Supplemental Information

Plectin-1-targeted recognition for enhancing comprehensive therapy in pancreatic ductal adenocarcinoma

Qing Zhu[a,b,1], Silue Zeng[a,b,1], Junying Yang[a,b], Jiaming Zhuo[a,b], Peifeng Wang[a,b], Sai Wen[a,b], Chihua Fang[a,b,*]

[a]*Department of Hepatobiliary Surgery I, General Surgery Center, Zhujiang Hospital, Southern Medical University, Guangzhou 510280, China.*

[b]*Guangdong Provincial Clinical and Engineering Center of Digital Medicine, Guangzhou, 510280, China.*

*Corresponding author. Department of Hepatobiliary Surgery, Zhujiang Hospital, Southern Medical University, Guangzhou, 510280, PR China.

E-mail addresses: fangchihua@smu.edu.cn (C. Fang).

[1]These authors contributed equally to this work.

Methods

Photothermal Conversion Efficiency (PCE) of PTP-Lipo-Gem-ICG NPs

The calculation steps of the PCE of PTP-Lipo-Gem-ICG NPs are as follows:

$$\eta = \frac{hS\Delta T - Qdis}{I(1-10^{-A808})} \quad (1)$$

where the heat transfer coeffcient is expressed in terms of h, the surface area of the container is expressed in terms of S, and the temperature change of solution is expressed in terms of ΔT. where A_{808} is the absorption at 808 nm of PTP-Lipo-Gem-ICG NPs, I is the power of 808 nm laser, and the PCE was expressed in terms of η.

$$hS = \frac{mC_{water}}{\tau s} \quad (2)$$

where m is the mass of ultrapure water (solvent) and C_{water} is the heat capacity of ultrapure water.

$$t = -\tau s \ln \theta = -\tau s \ln \left(\frac{T\text{-}T_{surr}}{\Delta T} \right) \quad (3)$$

where T_{surr} is the room temperature

$$Qdis = \frac{mC_{H2O}(\Delta T_{(water)})}{\tau_{water}} \quad (4)$$

Hemocompatibility of PTP-Lipo-Gem-ICG NPs

The hemocompatibility of PTP-Lipo-Gem-ICG NPs was assessed through hemolysis assay. The specific experimental steps are as follows: First, the erythrocytes were obtained via centrifugation of the mouse blood for 5 min at 3000 rpm. The obtained erythrocyte was then washed with saline (0.9%) five times. 2% hematocrit was formed by mixing 0.2 mL of centrifuged sediment with 9.8 mL of 0.9% saline. Then, red blood cells were mixed with an equal volume of PTP-Lipo-Gem-ICG NPs solutions at different concentrations (10, 20, 30, 40, and 50 μg/mL), 0.9% normal saline, and deionized water, respectively. The mixtures were then incubated for 4 h at 37 °C. The supernatants were collected after the centrifugation of the mixed solutions, and then, the absorbance at 540 nm was tested. The hemolysis rate can be calculated according to the following formula:

Hemolysis rate (%) =[(A - A_-) / (A_+ -A_-)]× 100%

where A_- represents the absorbance of erythrocytes without hemolysis

where A_+ represents the absorbance of erythrocytes after complete hemolysis

and A represents the absorbance of supernatant.

***In vivo* toxicity evaluation of PTP-Lipo-Gem-ICG NPs**

To investigate the *in vivo* biosafety of PTP-Lipo-Gem-ICG NPs, healthy mice were received an intravenous injection of PTP-Lipo-Gem-ICG NPs (ICG: 2 mg/kg). Mice were monitored for body weight every other day. At 14 d post-injection, the mice were euthanized to collect the blood and major organs including heart, liver, spleen, lung, kidney and pancreas. Afterward, the blood biochemical analysis was

executed to confirm the biocompatibility of PTP-Lipo-Gem-ICG NPs. The harvested organs were performed for H&E staining to verify the histocompatibility of PTP-Lipo-Gem-ICG NPs. In addition, the healthy mice were used as a blank control.

Additional Figures

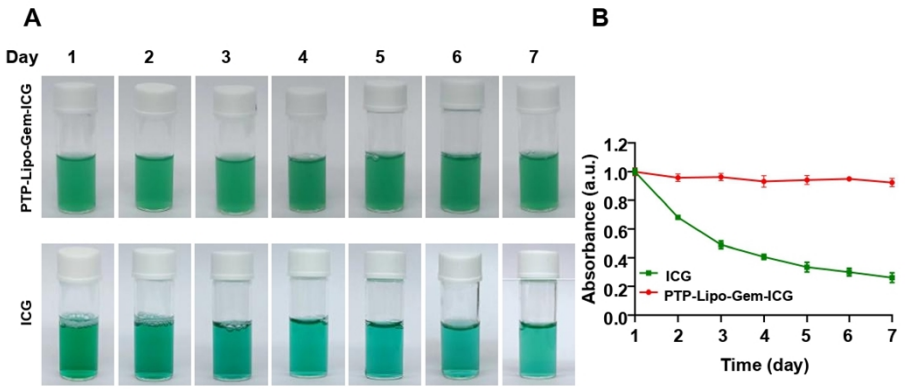

Figure S1. (A) and (B) Changes in color and absorbance at 780 nm of PTP-Lipo-Gem-ICG NPs and free ICG aqueous solutions over 7 days.

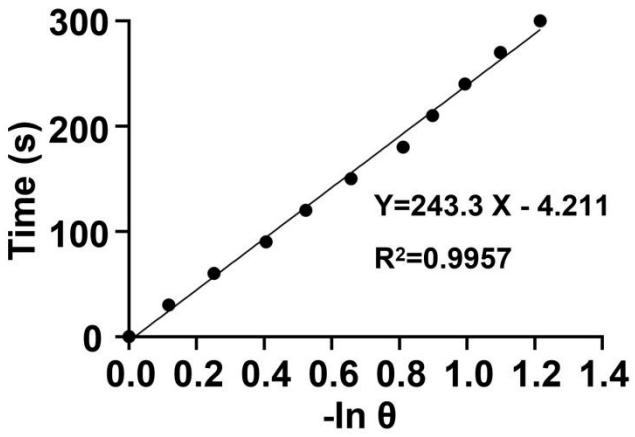

Figure S2. Linear profile of time versus−lnθ obtained from the cooling period of water.

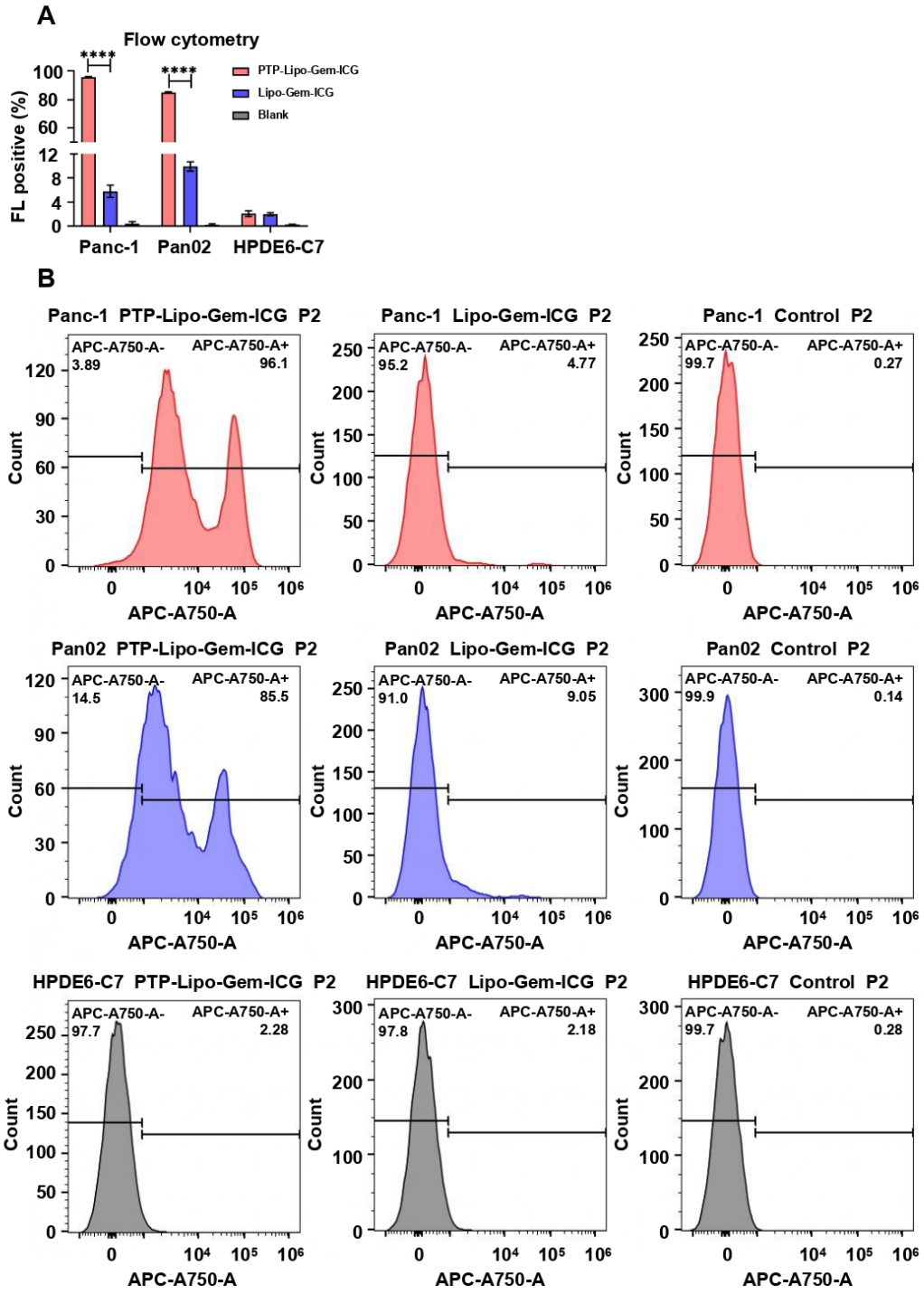

Figure S3. (A) and (B) Flow cytometry analysis of PTP-Lipo-Gem-ICG NPs targeting capabilities in Panc-1, Pan02, and HPDE6-C7 cells.

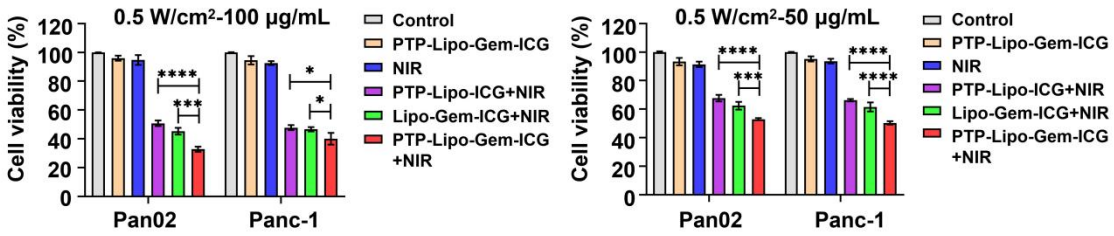

Figure S4. Cell viability following various concentrations (100 μg/mL and 50 μg/mL) under NIR laser irradiation (808 nm, 0.5 W/cm^2, 10 min) with PTP-Lipo-Gem-ICG NPs, NIR, PTP-Lipo-ICG NPs + NIR, Lipo-Gem-ICG NPs + NIR, and PTP-Lipo-Gem-ICG NPs + NIR (n=3). *P < 0.05; ***P < 0.001; ****P < 0.0001.

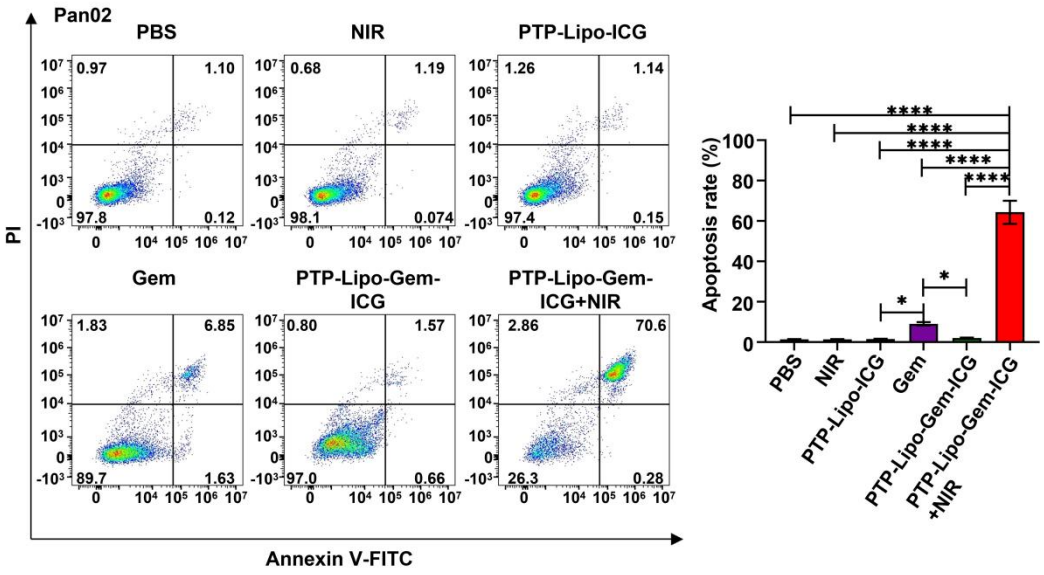

Figure S5. Flow cytometry-based apoptosis analysis of Pan02 cells after different treatments: PBS, NIR, PTP-Lipo-ICG NPs, Gem, PTP-Lipo-Gem-ICG NPs, and PTP-Lipo-Gem-ICG NPs + NIR (808 nm, 1.0 W /cm^2 , 10 min) (n=3). *P < 0.05, ****P < 0.0001.