Supporting Information

Reduction-responsive shell-crosslinked micelles prepared from Y-shaped amphiphilic block copolymers as the drug carrier

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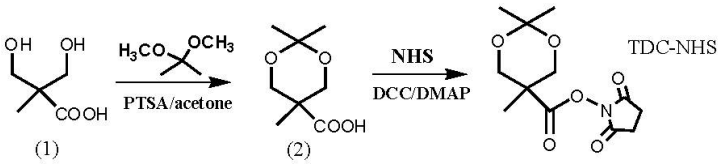

Scheme S1. The synthesis of TDC-NHS

Synthesis of 2,2,5-Trimethyl-1,3-dioxane-5-carboxylic acid N-hydroxysuccinimide ester (TDC-NHS)

The synthetic route of TDC-NHS was shown in Scheme S1. Firstly, 15 g (0.112 mol) of 2,2-Bis(hydroxymethyl) propionic acid (1) was dissolved in 70 ml of anhydrous acetone, followed by addition of 21 ml of 2,2-dimethoxypropane and 1.0 g PTSA. The mixture was stirred at room temperature for 2 h. After that, the PTSA was neutralized with NH_3•H_2O/EtOH (v:v=50:50) solution and the solvent was evaporated under reduced pressure. The crude product was redissolved in 300 ml of CH_2Cl_2 and washed with 30 ml of water for three times. The organic phase was dried with anhydrous $MgSO_4$ overnight and the intermediate product (2) was collected by evaporation the solvent (yield: 60%). Secondly, prescribed amount of (2) (6.0 g, 0,034 mol) and N-Hydroxysuccinimide (NHS, 3.98 g, 0.034 mol) were dissolved in 100 ml of CH_2Cl_2, followed by dropwise addition of 7.1 g of dicyclohexylcarbodiimide (DCC, 0.034 mol) in 25 ml of CH_2Cl_2 at 0 ^oC. After stirring at room temperature for 24 h, the white precipitates produced during the reaction were removed by filtration and the colorless filtrate was evaporated under reduced

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pressure to get white solid. Finally, the crude product was purified by recrystallization using acetic ether (yield: 65%)

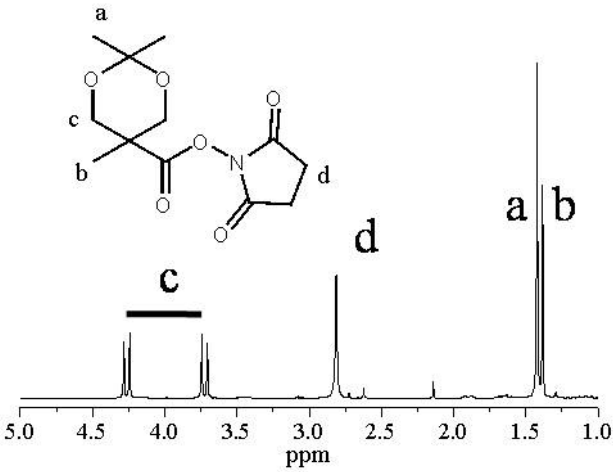

Figure S1. The structure and ^{1}H NMR spectra of TDC-NHS in $CDCl_3$

(TDC-NHS:)

Synthesis of amino-terminated mPEG (mPEG-NH_2)

Firstly, 5.0 g of monomethoxyl poly(ethylene glycol) (mPEG, 1 mmol) and 0.17 g of methylsulfonyl chloride (1.5 mmol) were dissolved in 10 ml of anhydrous CH_2Cl_2. A few drop of TEA was added into the above solution and the mixture was then stirred at 0 ^{o}C overnight. After reaction, the solution was precipitated against 15-fold volume of diethyl ether. The white precipitates were collected and dried for 8 h (yield: 80%). Secondly, the above product was dissolved in 100 ml of $NH_3 \bullet H_2O$ solution which contained 2.0 g of NH_4Cl and the mixture was stirred at room temperature for 2 days. Finally, the solution was concentrated and the product, mPEG-NH_2, was extracted from the solution using CH_2Cl_2.