Supporting Information

Preparation of Taxol-SA and Dex-SA:

The synthetic route was according to the reference we have reported\textsuperscript{1}.

\textsuperscript{1}H-NMR and HR-MS of synthetic compounds:

\begin{figure}
\centering
\includegraphics[width=\textwidth]{Fig_S-1.png}
\caption{\textsuperscript{1}H NMR of Dex-K(Taxol)E-ss-EE}
\end{figure}
Fig. S-2. HR-MS of Dex-K(Taxol)E-ss-EE

Fig. S-3. $^1$H NMR of Ac-K(Taxol)E-ss-EE
Fig. S-4. HR-MS of Ac-K(Taxol)E-ss-EE

Fig. S-5. $^1$H NMR of Taxol-K(ac)E-ss-EE
**Fig. S-6.** HR-MS of Taxol-K(ac)E-ss-EE

**Fig. S-7.** $^1$H NMR of Taxol- E-ss-EE
Fig. S-8. HR-MS of Taxol- E-ss-EE

Fig. S-9. $^1$H NMR of Taxol- R-ss-EE
Fig. S-10. HR-MS of Taxol- R-ss-EE

Fig. S-11. $^1$H NMR of Taxol- S-ss-EE
**Rheology**

Fig. S-12. HR-MS of Taxol-S-ss-EE

Fig. S-13. Rheological measurement in dynamic time sweep mode for PBS (pH=7.4) solutions containing 1.0 wt% of different precursors and 4.0 equiv. of GSH (strain = 1.0% and frequency = 1.0 rad/ s) at 37°C: A) Dex-K(Taxol)E-gel, B) AcK(Taxol)E-gel, C) Taxol-K(Ac)E-gel, D) Taxol-E-gel, E) Taxol-R-gel, and F) Taxol-S-gel
**Fig. S-14.** Dynamic strain sweep of different kinds of hydrogels (frequency = 1.0 rad/s) at 37°C: A) Dex-K(Taxol)E-gel, B) AcK(Taxol)E-gel, C) Taxol-K(Ac)E-gel, D) Taxol-E-gel, E) Taxol-R-gel, and F) Taxol-S-gel

**Fig S-15.** Optical images of hydrogels after injection through a 1 mL syringe: A) Dex-K(Taxol)E-gel, B) AcK(Taxol)E-gel, C) Taxol-K(Ac)E-gel, D) Taxol-E-gel, E) Taxol-R-gel, and F) Taxol-S-gel
**Fig. S-16.** Rheological measurement in dynamic time sweep mode six hydrogels after injection through a 1 mL syringe at 37°C: A) Dex-K(Taxol)E-gel, B) AcK(Taxol)E-gel, C) Taxol-K(Ac)E-gel, D) Taxol-E-gel, E) Taxol-R-gel, and F) Taxol-S-gel

**Release profile of anti-cancer drugs:**

**Fig. S-17.** Accumulative Taxol release profile of different kinds of hydrogels at 37°C in 100 mM PBS buffers (pH=7.4)
Cytotoxicity measurement:

Fig. S-18. Cytotoxicity measurement of different peptides

Figure S-19. Representative congress curve of cell inhibition of different kinds of precursors
Fig. S-20. Representative congress curve of cell inhibition of different kinds of hydrogels

References: