ug of peptide was loaded per well and TCEP was allowed to react for 30 minutes prior to loading.

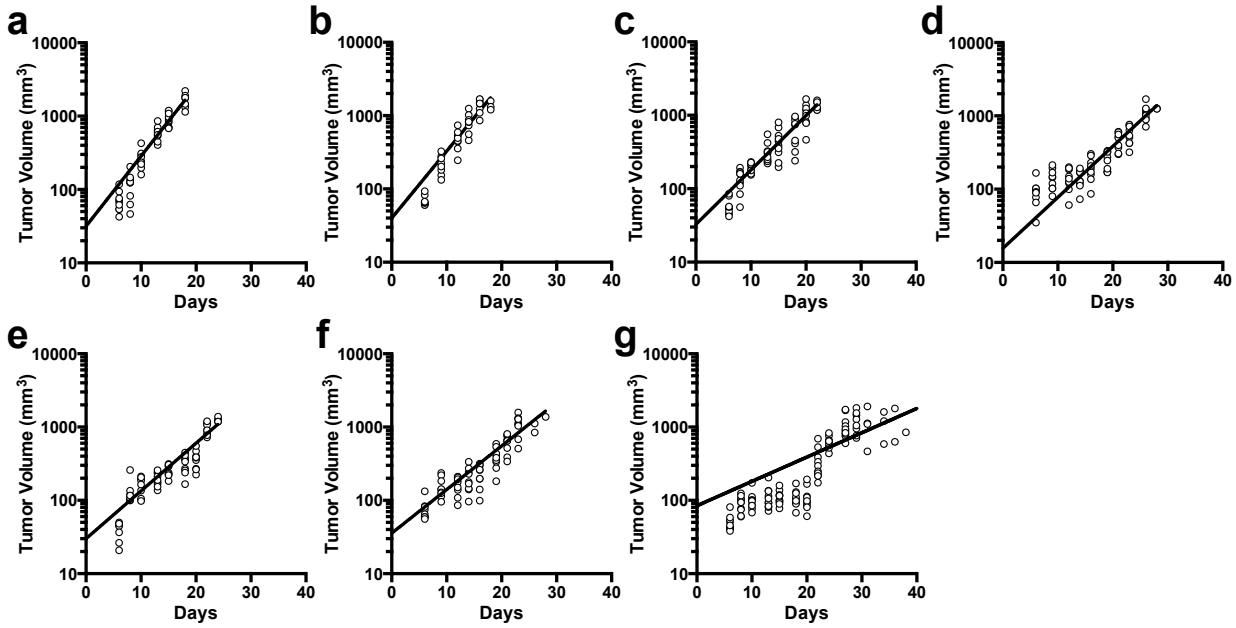

Fig. S4. Intracellular delivery of BIM conjugates suppresses tumor growth and reduces tumor growth rates. Tumor growth curves correspond to survival data from Figure 6. Treatments include **(a)** PBS, **(b)** Pol950, **(c)** chemo, **(d)** chemo+Pol950, **(e)** chemo+αCD22-mCTA-BIM, **(f)** chemo+αCD22-Pol950-BIM/LE, **(g)** and chemo+αCD22-Pol950-BIM. Tumor volumes were plotted on a log scale to eliminate skewing from a non-Gaussian distribution, then fit with a linear curve to determine the tumor doubling time for each treatment. Tumor doubling times and tumor growth delay values can be found in Table S1.

Treatments	Median Survival 75%	50%	25%	Doubling Time	Doubling Time (95% CI)	Tumor Growth Delay
PBS	16	16	17	3.15	2.83 – 3.55	-
Pol950	16	16	20	3.30	3.20 – 3.40	0.15
chemo	20	22	23	4.06	3.56 – 4.73	0.91
chemo + Pol950	23	26	26	4.33	3.90 – 4.85	1.18
chemo + αCD22-mCTA-BIM	23	23	26	5.06	4.39 – 5.96	1.91
chemo + αCD22-Pol950-BIM/LE	22	24	24	4.63	4.61 – 4.64	1.48
chemo + αCD22-Pol950-BIM	29	29	34	9.07	7.68 – 11.08	5.92

Table S1. Median survival and tumor growth rates were calculated from Figures 6 and S4. Median survival times were calculated at 75, 50, and 25% survival for each treatment as well as the tumor doubling time and tumor growth delays.

SUPPLEMENTARY MATERIALS AND METHODS

Synthesis of PyrSMA monomer. In a 500 mL round-bottom flask, mono-2-(methacryloyloxy)ethyl succinate) (SMA, 8.9 g, 0.0387 mol) was dissolved in chloroform (300 mL). To this solution N-hydroxysuccinimide (NHS, 4.89 g, 0.0425 mol) was added and stirred for 30 min under N_2. Solution was cooled to 0 ^oC and reaction mixture was further stirred for 30 min. N,N'-dicyclohexyl carbodimide (DCC, 9.57 g, 0.0464 mol) and a catalytic amount of 4-(dimethylamino)pyridine (66 mg) were added and solution stirred for 1 h at 0 ^oC. Reaction was continued for 22 h at room temp under N_2. After reaction, precipitated dicyclohexylurea was filtered twice. A solution of 2-pyridyldithiolethylamine hydrochloride (1.0 g, 0.0045 mol) and Et3N (1.13 g, 0.0112 mol) was cooled to 0 ^oC and stirred for 30 min. Previously synthesized NHS-activated SMA solution (2.2 g, 0.0067 mol) in chloroform (65 mL) was then added drop wise for 1 h. Reaction mixture was stirred overnight (16 h) at room temp and transferred to separating funnel and washed with H_2O (3 x 150 mL). Organic extracts were finally washed with brine and dried over Na_2SO_4, filtered, and concentrated in vacuum to afford a crude oil which

was purified by column chromatography [SiO2, EtOAc/hexane 3:1] to obtain 1.62 g pure product (yield=60.5%). 500 MHz ^{1}H NMR in acetone D_6: δ ppm 5.81 (C**H$_2$**CCH$_3$ trans, s, 1H), 6.11 (C**H$_2$**CCH$_3$ cis, s, 1H), 1.92 (CCC**H$_3$**, s, 3H**),** 4.35 (OC**H$_2$**C**H$_2$**O), 3.50 (NHC**H$_2$**, t, 2H), 2.99 (NHCH$_2$C**H$_2$**, t, 2H), 2.50 (OCH$_2$C**H$_2$**COCH$_2$, t, 2H), 2.61 (OC**H$_2$**CH$_2$COCH$_2$, t, 2H), 8.48 (NCH, d, 1H), 7.81 (NCHC**H**C**H**, m, 2H), 7.47 (N**H**, b, 1H), 7.23 (CCH, d, 1H).

Synthesis of bioHEMA monomer. To a 50 mL round bottom flask was added Biotin (2.0 g, 8.19 mmol, 1 eqv.) and 20 mL DMSO. The biotin was then allowed dissolve overnight in the dark. To this solution was then added DMAP (4.0 g, 33.7 mmol, 4 eqv.), and HEMA (4.2 g, 33.7 mmol, 4 eqv.). After the DMAP had completely dissolved DIC (5.07 mL, 33.7 mmol, 4 eqv.) was added. The solution was then septa sealed and allowed to react for 18 hours in the dark. After this time the solution filtered and then precipitated (1 to 20) into cold (3 ^{o}C) 150 mM HEPES buffer pH 8.4. The filtrate was then washed thoroughly with deionized water and then dried under high vacuum. 500 MHz ^{1}H NMR in DMSO D_6: δ ppm 1.25-1.68 (SCHC**H$_2$**C**H$_2$**C**H$_2$**, m, 6H), 1.88 (C**H$_3$**, s, 3H), 2.31 (C**H$_2$**CO$_2$, t, 2H), 2.55 (SC**H$_2$**, d, 1H), 2.82 (SC**H$_2$**, dd, 1H), 3.08 (CHC**H**(CH$_2$)S, m, 1H), 4.13 (C**H**CH(CH$_2$)S, m, 1H), 4.29 (OC**H$_2$**C**H$_2$**O and NHC(**H**)CH(CH$_2$)S, s/m , 5H), 5.7 (C**H$_2$**CCH$_3$ trans, s, 1H), 6.03 (C**H$_2$**CCH$_3$ cis, s, 1H), 6.35 and 6.43 (CON**H**CH, s, 1H).

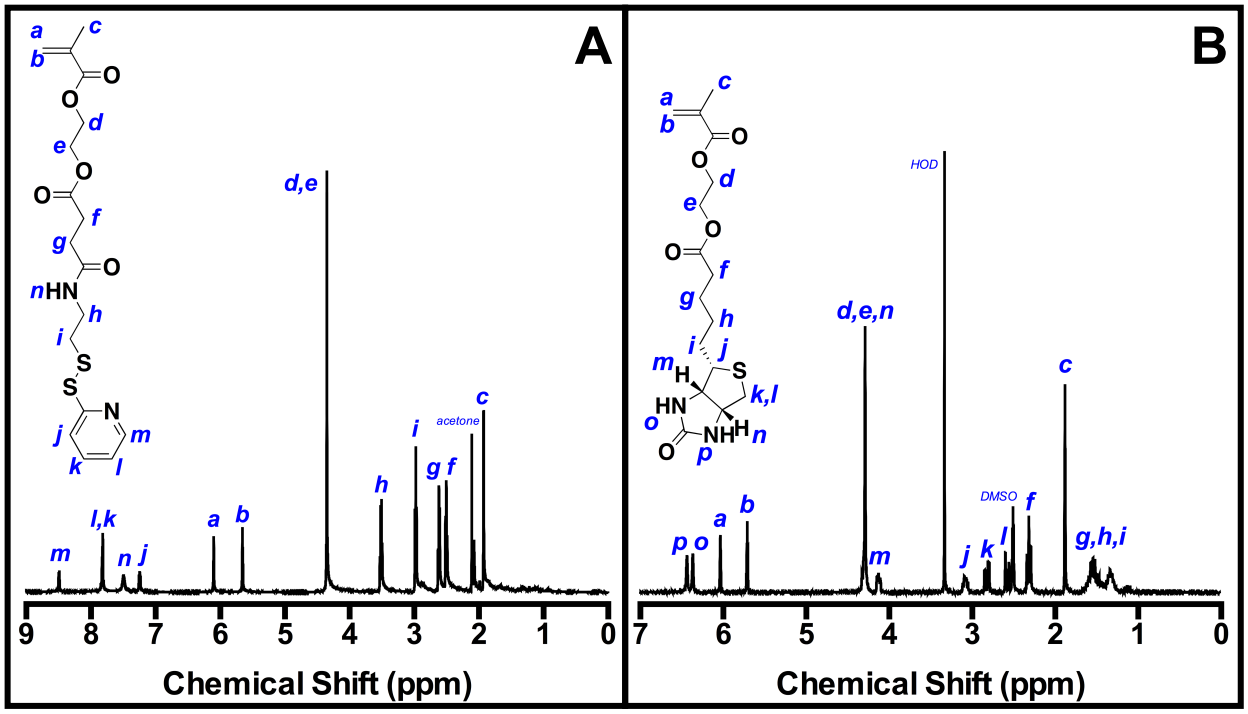

Fig. S5. 1H-NMR spectrum of functional **(a)** pyridyldisulfide methacrylate (PyrSMA) monomer and **(b)** biotin-hydroxyethyl methacrylate (bioHEMA) monomer.