Supporting Information

Synthesis of SN38 Prodrug with Amphiphilic Phosphorylcholine Polymers and Prodrug Micelle Properties

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Figure S1 $^1$H NMR of P(CL-co-BCL)-OH(A), P(CL-co-ACL)-OH(B).
P(CL-co-ACL)-Br(C) in CDCl3.

The total DP of polycaprolactone was determined by $^1$H NMR in Figure S1(A) from the integral ratio of peak $g''$ at 3.65 ppm (methylene protons neighbouring OH in end CL) to peak $c$ at 2.3 ppm (methylene protons neighbouring carbanyl group in CL). The calculated DP of PCL in the copolymers was respectively 29 and 48. The peak $g$ at 4.2 ppm was attributed to the methenyl proton of $\alpha$-BrCL moieties. Thus, $\alpha$-BrCL molar fractions were determined by the integral ratio of peak $g$ at 4.2 ppm to peak $c$ at 2.3 ppm, around 10% of sum units. The calculation formula was as follows.

$$n = \frac{1}{2} \frac{\sum I_c}{\sum I_g - I_c}$$

$$\omega\% = \frac{1}{2} \frac{\sum I_c' g' g}{\sum I_c' g' g + I_c}$$

Where the $n$ represents degree of polymerization of the sum of $\alpha$-BrCL and $\varepsilon$-caprolactone; $I_c$ represents integral area of peak $c$; $I_c' g'$ represents sum of the integral areas of peak $c'/g'$ and $g$; $\omega$ represent percentage $\alpha$-BrCL.

![Figure S2 FT-IR spectrum of P(BCL-co-CL)-OH (A), P(ACL-co-CL)-OH (B), P(ACL-co-CL)-Br (C), P(ACL-co-CL)-b-PMPC (D).](image_url)
Figure S3 GPC curves of different polymers

Figure S4 DSC curves of different polymers for heating (A,C) and cooling (B,D)
Figure S5 Cytotoxicity of blank micelles of $P$(ACL-co-CL)$_{29}$-PMPC$_{10}$ and $P$(ACL-co-CL)$_{48}$-PMPC$_{10}$ against L929 cells (A), MCF-7 cells (B) and 4T1 cells (C).
Table S1. In vitro growth inhibitory activity of SN38 and P(CL/CL-g-SN38)_{48}-PMPC_{10} to MCF-7 and 4T1 (MTT assay) (48 h treatment).

<table>
<thead>
<tr>
<th>Cell</th>
<th>SN38</th>
<th>P(CL/CL-g-SN38)<em>{48}-PMPC</em>{10}</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCF-7</td>
<td>0.16</td>
<td>0.27</td>
</tr>
<tr>
<td>4T1</td>
<td>8.04</td>
<td>24.06</td>
</tr>
</tbody>
</table>

Figure S6 The standard curve of SN38 in DMSO by Fluorescence spectrophotometer.