Supporting Information

for

Synthesis of an amphiphilic copolymer using biopolymer-dextran via a combination of

ROP and RAFT techniques

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Experimental:

Synthesis of dextran-based macroinitiator (DXAM)

1 g dextran [^{1}H-NMR (D$_2$O, 400 MHz) δ (ppm): 4.98 (–CH, glycoside proton; H1); 4.85 (–OH4); 4.77 (–OH2); 3.99-4.01 (–CH$_2$, H6); 3.91–3.94 (–CH, H5); 3.75-3.78 (–CH, H3) and 3.51-3.71 (–CH, H2,4)][1] was dissolved in DMSO (30 mL). Afterwards, diisopropylamine (10 mL, 70 mmol) was poured into the solution and stirred overnight. Then 2-bromo-2-methyl-propionyl bromide (0.15 mL, 1.5 mmol) was dropwise added into the reaction mixture in presence of ice bath. The reaction was continued for 8h at room temperature. Then the precipitation of the solution mixture was accomplished in excess acetone followed by the filtration. The collected filtrate was dried in vacuum oven at 55 °C (yield: 0.76 g).

[^{1}H-NMR (d$_6$-DMSO, 400 MHz) δ (ppm): 4.98 (–CH, glycoside proton; ∫ 1.19, H1); 4.67 (∫ 1.17, –OH4); 4.59 (∫ 1.34, –OH2); 3.75 (–CH$_2$, ∫ 1.23, H6); 3.62 (–CH, ∫ 1.47, H5); 3.57 (–CH, ∫ 1.36, H3); 3.16-3.21 (–CH, ∫ 2.71, H2,4); 2.08 (–CH$_3$, ∫ 3.24, H7,8)].

The conversion degree (%) was calculated using *eq*. S1 from the integration value of ^{1}H-NMR spectrum of dextran-based macroinitiator (Fig. S5) and the value is 32.9 %.

$$\text{Conversion degree (\%)} = \frac{I_H(\text{methylene group})}{I_{(-OH^2)} + I_{(-OH^4)} + I_H(\text{methylene group})} \times 100$$

(S1)

Synthesis of dextran-based RAFT agent (DXAR)

Dextran-based macroinitiator (DXAM) was used to prepare DXAR. At first, 0.15 g DXAM was completely dissolved in DMSO (25 mL). Then PEX (0.5 g, 3.1 mmol) was poured into the solution and stirred for 24 h at 60 °C. Then, the precipitation of the reaction mixture

was completed in acetone and filtered. Then the filtrate was dried in vacuum oven at 55 °C (yield: 0.22 g).

[^{1}H-NMR (d$_6$-DMSO, 400 MHz) δ (ppm): 4.89 (–CH, glycoside proton; ∫ 1.00, H1); 4.63 (∫ 0.98, –OH4); 4.51 (∫ 0.82, –OH2); 3.70 (–CH$_2$, ∫ 1.26, H6); 3.58 (–CH, ∫ 0.68, H5); 3.52 (–CH$_2$, ∫ 0.50, H9); 3.45 (–CH, ∫ 1.24, H3); 3.12-3.17 (–CH, ∫ 1.76, H2,4); 1.22 (–CH$_3$, ∫ 3.88, H7,8); 1.16 (–CH$_3$, ∫ 2.68, H10)].

The conversion degree (%) was calculated using *eq.* S1 from the integration value of ^{1}H-NMR spectra of DXAR (Fig. S6) and the value is 21.7 %.

Synthesis of HPMA-PCL

HPMA was used as initiator for polymerization of ε-caprolactone. A solution of ε-caprolactone (5.15 g, 45 mmol) and HPMA (1.07 g, 7.4 mmol) was mixed and stirred at 80 °C for 2h in an inert atmosphere. Then, Sn(Oct)$_2$ (0.125 g, 0.31 mmol) was added into the solution mixture. After that, the whole reaction mixture was stirred for 12h at 140 °C in presence of N$_2$. Afterwards, the developed product was dissolved in DMF followed by precipitation in methanol and filtered. Finally, the filtrate was dried in vacuum oven at 55 °C (yield: 0.90 g).

The integration and peak values of HPMC-PCL for before and after precipitation are assigned below:

Before precipitation: [^{1}H-NMR (CDCl$_3$, 400 MHz,) of HPMA-PCL δ (ppm): 6.27 (=CH, ∫ 1.26, H11b); 5.70 (=CH, ∫ 1.18, H11a); 4.66 (-CH$_2$, ∫ 1.78, H13); 3.87 (-CH$_2$, ∫ 0.58, H15); 3.64 (-CH$_2$, ∫ 2.03, H20); 3.12 (-CH$_2$, ∫ 2.33, H16); 2.14 (-CH$_3$, ∫ 2.22, H12); 1.31 (-CH$_2$, ∫ 2.34, H14); 1.28 (-CH$_2$, ∫ 2.34, H17); 1.28 (-CH$_2$, ∫ 1.42, H19); 1.22(-CH$_2$, ∫ 2.02, H18)].

After precipitation: [^{1}H-NMR (CDCl$_3$, 400 MHz,) δ (ppm): 6.07 (=CH, ∫ 1.09, H11b); 5.51 (=CH, ∫ 1.09, H11a); 4.95 (-CH$_2$, ∫ 1.61, H13); 3.98 (-CH$_2$, ∫ 0.58, H15); 3.58 (-CH$_2$, ∫ 2.00,

H20); 3.09 (-CH$_2$, ∫ 2.15, H16); 2.23 (-CH$_3$, ∫ 2.27, H12); 1.87 (-CH$_2$, ∫ 2.12, H14); 1.57 (-CH$_2$, ∫ 2.62, H17); 1.30 (-CH$_2$, ∫ 2.08, H19); 1.15(-CH$_2$, ∫ 2.49, H18)].

^{1}H NMR spectroscopy has been performed before and after precipitation (Fig. S7 and Fig. S8) of the reaction to calculate (eq. S2) the degree of polymerization (DP) of poly(ε-caprolactone) by the following equation.

$$\text{Degree of Polymerization} = \frac{\text{Total area of all peaks} \times \text{The number of attached methylene groups with end group}}{\text{Area of peak corresponding to hydrogens attached to end groups}} \quad \text{(S2)}$$

Simultaneously, molecular mass by end group calculation (eq. S3) from ^{1}H NMR spectroscopy using following equation.

$$Mn = \text{Formula weight of end group} + (\text{Formula weight of monomer} \times DP) \quad \text{(S3)}$$

Synthesis of Dextran-*g*-(PHPMA-*co*-PCL)

To prepare Dextran-*g*-(PHPMA-*co*-PCL), at first DXAR (0.5 g) was completely dissolved in 20.0 mL DMSO. Then, AIBN (0.012 g, 0.07 mmol) was added into the reaction vessel. Afterwards, modified monomer (HPMA-PCL) (3.0 g) was added and the reaction was continued for 24h. The precipitation of total solution was accomplished into acetone, filtered and filtrate was kept in vacuum oven to dry the product (yield=1.91 g). The probable schematic diagram is represented in Scheme 1. The reaction was performed in inert atmosphere of N$_2$.

The various chain length has been varied to obtain graft copolymers with different hydrophobic segments. The required amount of dextran-based RAFT agent: HPMA-PCL with feed ratio used in each reaction mixture are listed in Table S2. The Dextran-*g*-

(PHPMA-*co*-PCL)s are labelled by a numeric sub-index from 1 to 3, successively with increasing weight fraction of HPMA-PCL.

[^{1}H-NMR (d$_6$-DMSO, 400 MHz) of Dextran-*g*-(PHPMA-*co*-PCL)$_1$; δ (ppm): 4.93 (-CH, glycoside proton; ∫ 1.08, H1); 4.67 (∫ 2.94, –OH4); 4.53 (∫ 2.48, –OH2); 4.14 (–CH$_2$, ∫ 1.96, H13,15); 3.90 (–CH$_2$, ∫ 2.24, H9); 3.74 (–CH$_2$, ∫ 2.26, H6); 3.59 (–CH, ∫ 2.57, H3,5); 3.49 (–CH$_2$, ∫ 2.92, H20); 3.17 (–CH, ∫ 1.66, H2,4); 2.67 (–CH$_2$, ∫ 1.43, H11); 2.33(–CH$_2$, ∫ 2.33, H17); 2.04 (–CH$_3$, ∫ 2.82, H12); 1.88 (–CH$_2$, ∫ 2.09, H16); 1.23 (–CH$_2$, ∫ 1.96, H14); 1.15 (–CH$_2$, ∫ 1.63, H19); 1.14 (–CH$_3$, ∫ 3.99, H10); 1.08 (–CH$_2$, ∫ 1.66, H18); 1.06 (–CH$_3$, ∫ 3.55, H7,8)].

[^{1}H-NMR (d$_6$-DMSO, 400 MHz) of Dextran-*g*-(PHPMA-*co*-PCL)$_2$; δ (ppm): 4.92 (-CH, glycoside proton; ∫ 1.05, H1); 4.68 (∫ 2.20, –OH4); 4.53 (∫ 2.82, –OH2); 4.13 (–CH$_2$, ∫ 4.29, H13,15); 3.81 (–CH$_2$, ∫ 2.01, H9); 3.77 (–CH$_2$, ∫ 1.81, H6); 3.63 (–CH, ∫ 1.88, H3,5); 3.47 (–CH$_2$, ∫ 2.52, H20); 3.17 (–CH, ∫ 1.60, H2,4); 2.67 (–CH$_2$, ∫ 1.48, H11); 2.37(–CH$_2$, ∫ 1.57, H17); 2.33 (–CH$_3$, ∫ 1.85, H12); 2.30 (–CH$_2$, ∫ 1.22, H16); 2.17 (–CH$_2$, ∫ 2.68, H14); 2.08 (–CH$_2$, ∫ 2.32, H19); 2.04 (–CH$_3$, ∫ 1.33, H10); 1.23 (–CH$_2$, ∫ 1.17, H18); 1.10 (–CH$_3$, ∫ 6.33, H7,8)].

[^{1}H-NMR (d$_6$-DMSO, 400 MHz) of Dextran-*g*-(PHPMA-*co*-PCL)$_3$; δ (ppm): 4.93 (-CH, glycoside proton; ∫ 1.27, H1); 4.67 (∫ 1.86, –OH4); 4.53 (∫ 1.12, –OH2); 4.12 (–CH$_2$, ∫ 4.01, H13,15); 3.86 (–CH$_2$, ∫ 1.80, H9); 3.76 (–CH$_2$, ∫ 2.42, H6); 3.64 (–CH, ∫ 2.34, H3,5); 3.50 (–CH$_2$, ∫ 2.18, H20); 3.17 (–CH, ∫ 4.48, H2,4); 2.67 (–CH$_2$, ∫ 1.68, H11); 2.33 (–CH$_2$, ∫ 1.94, H17); 2.19 (–CH$_3$, ∫ 3.14, H12); 2.08 (–CH$_2$, ∫ 1.80, H16); 2.04 (–CH$_2$, ∫ 2.19, H14); 1.90 (–CH$_2$, ∫ 2.40, H19); 1.53 (–CH$_3$, ∫ 3.21, H10); 1.23 (–CH$_2$, ∫ 2.41, H18); 1.10 (–CH$_3$, ∫ 6.07, H7,8)].

The monomer conversion (%) of the copolymer were determine through gravimetric technique using *eq.* S4[2] (Table 1).

$$\text{Monomer conversion (\%)} = \frac{W_2}{W_1 \times 100}$$

(S4)

Here, W_2 indicates the weight of the Dextran-g-(PHPMA-co-PCL)$_3$ and W_1 signifies the weight of HPMA-PCL.

Also, the monomer conversion (%) and grafting efficiency (%) were evaluated from the integration value of ^{1}H-NMR spectra of HPMA-PCL (Fig. S8) and Dextran-g-(PHPMA-co-PCL)$_3$ (Fig. 2) using $eq.$ S5[3] and S6[4] respectively (Table 1).

$$\text{Monomer conversion (\%)} = \frac{I_{H^{11}(\text{Dextran-}g\text{-(PHPMA-}co\text{-PCL))}}}{I_{H^{11}\,(\text{Dextran-}g\text{-(PHPMA-}co\text{-PCL))}} + I_{H^{11}\,(\text{HPMA-PCL})}} \times 100$$

(S5)

Here, $I_{H^{11}(\text{Dextran-}g\text{-(PHPMA-}co\text{-PCL))}}$ is the total area of H^{11} proton of Dextran-g-(PHPMA-co-PCL)$_3$ and $I_{H^{11}\,(HPMA-PCL)}$ is the total area of H^{11} proton of HPMA-PCL.

$$\text{Grafting efficiency towards –OH groups (\%)} = \frac{I_{H^{11}(\text{copolymer})}}{I_{\text{-OH}^2} + I_{\text{-OH}^4}} \times 100$$

(S6)

Here, % grafting of graft copolymers was calculated ($eq.$ S7) using following equation.

$$\text{\% Grafting} = \frac{I_{H^{11}(\text{copolymer})} - I_{H^{11}(\text{HPMA-PCL})}}{I_{H^{11}(\text{HPMA-PCL})}} \times 100$$

(S7)

Characterization techniques:

Gel permeation chromatography attached to multi angle light scattering spectrometer (GPC/MALS) (Model: BI-RI/620; Serial No. 15 105; Power: 90-260V 47-63 Hz, USA) was used to assess molecular mass (MW) and dispersity (Đ) of the synthesized polymers. The polymer solution was filtered [using Whatman syringe filter (0.45 μm)] before injected into the column with a flow rate of 0.5 mL/min at 30 °C. The mobile phase was HPLC grade water. Dextran was used as standard to calibrate the GPC.

For the analysis of the synthesized copolymers, at first, the instrument was calibrated using dextran standard with known molecular mass. Then the calibration curve was constructed by logarithmic plot of that known molecular mass as a function of elution volume. After that the molecular mass of the synthesized copolymer was obtained using the calibration curve and observing the elution volume.

NMR spectrophotometer (400 MHz; Bruker, USA) was used to record the spectra in DMSO-d_6 and CDCl$_3$ as NMR solvents.

Critical micelle concentration (CMC) of the self-assembled copolymer was measured fluorometrically (Fluorescence spectrometer, Model: LS55; Make: Perkin Elmer, USA).

Field Emission Scanning Electron Microscopic (FESEM, Model: Zeiss Ultra 55cv FESEM, Make: Zeiss, Germany) was used to analyzed the surface morphology of the Dextran-*g*-(PHPMA-*co*-PCL)$_3$.

Transmission electron microscopic (TEM, Model: Talos F200X G2, Make: Thermo Fischer Scientific, USA) analyses were performed to investigate the surface morphology of the polymer. At first the synthesized Dextran-*g*-(PHPMA-*co*-PCL)$_3$ was dissolved in 5.0 mL tetrahydrofuran (THF) in a 50 mL round bottomed flask. Then 5.0 mL of water was added and sonicated for 10 min. Afterward, THF was evaporated using a rotary evaporator, and was obtained the polymer

suspension. Then, the polymer suspension was drop casted on carbon coated copper grid and dried for TEM analysis.

DLS analysis was performed using Nano Particle Size Analyzer (Horiba Scientific, Nano Partica, SZ -100, Japan) to determine the hydrodynamic diameter of the copolymer and DIP loaded copolymer. In aqueous environment, DLS analysis was performed.

DIP loading (%) and *in vitro* release rate of DIP were recorded through UV–visible spectrophotometer (UV-1800, Shimadzu, Japan).

Determination of CMC of Dextran-*g*-(PHPMA-*co*-PCL)$_3$

The copolymer concentrations were varied from 0.6 mg/L to 2 mg/L to determine the CMC of the self-assembled polymer. In fluorometric analysis, pyrene (at a fixed pyrene concentration of 2.9×10^{-6} M) was used as a probe in different polymer solution concentrations to determine the aggregation behaviour of polymer chains. The emission spectra were recorded at 374 (I_1) and 415 (I_3), as the larger sensitivity towards polarity of microenvironment than other peaks (I_2, 392, I_4, 445 and I_5, 462 nm).

Encapsulation of dipyridamole into copolymeric micelle and *in-vitro* release study

Dipyridamole (DIP) was used as a model hydrophobic drug to study the efficiency of self-assembled copolymer Dextran-*g*-(PHPMA-*co*-PCL) for loading, followed by release study. To prepare drug-loaded polymeric micelle, DIP was dissolved in acidic medium. The acidic solution of DIP was converted into basic medium by addition of NaOH and precipitates into cloudy particles.[5-7] Then polymeric micellar solution was added dropwise into freshly precipitated DIP and the precipitate was disappeared rapidly. The copolymer-drug solution was kept on ice for 45 min, followed by transferred into water bath at 25 °C for 1 h. The feeding mass ratio of drug and micelles was varied for drug-loading and the solutions were filtered to remove the drug, which

was not entrapped. DIP-loading capacity was evaluated by UV-vis spectral analysis of the filtrate.

The DIP-loading (%) and encapsulation efficiency (% EE) were calculate using *eq.* S8 and *eq.* S9, respectively.

$$\text{DIP-loading (\%)} = \frac{\text{Weight of } DIP \text{ - loaded drug in colymeric micelles}}{\text{Weight of dried copolymer}} \times 100$$

(S8)

$$\text{EE (\%)} = \frac{\text{Weight of DIP - loaded drug in colymeric micelles}}{\text{Weight of DIP taken}} \times 100$$

(S9)

The *in-vitro* cumulative release of DIP from Dextran-*g*-(PHPMA-*co*-PCL) polymeric micelle was studied using dialysis technique with the help of Dissolution Test Apparatus (Lab India, Model: DS 8000). A DIP-loaded micellar solution (5 mL) was taken in dialysis tube with a molecular mass cutoff of 12,000 Da. The dialysis bag has been placed into two buffer solutions (pH 1.2 and 7.4) at fixed temperature 37 °C ± 0.5 °C and stirred at 250 rpm. Aliquots (3 mL) of the buffer solutions were taken out at predetermined time intervals to examine the release rate of DIP and equal amount of corresponding buffer solution was added into the bath. Then the drug concentration was determined using UV-vis spectroscopy and the cumulative % DIP release (E_r) was calculated using *eq.* S10. The release study was repeated for three times and the release data revealed as average of three readings with ± SD (n=3).

$$E_r (\%) = \frac{DIP \text{ release at certain time}}{\text{Total amount of DIP in } co\text{polymer}} \times 100$$

(S10)

Results and discussion
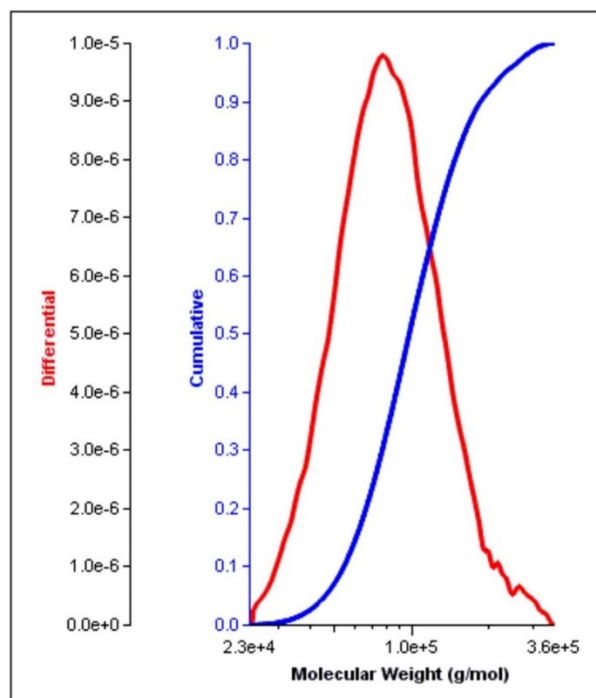
Results		
M_n	7.247e+04	g/mol
M_w	8.975e+04	g/mol
M_z	1.128e+05	g/mol
M_p	7.753e+04	g/mol
M_w/M_n	1.238	
M_z/M_w	1.256	
$<M_{10}$	5.428e+04	g/mol
$>M_{50}$	1.862e+05	g/mol
V_p	9.22	mL
$Area_{RI}$	2.074e-02	V*mL
Concentration	undetermined	mg/mL
dn/dc	0.1893	mL/g
Sample Recovery	undetermined	%
$[\eta]$	undetermined	mL/g
$<Rg>_n$	8.808e+03	nm
$<Rg>_w$	8.723e+03	nm
$<Rg>_z$	8.497e+03	nm

Sample Parameters

Concentration	2.222	mg/ml (given)
dn/dc	unknown	mL/g
Duration	35.0	min
A_2	5.00e-04	mL mol/g^2
Injection Volume	20.000	µL

Calculation Options

Conc. Signal From	RI
Method	SLS
Concentration	given
dn/dc	measured

System Information

System ID ISM Dhanbad First System Setup	
Group ID	PUJA
Eluent	Water
Eluent Additive	
Flow Rate	0.500 mL/min

Calculation Limits

Baseline	4.87 to 10.49 mL
Integration	8.26 to 10.48 mL
Fit	8.26 to 10.48 mL

Fig. S1. MALS-GPC analysis of dextran-based macroinitiator.
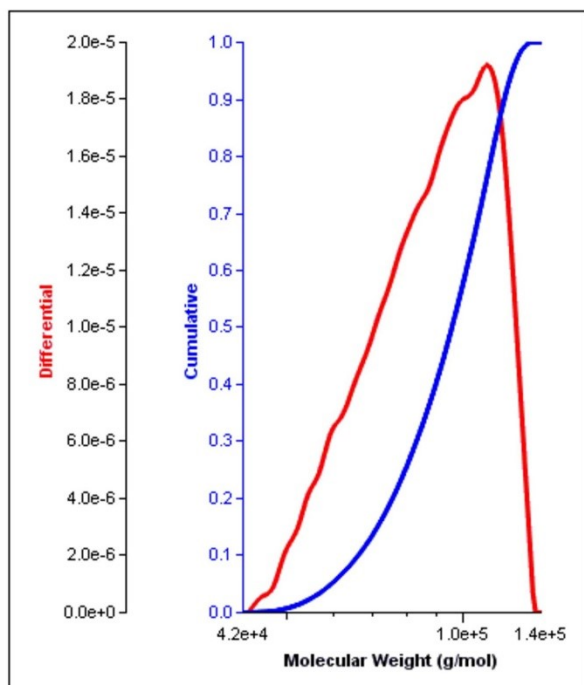
Results		
M_n	8.505e+04	g/mol
M_w	8.996e+04	g/mol
M_z	9.444e+04	g/mol
M_p	1.083e+05	g/mol
M_w/M_n	1.058	
M_z/M_w	1.050	
$<M_{10}$	6.601e+04	g/mol
$>M_{50}$	1.173e+05	g/mol
V_p	9.08	mL
$Area_{RI}$	6.228e-03	V*mL
Concentration	undetermined	mg/mL
dn/dc	0.0919	mL/g
Sample Recovery	undetermined	%
$[\eta]$	undetermined	mL/g
$<Rg>_n$	2.426e+01	nm
$<Rg>_w$	2.835e+01	nm
$<Rg>_z$	3.232e+01	nm

Sample Parameters

Concentration	1.374	mg/ml (given)
dn/dc	unknown	mL/g
Duration	31.0	min
A_2	5.00e-04	mL mol/g^2
Injection Volume	20.000	µL

Calculation Options

Conc. Signal From	RI
Method	SLS
Concentration	given
dn/dc	measured

System Information

System ID ISM Dhanbad First System Setup	
Group ID	PUJA
Eluent	Water
Eluent Additive	
Flow Rate	0.500 mL/min

Calculation Limits

Baseline	8.32 to 12.99 mL
Integration	8.32 to 9.28 mL
Fit	8.32 to 9.28 mL

Fig. S2. MALS-GPC analysis of dextran-based RAFT agent.
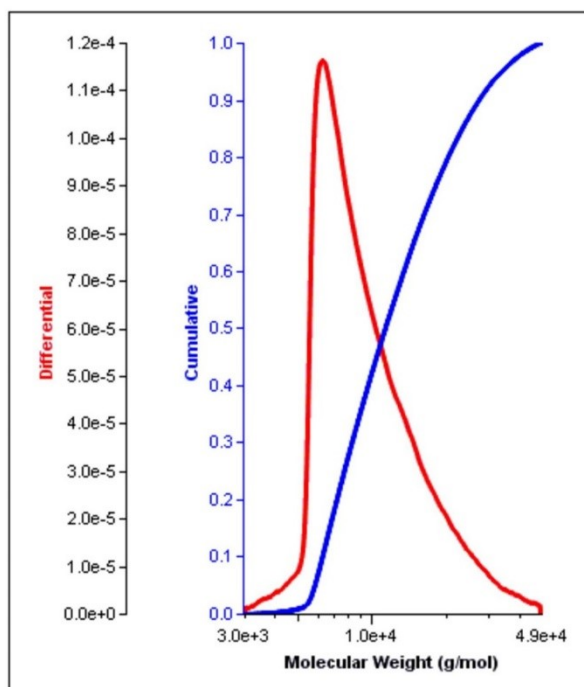
Results

M_n	8.572e+03	g/mol
M_w	1.067e+04	g/mol
M_z	1.441e+04	g/mol
M_p	6.288e+03	g/mol
M_w/M_n	1.244	
M_z/M_w	1.351	
$<M_{10}$	6.251e+03	g/mol
$>M_{50}$	2.729e+04	g/mol
V_p	9.78	mL
$Area_{RI}$	1.462e-01	V*mL
Concentration	undetermined	mg/mL
dn/dc	0.7299	mL/g
Sample Recovery	undetermined	%
$[\eta]$	undetermined	mL/g
$<Rg>_n$	1.246e+02	nm
$<Rg>_w$	1.205e+02	nm
$<Rg>_z$	1.146e+02	nm

Sample Parameters

Concentration	4.062	mg/ml (given)
dn/dc	unknown	mL/g
Duration	42.0	min
A_2	5.00e-04	mL mol/g^2
Injection Volume	20.000	µL

Calculation Options

Conc. Signal From	RI
Method	SLS
Concentration	given
dn/dc	measured

System Information

System ID ISM Dhanbad First System Setup	
Group ID	PUJA
Eluent	Water
Eluent Additive	
Flow Rate	0.500 mL/min

Calculation Limits

Baseline	2.45 to 15.13 mL
Integration	7.22 to 10.70 mL
Fit	7.22 to 10.70 mL

Fig. S3. MALS-GPC analysis of HPMA-PCL.

Results		
M_n	1.347e+05	g/mol
M_w	1.502e+05	g/mol
M_z	1.656e+05	g/mol
M_p	1.601e+05	g/mol
M_w/M_n	1.115	
M_z/M_w	1.103	
$<M_{10}$	9.971e+04	g/mol
$>M_{50}$	2.304e+05	g/mol
V_p	6.34	mL
$Area_{RI}$	1.840e-02	V*mL
Concentration	undetermined	mg/mL
dn/dc	0.6960	mL/g
Sample Recovery	undetermined	%
$[\eta]$	undetermined	mL/g
$<Rg>_n$	undetermined	nm
$<Rg>_w$	undetermined	nm
$<Rg>_z$	undetermined	nm
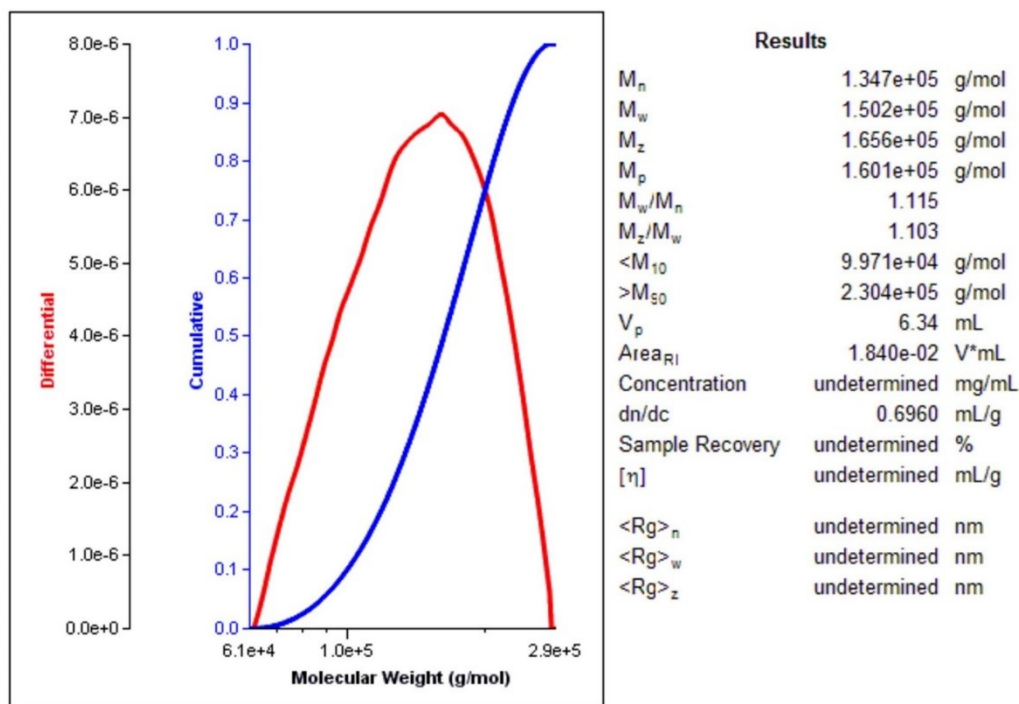
Sample Parameters

Concentration	0.536	mg/ml (given)
dn/dc	unknown	mL/g
Duration	32.0	min
A_2	5.00e-04	mL mol/g^2
Injection Volume	20.000	µL

Calculation Options

Conc. Signal From	RI
Method	SLS
Concentration	given
dn/dc	measured

System Information

System ID ISM Dhanbad First System Setup	
Group ID	PUJA
Eluent	Water
Eluent Additive	
Flow Rate	0.500 mL/min

Calculation Limits

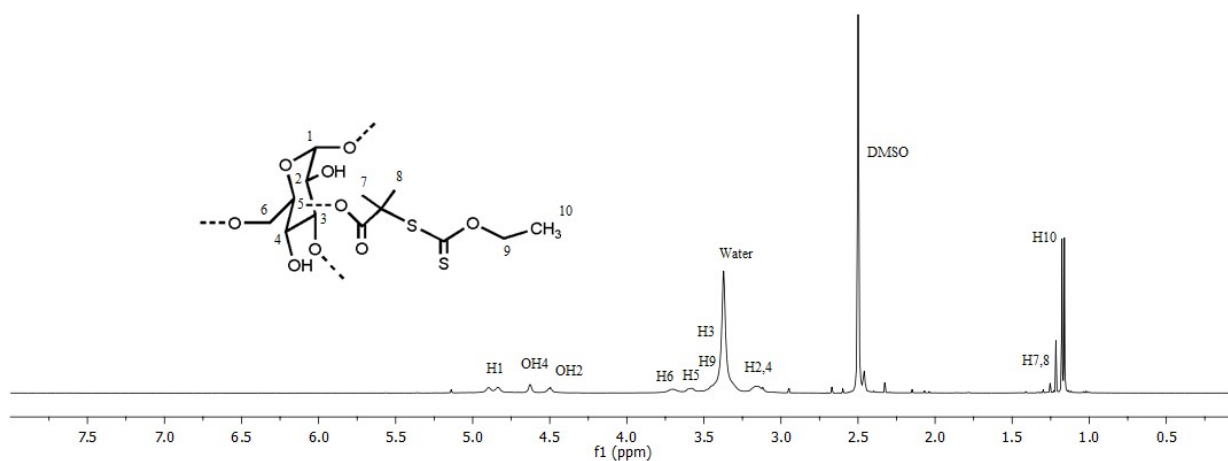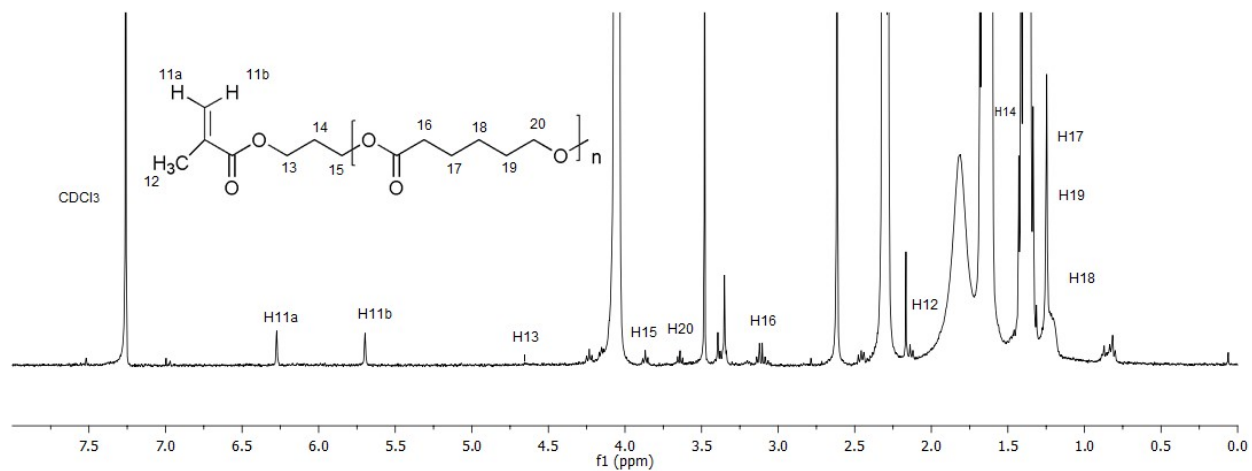|	
Baseline	3.58 to 7.14 mL
Integration	5.88 to 7.14 mL
Fit	5.88 to 7.14 mL

Fig. S4. MALS-GPC analysis of Dextran-*g*-(PHPMA-*co*-PCL)₃.
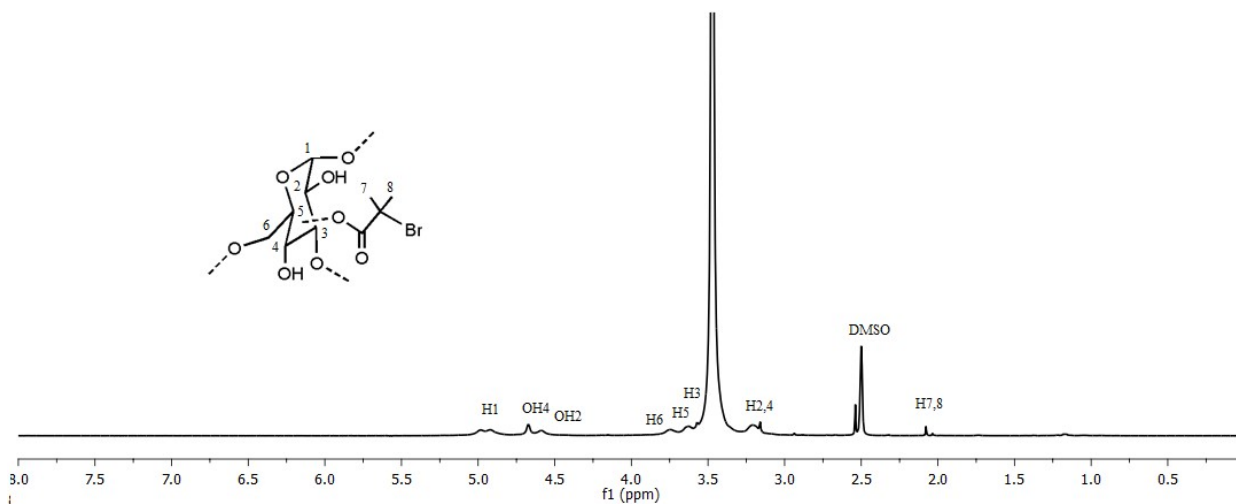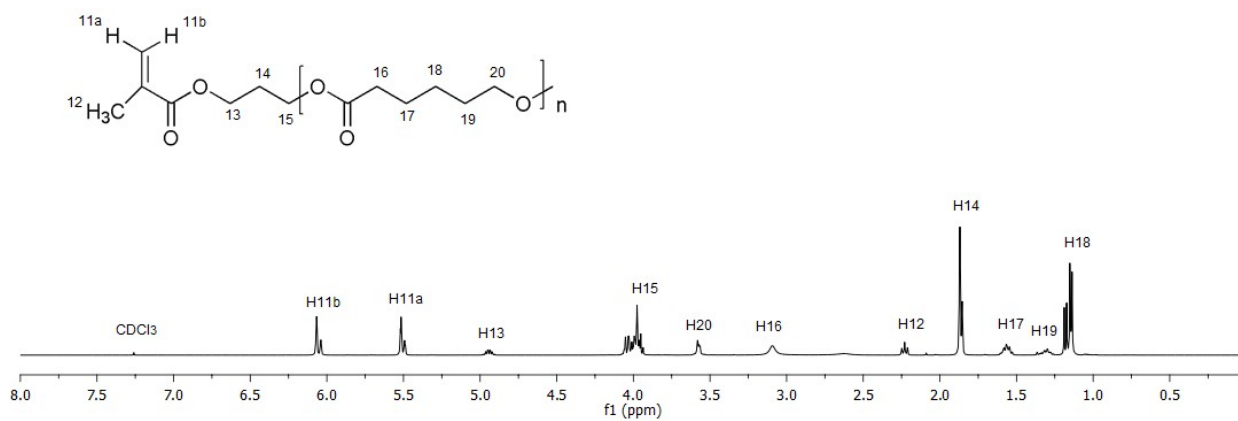
Fig. S5. ^{1}H NMR spectrum of dextran-based macroinitiator.

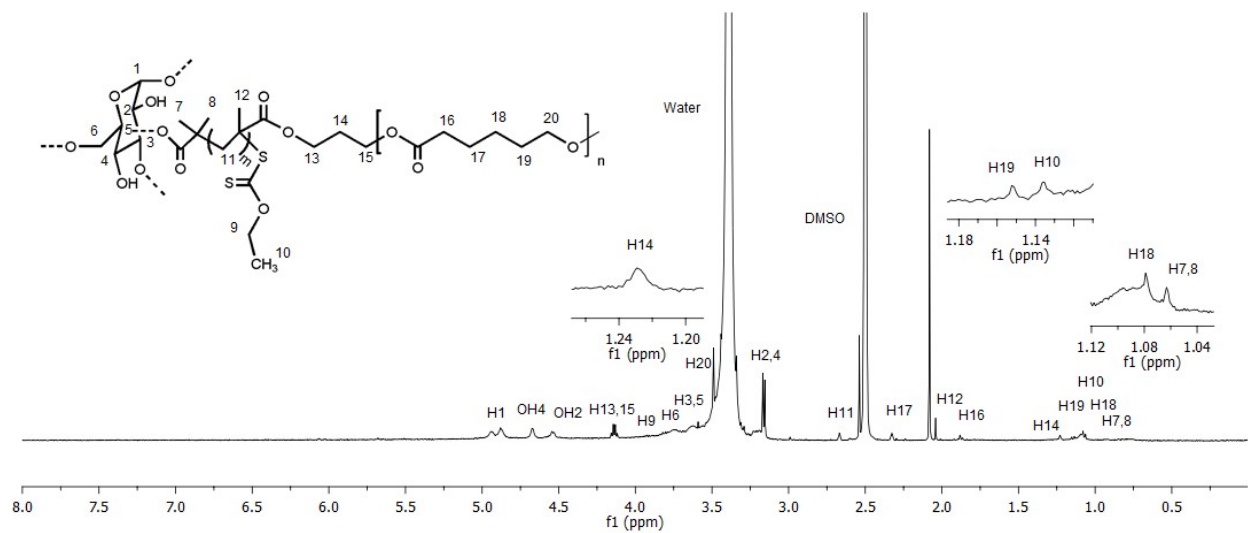**Fig. S6**. ^{1}H NMR spectrum of dextran-based RAFT agent.

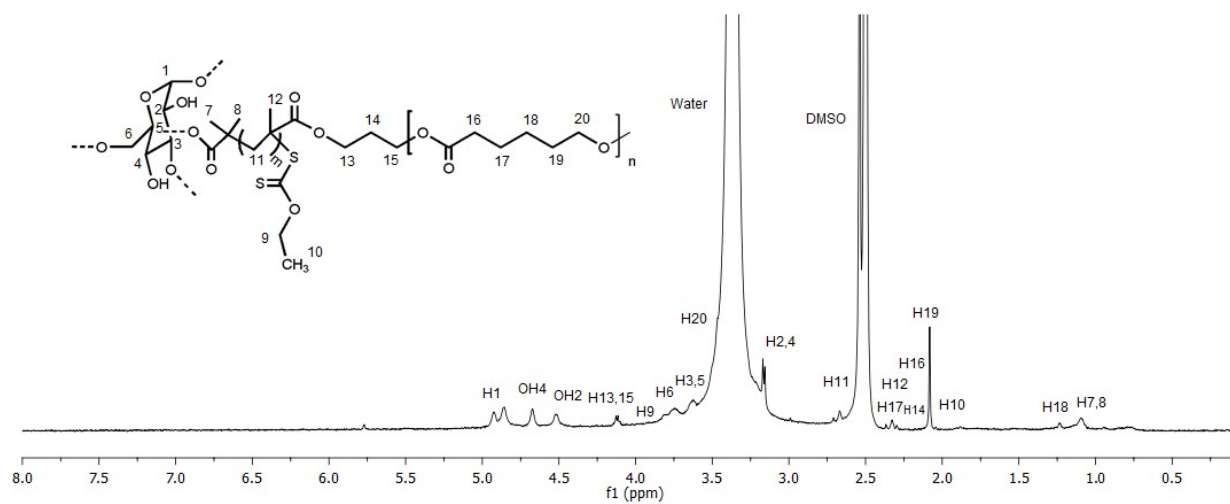**Fig. S7.** ^{1}H NMR spectrum of HPMA-PCL (before precipitation).

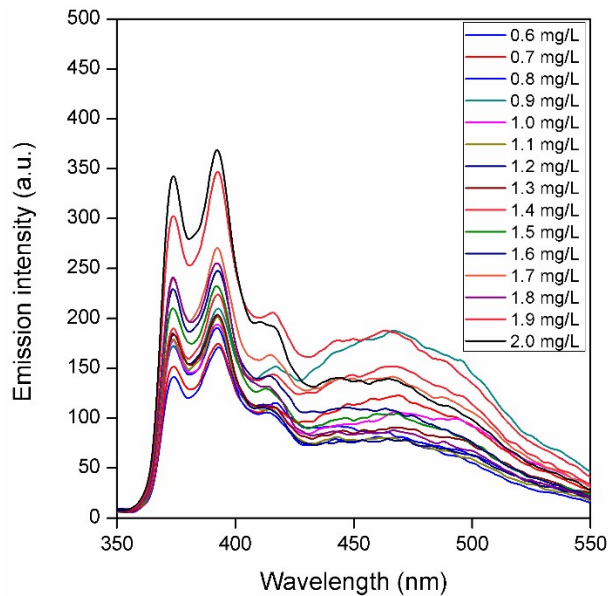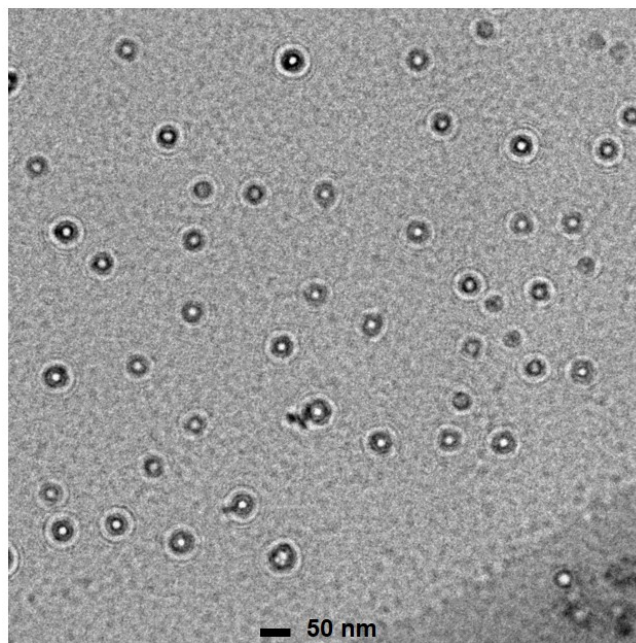**Fig. S8.** ^{1}H NMR spectrum of HPMA-PCL (after precipitation).

Fig. S9. ^{1}H NMR spectrum of Dextran-*g*-(PHPMA-*co*-PCL)$_1$.
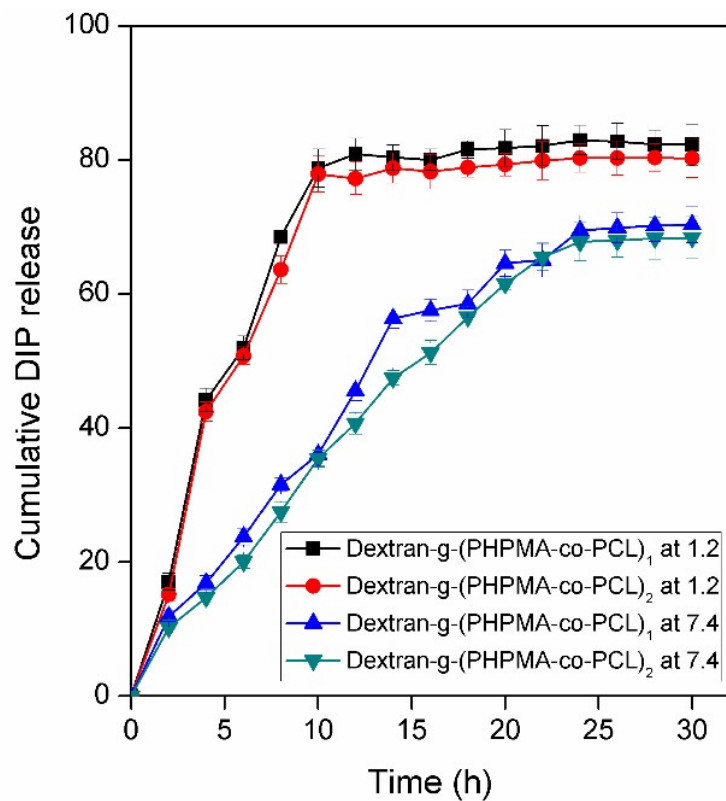

Fig. S10. ^{1}H NMR spectrum of Dextran-*g*-(PHPMA-*co*-PCL)$_2$.

Fig. S11. Steady state emission intensities of pyrene at various copolymer [Dextran-*g*-(PHPMA-

co-PCL)$_3$] concentrations.

Fig. S12. TEM analysis of Dextran-*g*-(PHPMA-co-PCL)$_3$ after loading of DIP.

Fig. S13. Cumulative release (%) of DIP from graft copolymers [Dextran-*g*-(PHPMA-*co*-PCL)$_1$ and Dextran-*g*-(PHPMA-*co*-PCL)$_2$].

Supporting Tables

Table S1. Molecular mass and degree of polymerization data of HPMA-PCL before precipitation and after precipitation.

HPMA-PCL	Mn (g/mol)	DP
Before precipitation	7801.77	67.24
After precipitation	8030.41	69.31

Table S2. % Grafting and % DIP release of various synthesised copolymers.

Sample	Feed ratio[a]	%Grafting (using ^{1}H NMR)	% DIP release at 7.4
DHP$_1$	1:2	31.2	70.3
DHP$_2$	1:4	35.8	68.4
DHP$_3$	1:6	54.1	60.7

Feed ratio [a] = for DXAR: HPMA-PCL

Table S3. Loading (%), encapsulation efficiency (%) and hydrodynamic diameter of dipyridamole-loaded Dextran-*g*-(PHPMA-*co*-PCL)$_3$

Drug	DIP/polymer ratio	Loading (%)	EE (%)	Hydrodynamic diameter (nm)
	0	0	0	82.4
	1:1	3.7	3.7	90.7
Dipyridamole	1:2	9.0	18.1	98.8
	1:3	13.0	39.0	103.3
	1:4	19.7	78.7	111.2

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