Supporting information

Camptothecin-based dendrimersomes for gene delivery and redox-responsive drug delivery to cancer cells

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**Figure S1.** $^1$H-NMR spectrum of thiolated camptothecin CPT-SH (in DMSO-d$_6$, 500 MHz).

$^1$H NMR (500 MHz, DMSO-d$_6$, δ ppm): 8.71 (s, 1H), 8.16 (m, 2H), 7.87-7.90 (m, 1H), 7.72-7.75 (m, 1H), 7.19 (s, 1H), 5.52 (s, 2H), 5.32 (s, 2H), 3.20 (m, 1H), 2.87-2.90 (m, 2H), 2.70-2.74 (m, 2H), 2.17-2.19 (m, 2H), 0.93-0.96 (t, 3H).
**Figure S2.** FTIR spectrum of CPT-bearing PEGylated DAB dendrimer (DPSSC) (A), DAB (B), and OPSS-PEG-SCM (C)
Figure S3. $^1$H-NMR spectrum of DPSSC dendrimer (CDCl$_3$, 600 MHz).
Figure S4. HPLC chromatogram of DPSSC (controls: CPT and CPT-SH)
Figure S5. MALDI-TOF MS spectra of DPSSC (A), DAB (B) and OPSS-PEG-SCM (C)
S1. CPT loading calculation

The CPT loading in DPSSC was calculated as the weight of conjugated CPT expressed as a percentage of the total average molecular weight:

CPT loading (%) = {(n x MW_{conjugated\ CPT})/[M]^+} x 100

Where n is the number of CPT conjugated to modified dendrimer, MW_{conjugated\ CPT} is the molecular weight of conjugated CPT (347.35 g/mol) and [M]^+ is the average molecular weight of the modified dendrimer (4480 g/mol), as obtained from MALDI-TOF mass spectrometry analysis.

CPT loading in DPSSC (%) = {(1 x 347.35)/4480} x 100 = 7.75%

Figure S6. Fluorescence spectra of Nile Red in presence of DPSSC at various concentrations in phosphate buffer (pH 7.4)
Figure S7. Size of DPSSC (2 mg/mL) incubated in presence of complete medium containing 10% FBS at 37 °C at various time intervals (n=3).
Figure S8. Size distribution of DPSSC (1 mg/mL, phosphate buffer (pH 7.4) in presence of various GSH concentrations: 0 (A), 10µM (B), 10mM (C) and 50mM (D)
Table S1. Zeta potential of DPSSC (1 mg/mL, phosphate buffer of pH 7.4) incubated in presence of various GSH concentrations (0, 10 µM, 10 mM and 50 mM) at 37 °C after different time intervals (n=3)

<table>
<thead>
<tr>
<th>DPSSC solutions (1 mg/mL)</th>
<th>Zeta Potential (mV)</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>After 6 h</td>
<td>After 7 days</td>
<td></td>
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<tr>
<td>No GSH</td>
<td>4.21 ± 0.65</td>
<td>4.97 ± 0.49</td>
<td></td>
</tr>
<tr>
<td>10 µM GSH</td>
<td>NA</td>
<td>4.09 ± 0.64</td>
<td></td>
</tr>
<tr>
<td>10 mM GSH</td>
<td>NA</td>
<td>0.46 ± 0.06</td>
<td></td>
</tr>
<tr>
<td>50 mM GSH</td>
<td>NA</td>
<td>23.1 ± 2.55</td>
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**Figure S9.** Fluorescence emission spectra (λ_{exc}: 365 nm) of DPSSC complexed with DNA at DPSSC: DNA weight ratio of 20:1, in presence of PicoGreen (PG) (control: DPSSC only (200 µg/mL)). The amount of DNA was fixed at 10µg for each complex.
Figure S10. Cell viability of DPSSC, DAB and free CPT on PC3-Luc human prostate cancer cells at various concentrations after 24 (A) 48 (B) and 72 h (C) of incubation. The data points are mean ± SD. (n = 5).
Figure S11. Flow cytometry histograms of PC3-Luc cells following 2 hours incubation with DPSSC-DNA complexes (dendrimer: DNA weight ratios: 20:1 (A), 10:1 (B), 5:1 (C) and 10:1 (D)) (controls: DAB dendriplex (dendrimer: DNA weight ratio 5:1 (E)) and DNA solution (F))