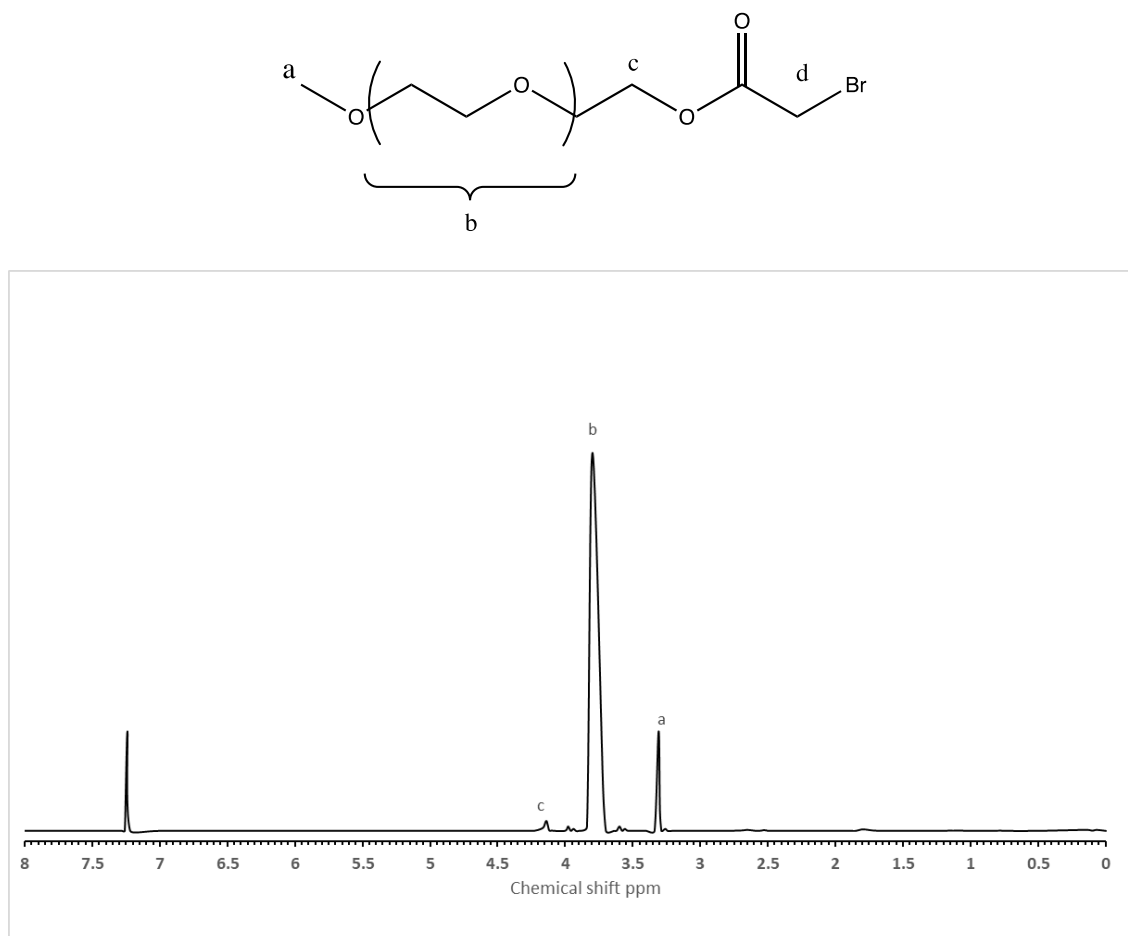


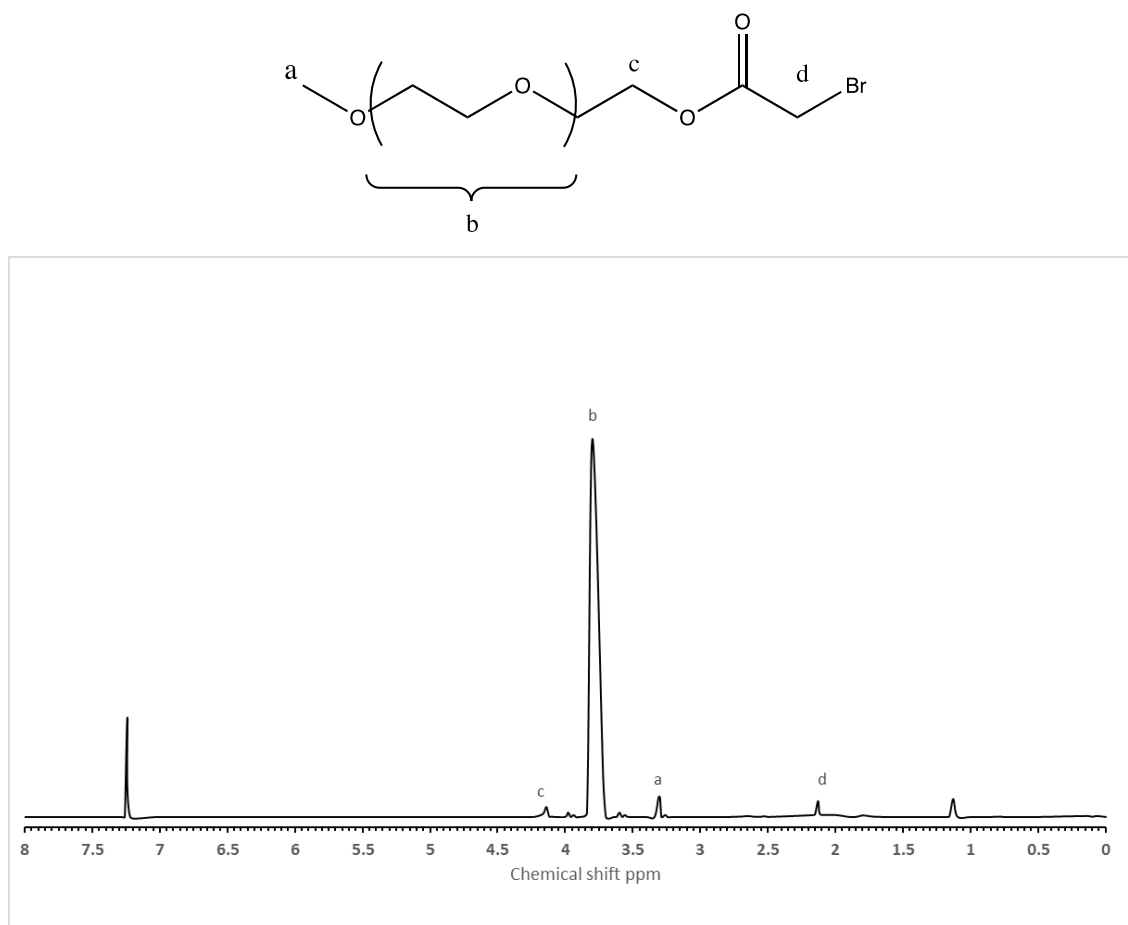
# Enhanced Anticancer Response of Curcumin- and Piperin-Loaded Lignin-g-p (NIPAM-co-DMAEMA) Gold Nanogels Against U-251 MG Glioblastoma Multiforme

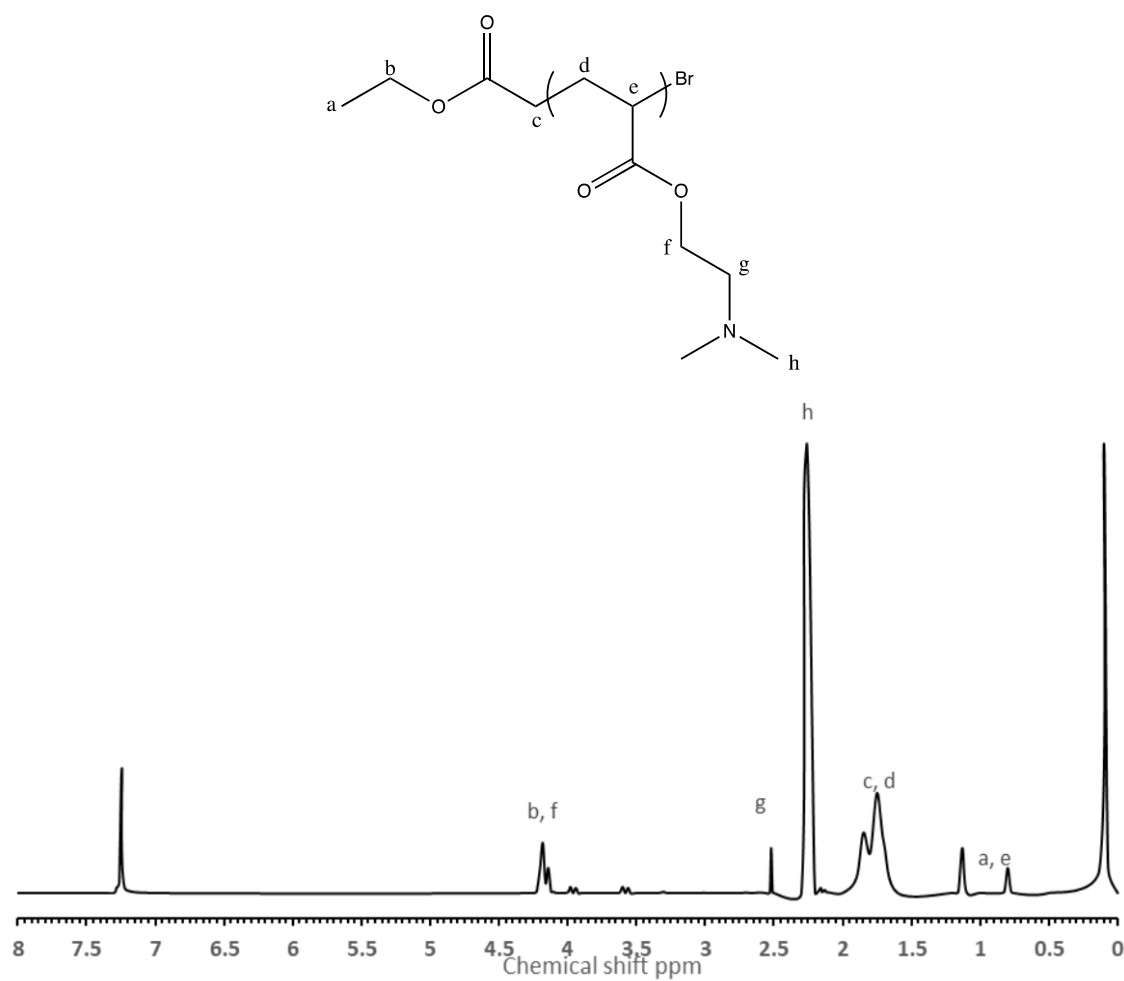
Supplementary materials

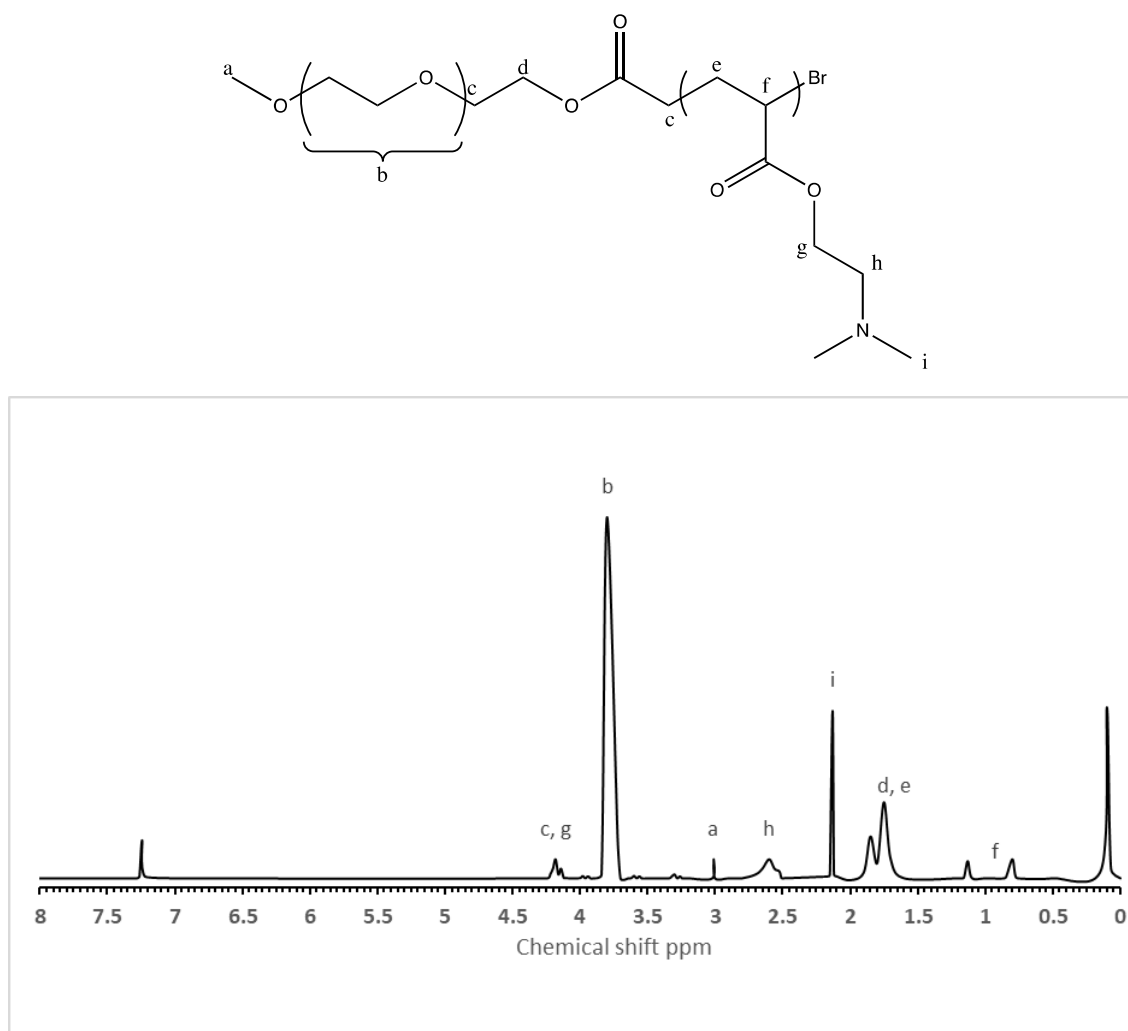
Figure S1



**Figure S1.** NMR spectrum example of PEG macroinitiator. PEG without end group modification.

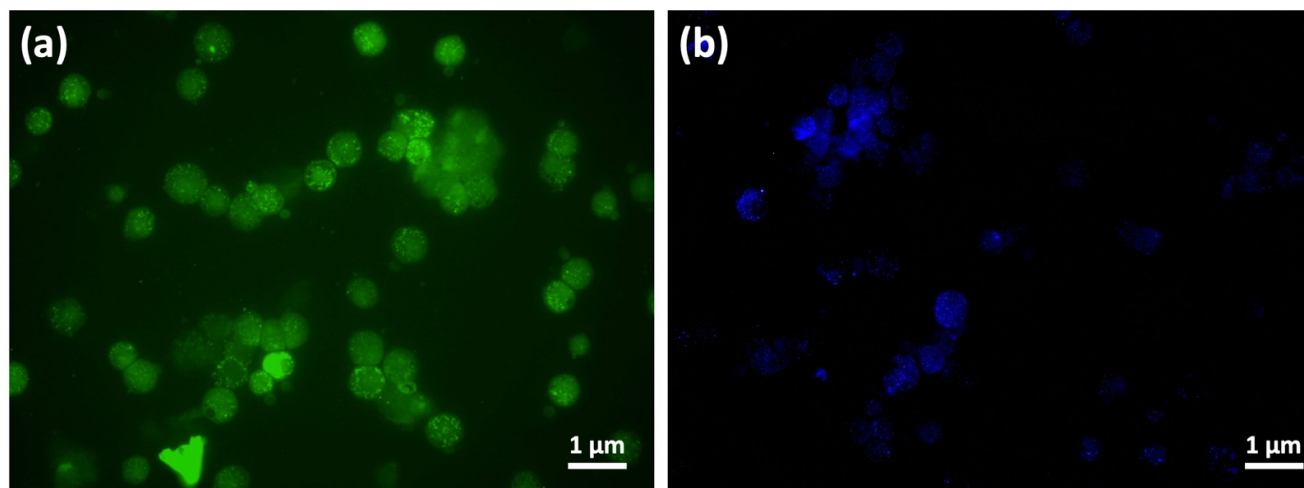
**Figure S2****Figure S2.** NMR spectrum example of PEG macroinitiator. PEG with end group modification.

**Figure S3****Figure S3.** NMR spectrum of PDMAEMA block copolymer.

**Figure S4****Figure S4.** NMR spectrum of PEG-PDMAEMA block copolymer, PEG-PDMAEMA.

## Figure S5

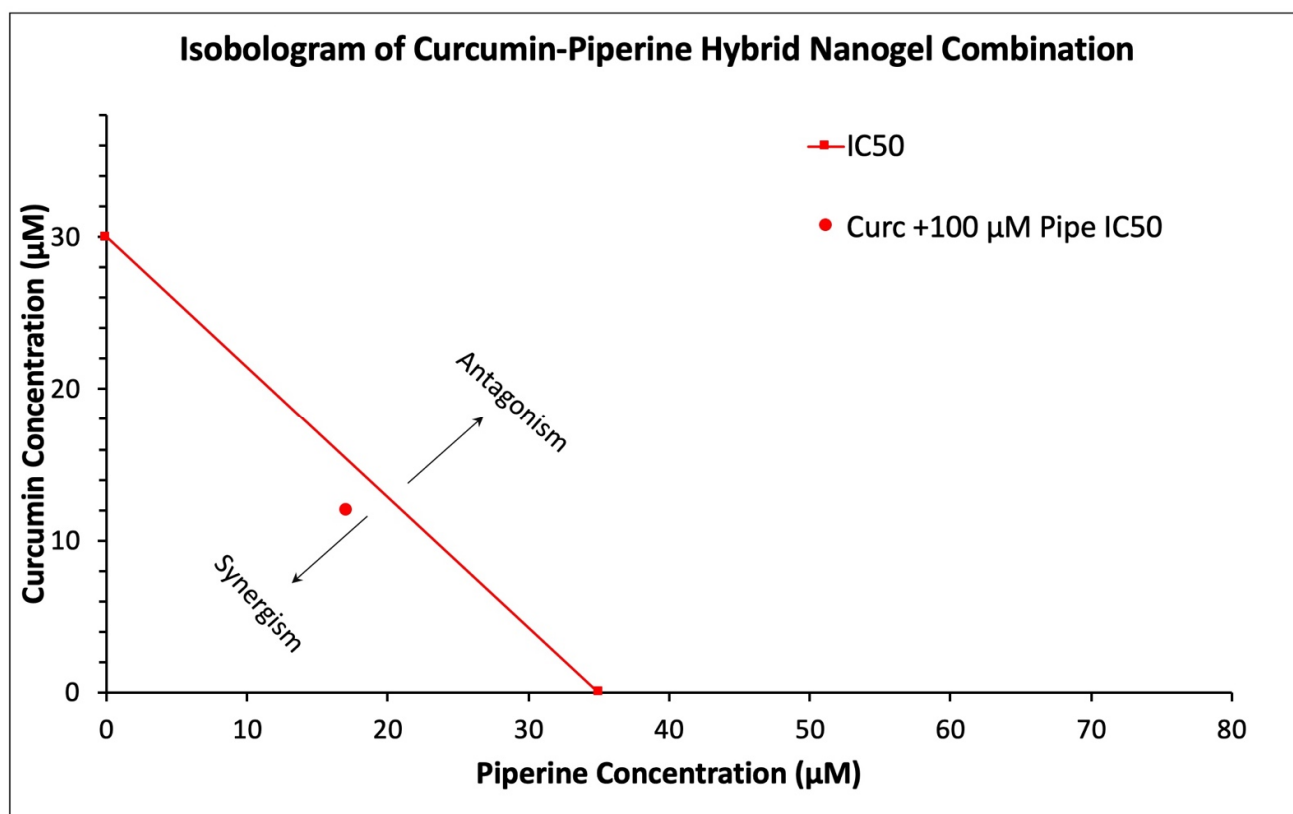
Gold nanogels were analyzed by using an Olympus epifluorescence microscopy with a 488 nm laser. A sample of 10  $\mu$ L was added to a hemocytometer and a coverslip was loaded on the counting surface. Curcumin-loaded gold nanogel was measured at a 488 nm laser wavelength. Piperine-loaded gold nanogel was measured with a UV light source. Particle numbers were systematically counted in selected squares. The concentration of nanogel in the sample was multiplied by  $10^4$  particle concentrations per mL.



**Figure S5.** Images of curcumin and piperine loaded gold nanogels (a) curcumin-loaded gold nanogel was measured at a 488 nm laser wavelength (b) piperine-loaded gold nanogel was measured with a UV light source.

## Figure S6

Isobologram analysis was performed to determine the antagonistic, synergistic or enhanced response of hybrid curcumin-piperine loaded nanogels against U-251 MG glioblastoma multiforme cancer cells. The combination index value was recorded at 0.886 which shows the mild synergistic and enhanced response of combinatorial curcumin-piperine loaded nanogels.



**Figure S6.** Isobologram of curcumin-piperine hybrid nanogel combination.