

**Supporting Information**

**Improving Tumor Chemotherapy Effect by Using an Injectable Self-healing Hydrogel as Drug Carrier**

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## 1. Measurements

Gel permeation chromatography (GPC) analyses were performed using N,N-dimethyl formamide (DMF) as the eluent. The GPC system was a Shimadzu LC-20AD pump 45 system consisting of an auto injector, a MZ-Gel SDplus 10.0  $\mu\text{m}$  guard column ( $50 \times 8.0 \text{ mm}$ , 102  $\text{\AA}$ ) followed by a MZ-Gel SDplus 5.0  $\mu\text{m}$  bead-size column (50-106  $\text{\AA}$ , linear) and a Shimadzu RID-10A refractive index detector. The ESI-MS data were recorded on a Micro TOF-QII Bruker. The FT-IR spectra were made in a transmission mode on a Perkin-Elmer Spectrum 100 spectrometer (Waltham, MA, USA). The UV-vis spectra were measured using a Shimadzu UV-2450 UV-vis spectra meter. The rheology analysis were carried out using a AR-2 reometer with parallel plate geometry (20 mm in diameter) at 25  $^{\circ}\text{C}$ .

## 2. Methods

### 2.1 Preparation of the hydrogels

Taxol (0.34 mg) was dissolved in 10  $\mu\text{L}$  of Taxol ethanol solution to reach a concentration of 20  $\text{mg}\cdot\text{mL}^{-1}$ . DF-PEG solution was prepared by dissolving 5.5 mg of DF-PEG into 40  $\mu\text{L}$  of saline water (0.9% NaCl). Chitosan solution was prepared by dissolving 1.65 mg of glycol-chitosan into 50  $\mu\text{L}$  of saline water (0.9% NaCl). Taxol ethanol solution (10  $\mu\text{L}$ , 20  $\text{mg}\cdot\text{mL}^{-1}$ ) was mixed with chitosan solution (50  $\mu\text{L}$ ) followed by triturating 15-20 times. Then, add DF-PEG solution (40  $\mu\text{L}$ ) to generate 100  $\mu\text{L}$  Taxol containing hydrogel.

18.5 mg of F127 was dissolved in 90  $\mu\text{L}$  of saline water (0.9% NaCl) to get a F127 solution. Then, the precursor solution of F127-TAX hydrogel was prepared by mixing Taxol ethanol solution (10  $\mu\text{L}$ , 20  $\text{mg}\cdot\text{mL}^{-1}$ ) and the F127 solutions, and the gelation will happen when the environment temperature is higher than 35  $^{\circ}\text{C}$ .

### 2.2 *In-vivo* tests

All *in vivo* tests were performed under the technical guidelines for non-clinical study of cytotoxic antitumor drugs issued by CFDA, and authorized by the ethics committee of Cancer Hospital, Chinese Academy of Medical Science. A human hepatocarcinoma tumor (BEL-7402) was cut into small pieces evenly and implanted into the right femur of each mouse. The tumor-bearing mice were cultured for 7 days till the tumor grew to about 100  $\text{mm}^3$ .

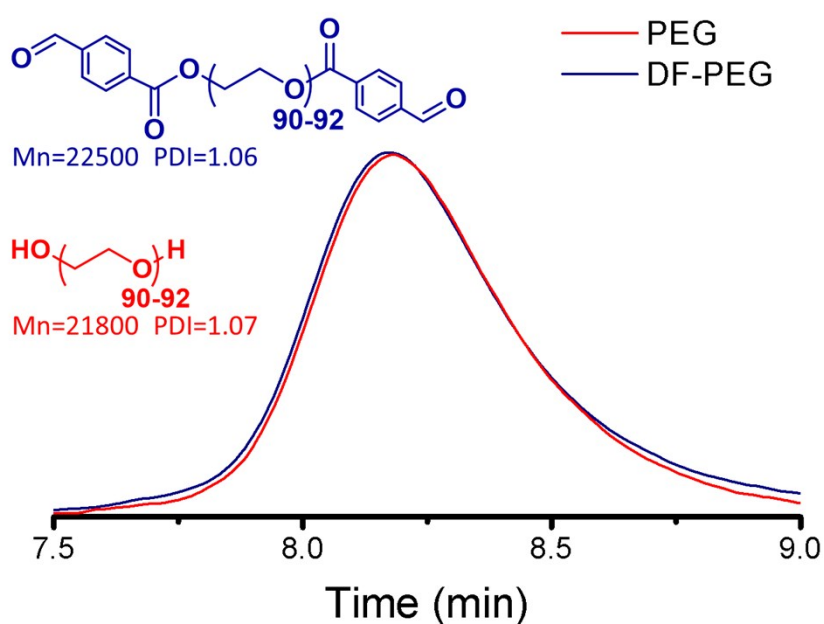
In the intra-tumor injection test, for each tumor-bearing mouse, 100  $\mu\text{L}$  of above-mentioned hydrogel was prepared in a 1mL syringe with a 21 gauge needle, and 50  $\mu\text{L}$  of the hydrogel was injected into the tumor. Mice in the control groups were performed in the same way.

Measurements were performed by measuring the length (b) and width (a) of the tumor; T is the tumor mass of each treated group, C is the tumor mass of the untreated group. The tumor volume was calculated by the following equations:

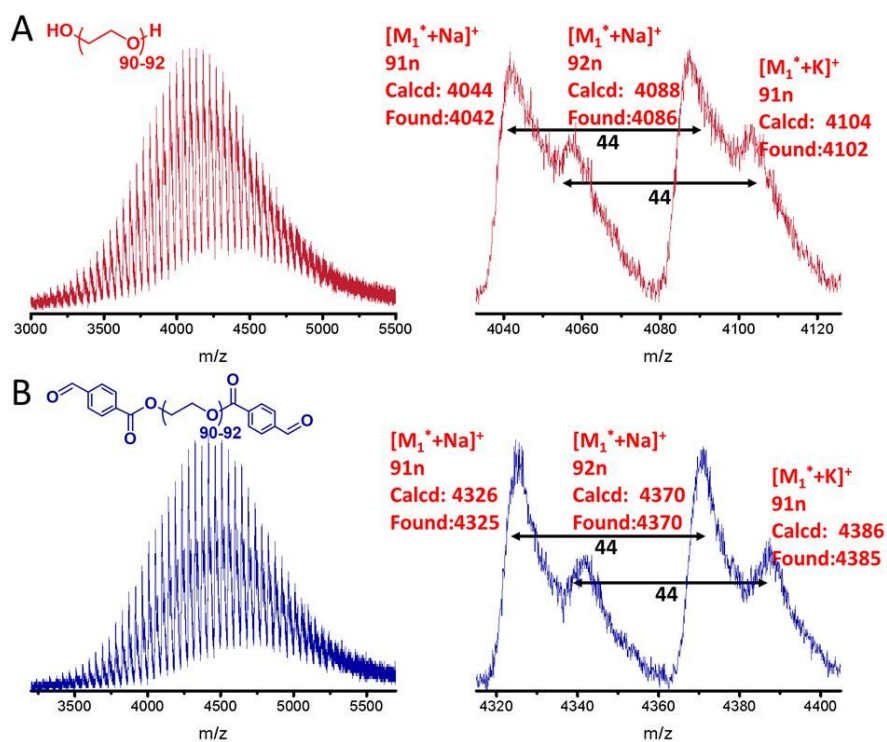
$$V = \frac{1}{2} a_2 * b \quad (1)$$

$$\%TGI = 100 - \left(\frac{T}{C} * 100\right) \quad (2)$$

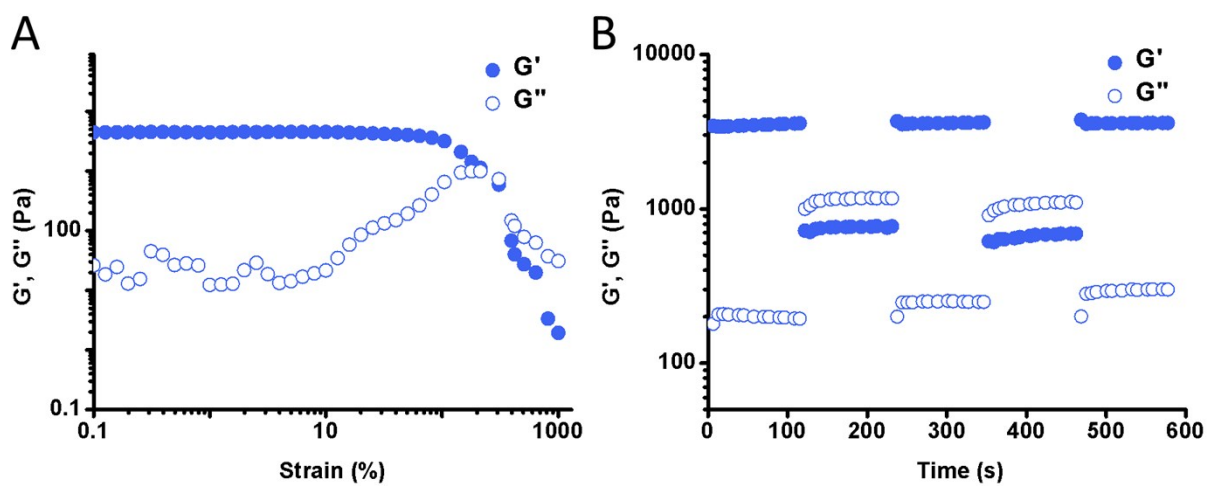
### Supporting data



**Figure S1.** GPC analyses of PEG<sub>4000</sub>(Red line), and DF-PEG (Blue line).



**Figure S2.** MALDI-TOF MS spectra of PEG<sub>4000</sub>(Red), and DF-PEG (Blue).



**Figure S3.** (A)  $G'$ ,  $G''$  of the CP hydrogel on strain sweep (strain% 0.01~1000). (B)  $G'$  and  $G''$  of the CP hydrogel in step-changing strain measurements.