Supporting information for

Side-Chain Amino Acid Based Cationic Polymer Induced Actin Polymerization

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Table S1. RAFT polymerization of Boc-Ala-HEMA in DMF at 70 °C.

Polymer	[M]/[CTA]/[AIBN]	Conv.[a] (%)	$M_{n,theo}$[b] (g/mol)	$M_{n,gpc}$[c] (g/mol)	$Đ$[c]
1a	15:1:0.2	65	3300	2400	1.12
2a	25:1:0.2	72	5800	5100	1.18
3a	60:1:0.2	67	12500	11200	1.21

[a] Determined by gravimetric analysis. [b] $M_{n,theo}$ = (([Boc-Ala-HEMA]/[CDP]) × molecular weight (*MW*) of Boc-Ala-HEMA × Conv.) + (*MW* of CDP). [c]Obtained by GPC.

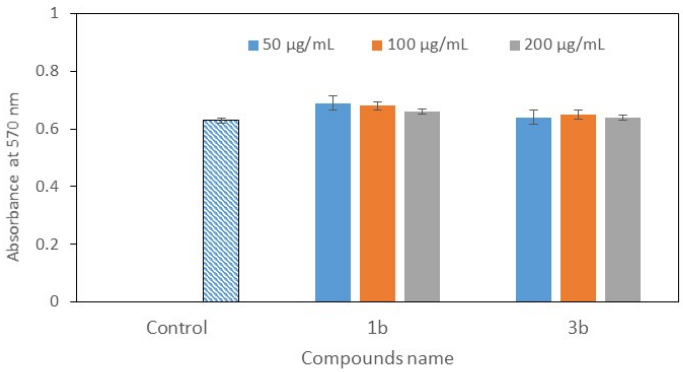

Fig. S1 Cytotoxicity was carried out following MTT assay after HeLa cells were treated with **1b** and **3b** for 48 h at different concentrations.

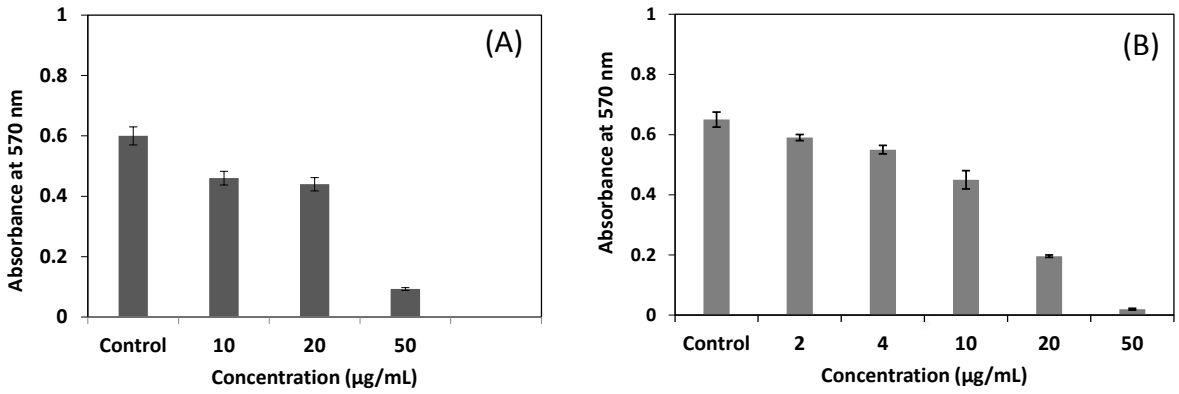

Fig. S2 Cytotoxicity study at different concentrations was carried out following MTT assay after HeLa cells were treated with poly-D-lysine for (A) 24 h and (B) 48 h.

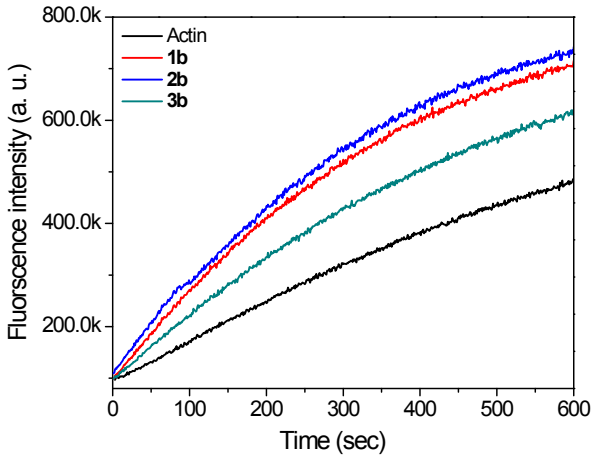

Fig. S3 Polymerization of G-actin to F-actin in presence of **1b**, **2b** and **3b** at concentration 100 µg/mL. For *in vitro* kinetics, 2 µM actin (10% pyrene labeled) was used. For *in vitro* kinetics, 2 µM actin (10% pyrene labeled) was used.

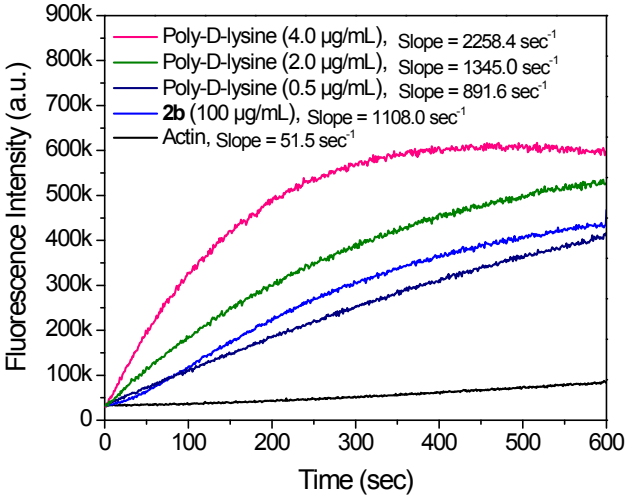

Fig. S4 2b and Poly-D-lysine polymerize G-actin to F-actin. For *in vitro* kinetics, 2 µM actin (10% pyrene labeled) was used. For *in vitro* kinetics, 2 µM actin (10% pyrene labeled) was used.

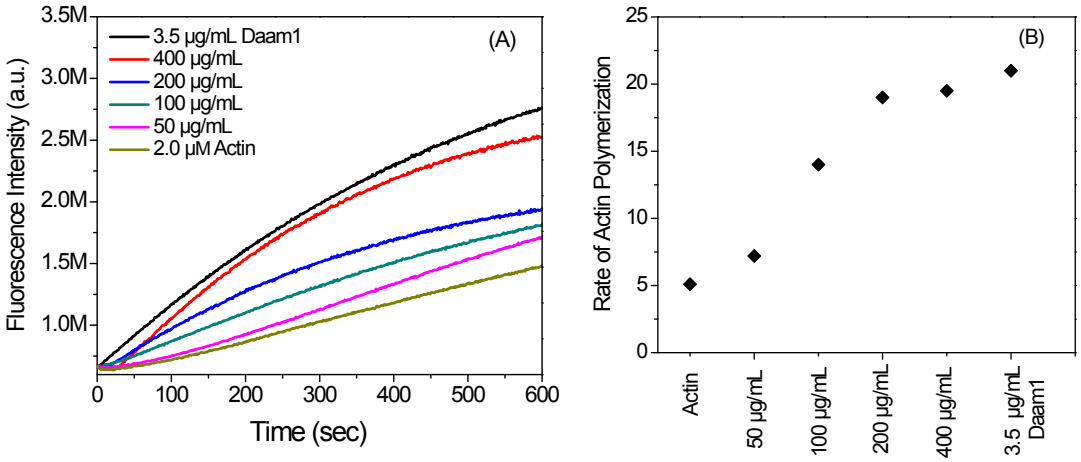

Fig. S5 **2c** polymer can polymerize G-actin to F-actin: (A) Comparison of pyrene-actin polymerization assay in presence of increasing concentration of **2c** and 3.5 µg/mL Daam1 (positive control). For *in vitro* kinetics 2µM actin (10% pyrene labeled) was used and indicated (µg/mL and nM) concentration of polymer and known actin nucleator. (B) Representation of polymerization rate of **2c** as a function of concentration. Slopes were taken at 10-100 s of the time course shown in A.

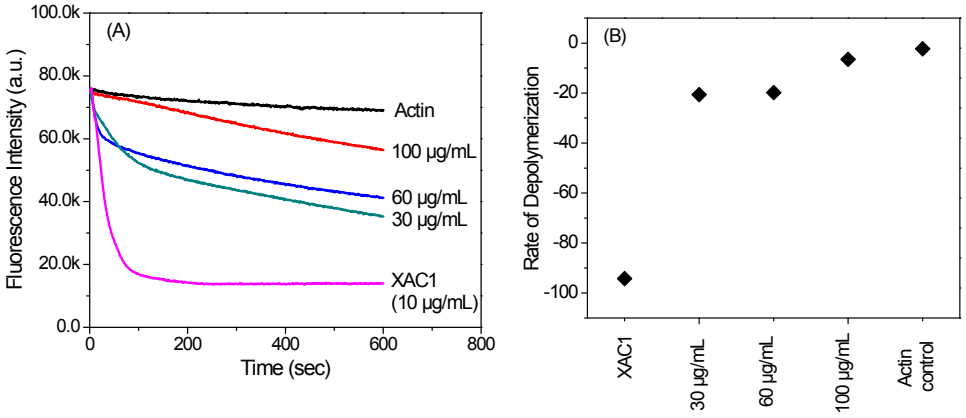

Fig. S6 Stabilization of actin filaments by **2b**: (A) The polymer (**2b**) could stabilize the actin filaments and (B) the rate of filament disassembly in an increasing concentration dependent manner.

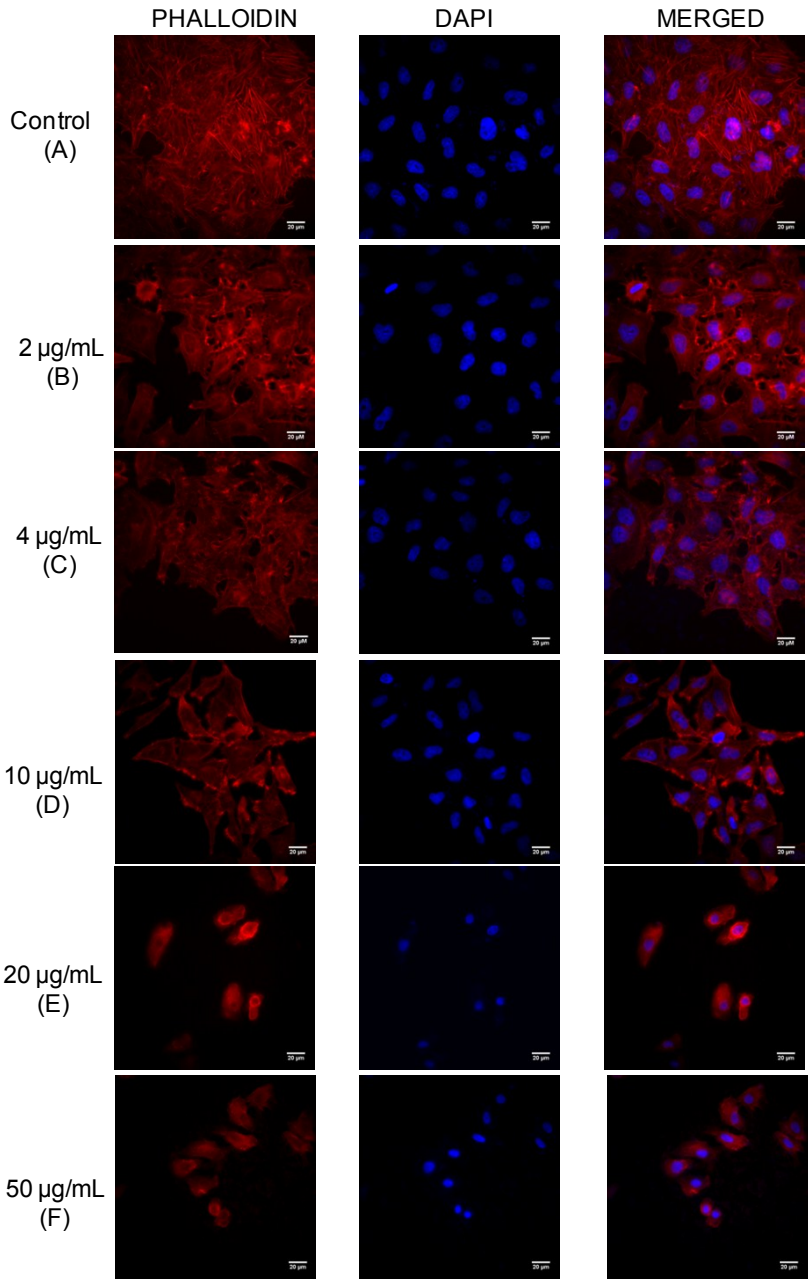

Fig. S7 Control untreated HeLa cells (upper row A) and with different concentrations of poly-D-lysine treated (lower rows B-F) HeLa cells were observed by staining with rhodamine-phalloidin and DAPI. The third column shows the merged images of actin and DAPI stained nuclei. All images were captured and scaled with identical settings. The scale bar represents 20 µm. The magnification is 60X.