Supplementary Information for the Manuscript Entitled

pH-Triggered Block Copolymer Micelles Based on a pH-Responsive PDPA (Poly[2-(diisopropylamino)ethyl Methacrylate]) Inner Core and a PEO (Poly(ethylene Oxide)) Outer Shell as a Potential Tool for the Cancer Therapy

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Dynamic Light Scattering

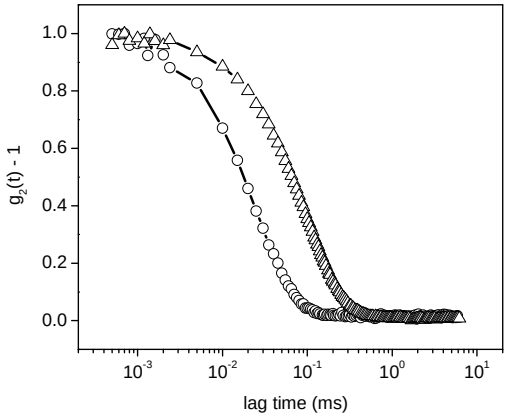

Figure S1. Autocorrelation functions for 4.0 mg.mL^{-1} PEO_{113}-*b*-$PG2MA_{30}$-*b*-$PDPA_{50}$ dissolved in ethanol (○) and 0.25 mg.mL^{-1} PEO_{113}-*b*-$PG2MA_{30}$-*b*-$PDPA_{50}$ prepared by using the nanoprecipitation protocol (Δ) in PBS (pH 7.4) both at 37 ^{o}C.

Steady-state fluorescence

Experimental

Steady-state fluorescence spectra of pyrene were recorded on a Hitachi F4500 Spectrofluorimeter. The block copolymer solutions over a wide range of concentration were excited at 336 nm and the emission spectra were recorded from 360 to 500 nm.

Result

Techniques using fluorescent probes such as pyrene have been extensively used to monitor the cmc of a variety of aggregation processes. The ratio between the bands I_1 (372.8 nm) and I_3 (384.0 nm) of the fluorescent pyrene probe is sensitive to small changes in the environment polarity. The I_3/I_1 ratio of pyrene is used as a criterion to evaluate the micropolarity of micellar aggregate microenvironments. Since the pyrene probe migrates from the polar aqueous medium to the apolar micellar cores during the micellization, the ratio I_3/I_1 enables us to follow the aggregation path. The profile of I_3/I_1 *vs.* PEO_{113}-*b*-$PG2MA_{30}$-*b*-$PDPA_{50}$ concentration is shown in Figure S1. In the presence of small amounts of PEO_{113}-*b*-$PG2MA_{30}$-*b*-$PDPA_{50}$ the I_3/I_1 ratio is around 0.60 which is compatible with the water polarity. The cmc value was determined at the concentration where the plateau ends. According to this methodology, the cmc value is equal to cmc = 2.3 x 10^{-3} mg.mL^{-1}.

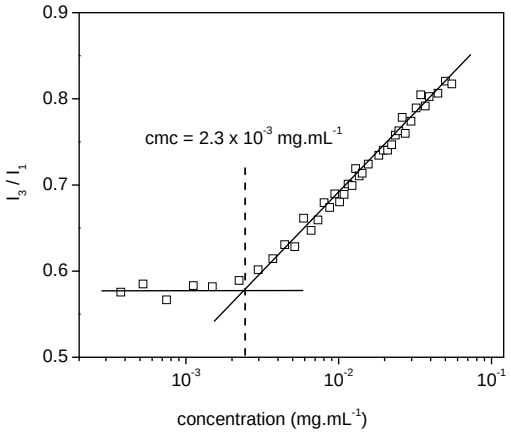

Figure S2. I_3/I_1 *vs*. PEO_{113}-*b*-$PG2MA_{30}$-*b*-$PDPA_{50}$ concentration in PBS solution.

Transmission Electron Microscopy (TEM)

The formation of mainly narrowly distributed nanosized spherical block copolymer micelles is evidenced in the TEM image given in Figure S3. The mean micelle diameter (2R) calculated by image analysis was 35 nm, which is in good agreement with DLS results.

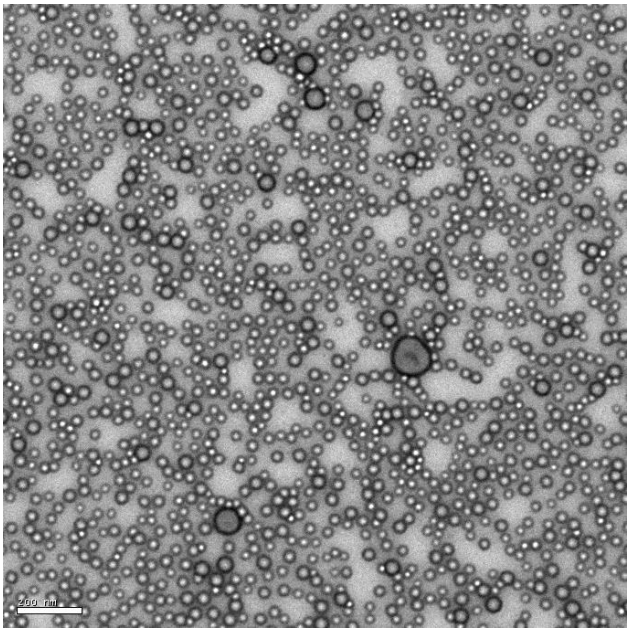

Figure S3. TEM image of the self-assembled block copolymer micelles.

Small-Angle X-ray Scattering (SAXS)

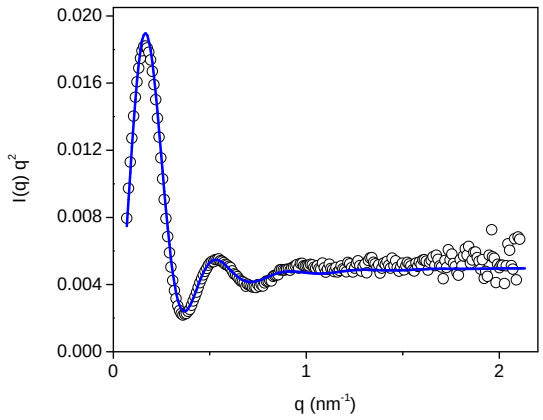

Figure S4. Kratky plot ($I(q)q^2$ *vs.* q) for 5.0 mg.mL^{-1} PEO_{113}-*b*-$PG2MA_{30}$-*b*-$PDPA_{50}$ in PBS solution (pH 7.4 at 37 ^{o}C).

pH Titration

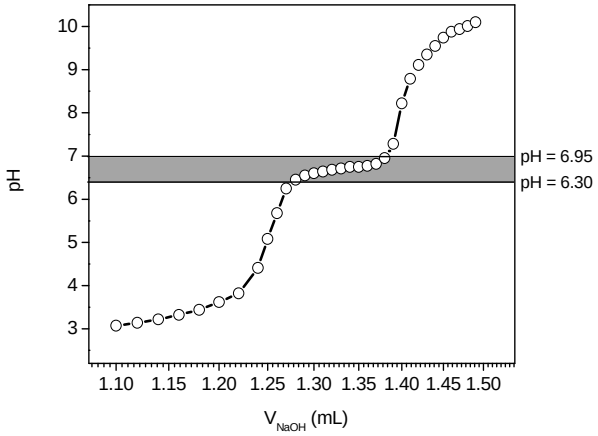

Figure S5. Potentiometric acid-base titration curve for 0.10 mg.mL^{-1} PEO_{113}-*b*-$PG2MA_{30}$-*b*-$PDPA_{50}$ aqueous solution at ionic strength I = 0.15 mol.L^{-1}. The solution was titrated with NaOH 0. 010 mol.L^{-1}.

Number-weighted Distributions

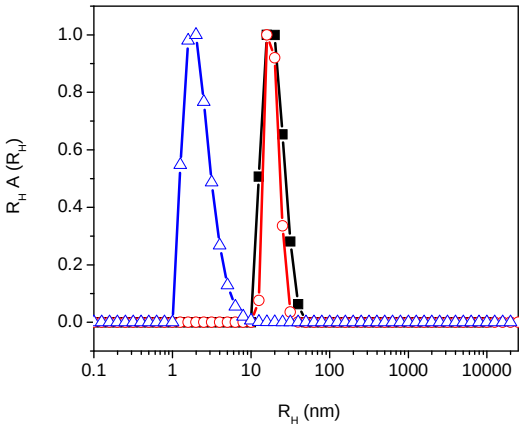

Figure S6. Number-weighted distributions of R_H for 4.0 mg.mL^{-1} PEO_{113}-*b*-$PG2MA_{30}$-*b*-$PDPA_{50}$ in PBS (37 ^{o}C) and different pH values (Δ - 5.5; ○ - 6.5; ■ - 7.4).

In Vitro Stability

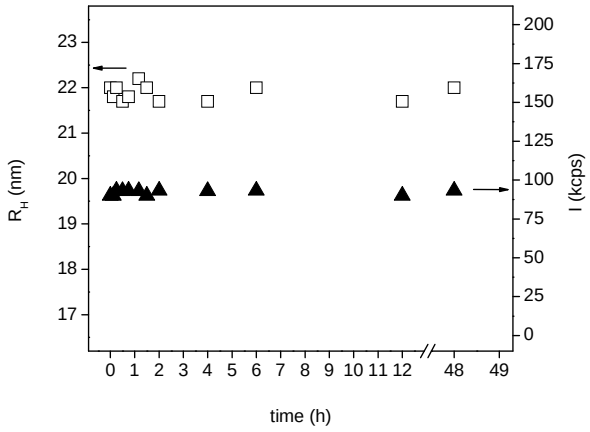

Figure S7. Stability of the PEO_{113}-*b*-$PG2MA_{30}$-*b*-$PDPA_{50}$ micelles in pure PBS at pH 7.4: R_H (○) and *I* (▲) *vs.* time.