Supplementary information

Polyethyleneimine-assisted one-pot synthesis of quasi-fractal plasmonic gold nanocomposites as a photothermal theranostic agent

Vladimir Mulens-Arias[1], Alba Nicolás-Boluda[1], Alexandre Gehanno[1], Alice Balfourier[1], Florent Carn[1], and Florence Gazeau[1]*

[1]Laboratoire Matière et Systèmes Complexes, UMR 7075, CNRS and Université Paris Diderot, 10 Rue Alice Domon et Léonie Duquet, 75205 Paris Cedex 13, France

Figure S1. (A) Time evolution of primary LSPR. (B) Absorbance at 680 nm for AuPEI-1, 2.5 and 5 nanocomposites

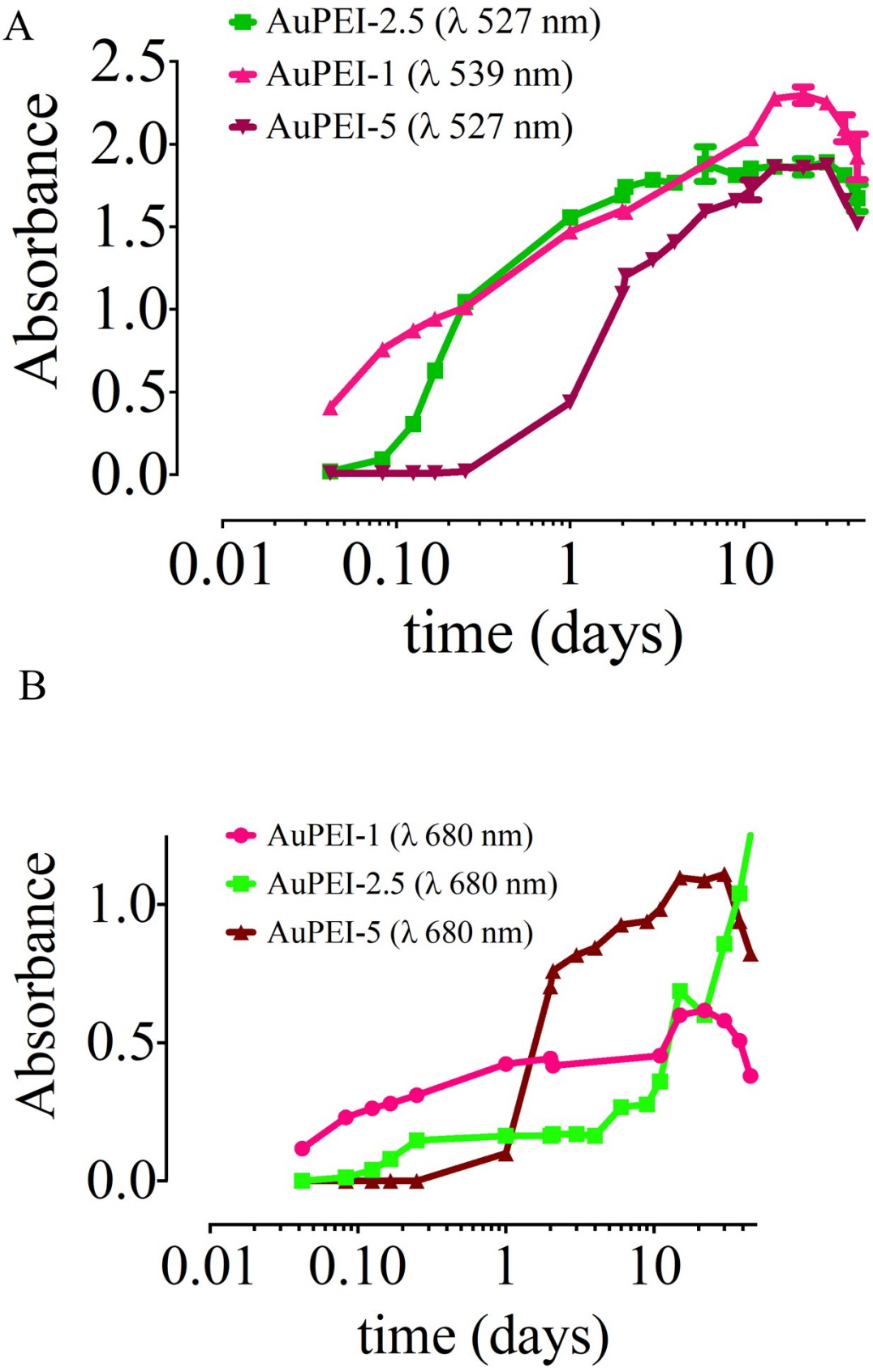

Figure S2. UV-visible light absorbance profile at different time points for $HAuCl_4$ and PEI mixtures at [PEI]: [Au] ratios of 0.5 (A) and 10 (B). (C) Time evolution of primary LSPR for AuPEI-0.5 and AuPEI-10 nanocomposites.

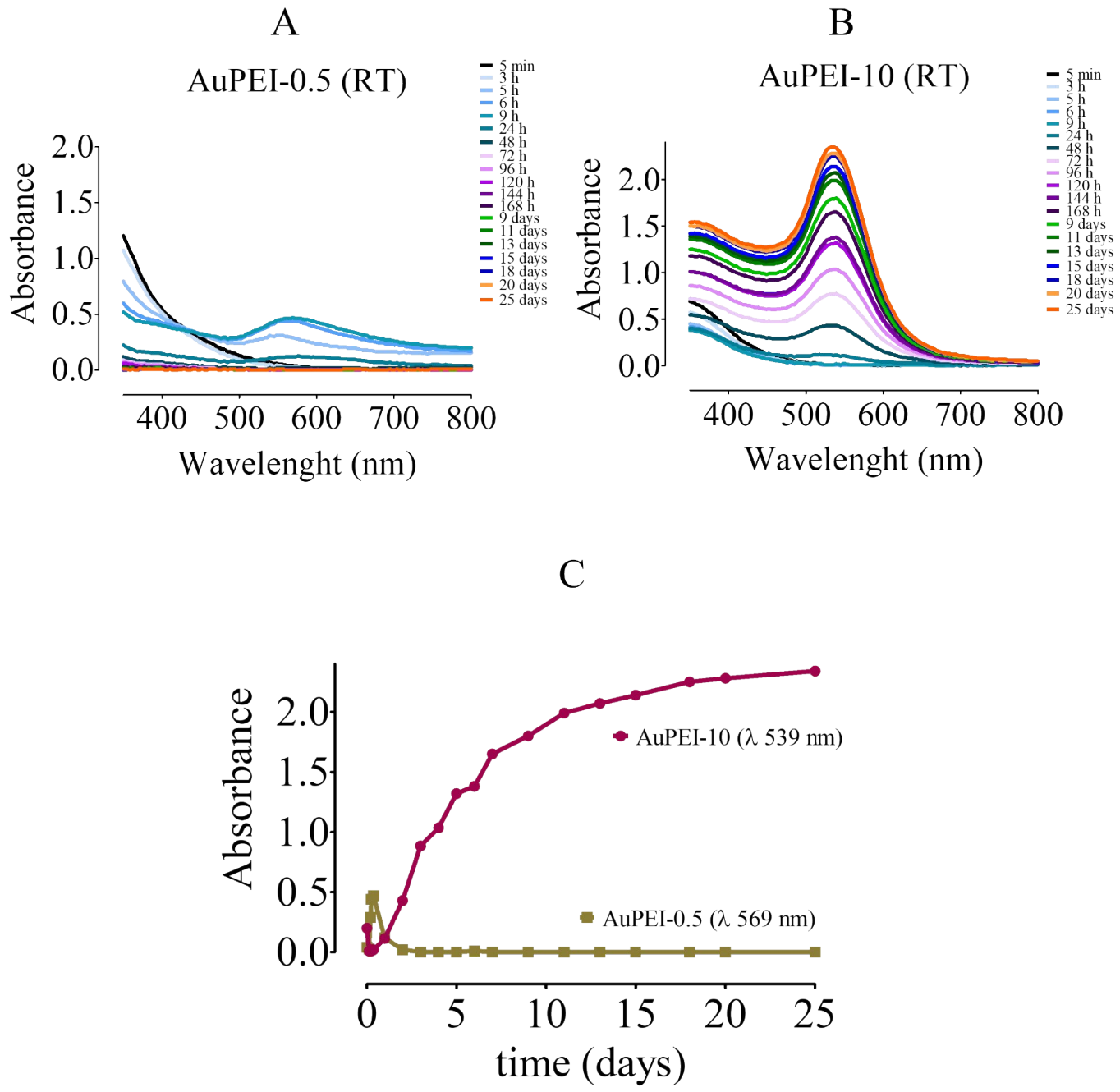

Figure S3. AuPEI toxicity on CT26 cells.

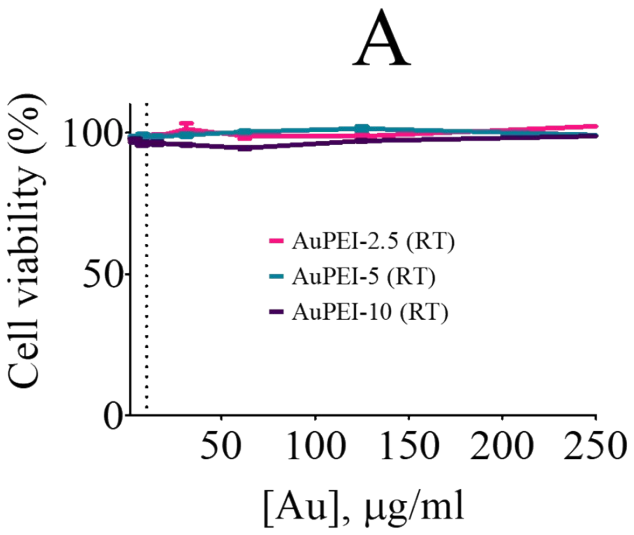

Figure S4. Photo-acoustic signal profiling of agarose phantoms of AuPEI-5 nanocomposites. AuPEI-5 were embedded in agarose 1 %, and photo-acoustic signal measured.

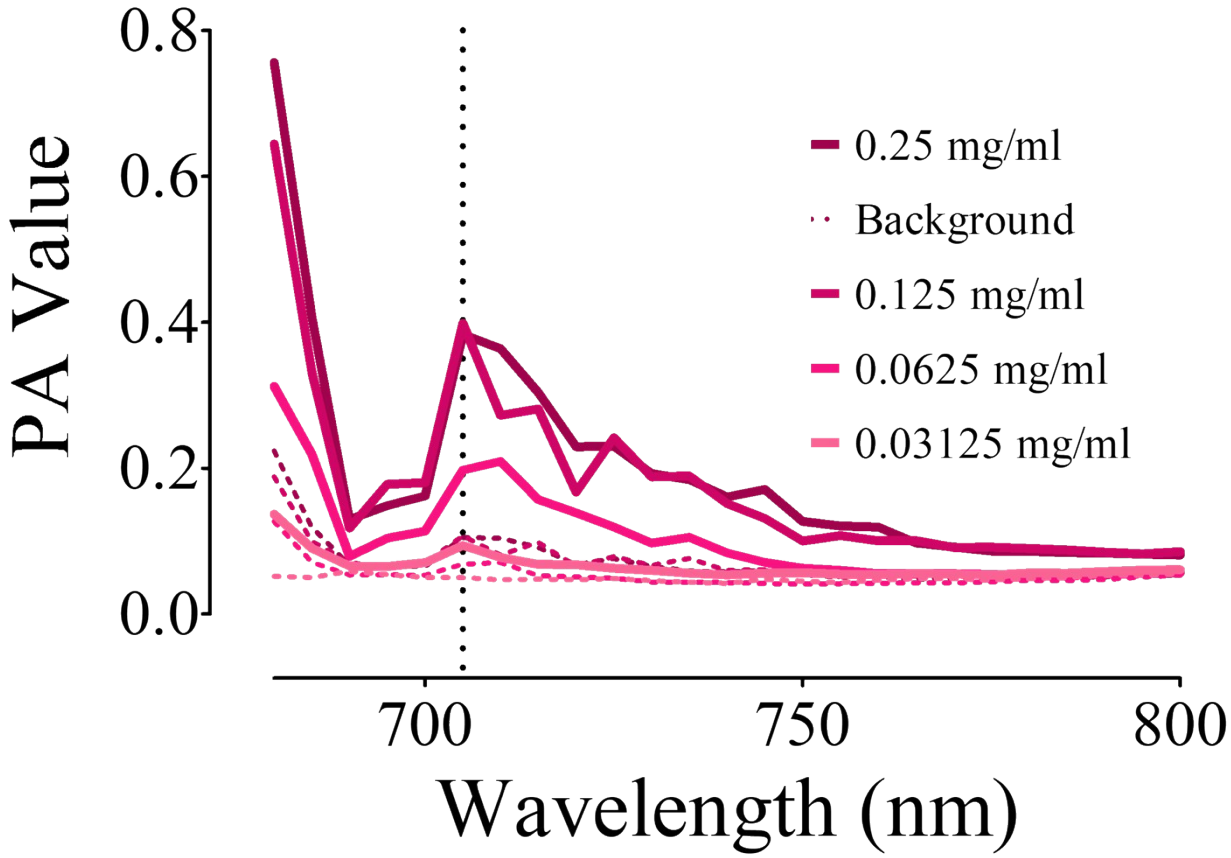

Figure S5. Mouse weight during *in vivo* photothermal ablation.

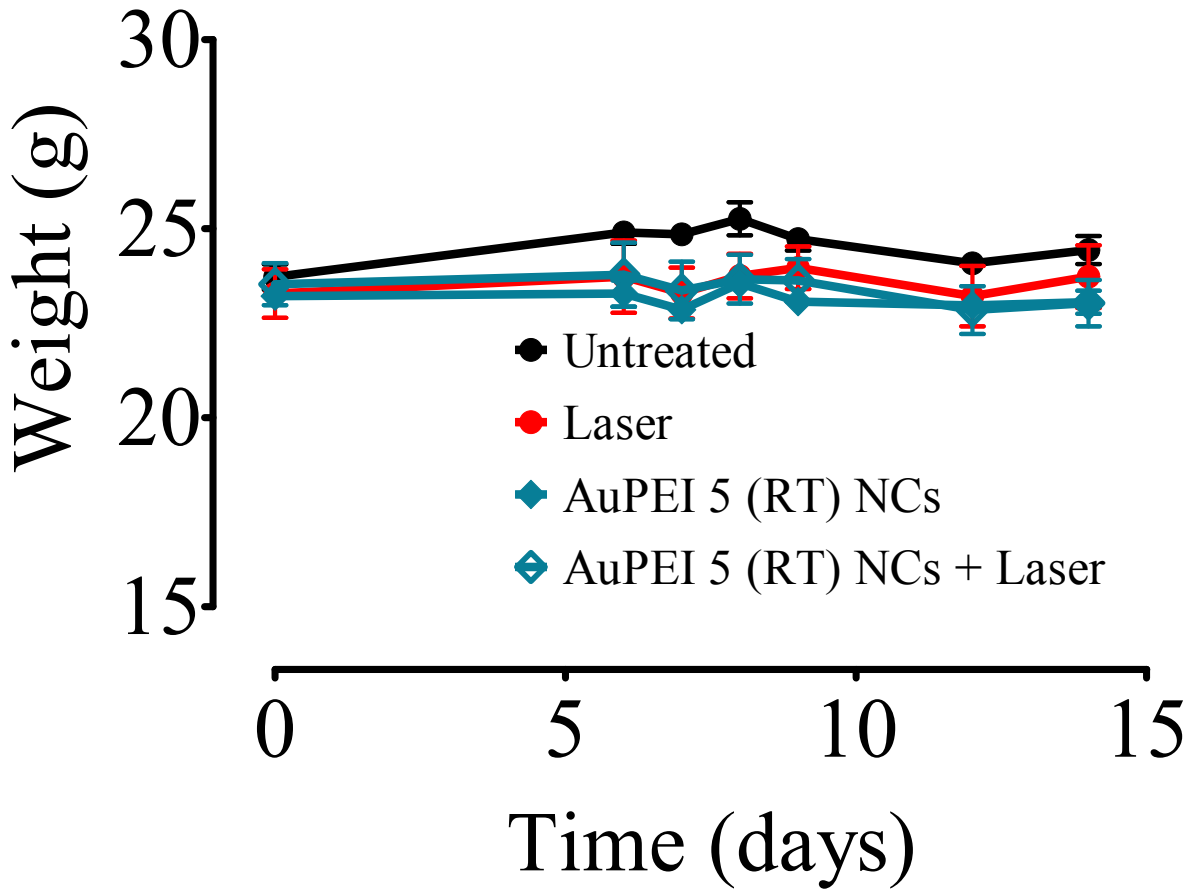

Figure S6. *In vivo* anti-tumor efficiency of AuPEI nanocomposites. (A) *In vivo* experimental procedure on subcutaneous CT26 tumor model. (B) Photoacoustic signal at 710 nm of AuPEI-2.5 nanocomposites upon intratumoral injection in CT26 tumors. (C) Representative temperature profile of tumor surface upon irradiation with 808 nm laser at 2 W/cm^2 for 15 minutes. (D) Individual tumor growth curves without (upper) and with (lower) laser irradiation. (E) Average tumor growth for different treatment groups (Untreated, n=16; Laser, n=10; AuPEI-2.5, n = 6; and, AuPEI-2.5 /Laser, n = 6). Tumor growth over time was compared by two-way ANOVA test with Bonferroni correction; $^{*}p < 0.05$, $^{**}p < 0.01$, and, $^{***}p < 0.001$, 95 % confidence. (F), Survival curves per treatment (Survival endpoint was reached when tumor volume was 1500 mm^3).

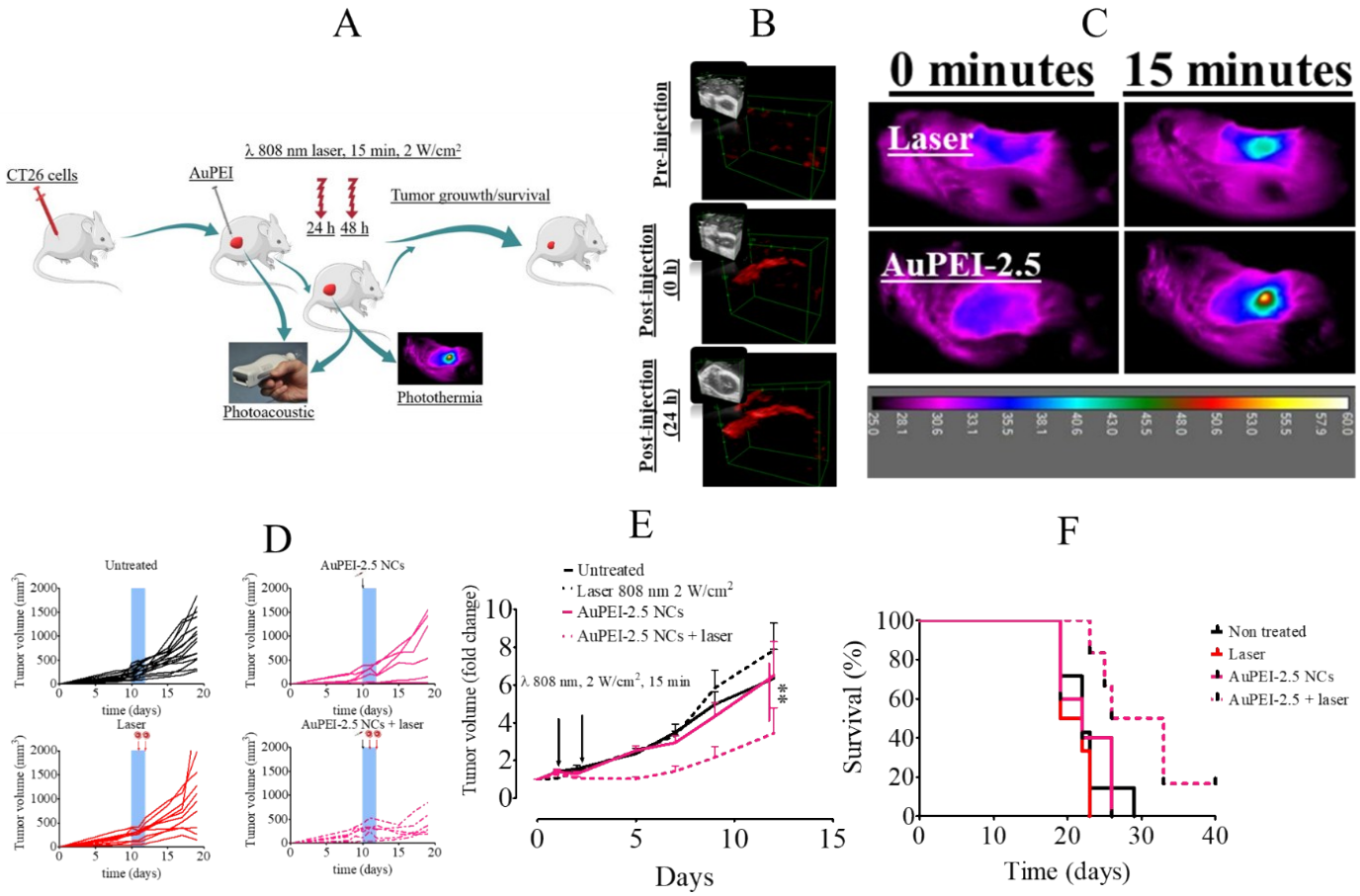

Figure S7. Cryo-TEM imaging of colloidal $AuNP_{16\ nm.}$

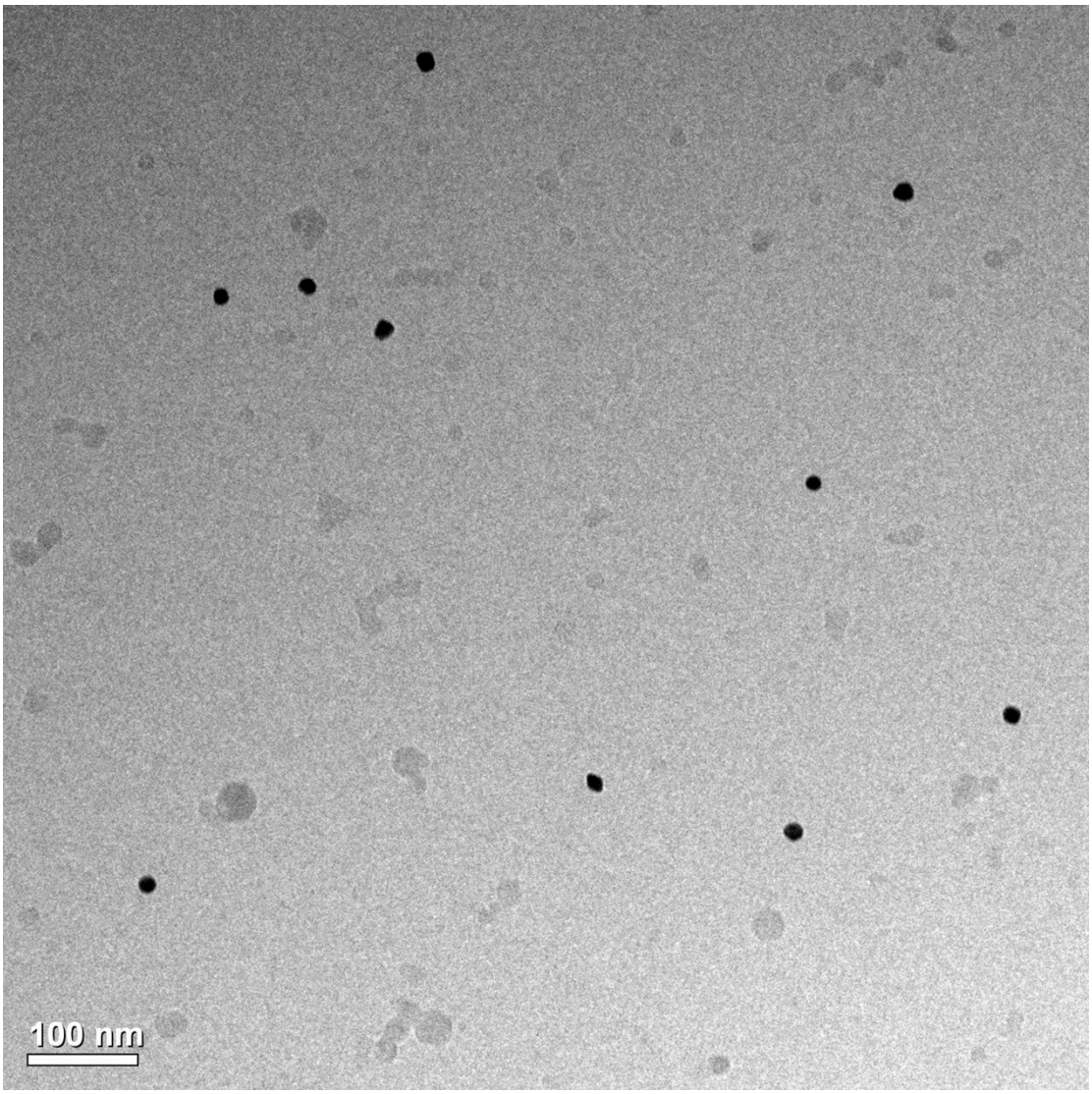

Figure S8. *In vivo* photoacoustic signal (3D) at 710 nm of $AuNP_{16\,nm}$ upon intratumoral injection in CT26 tumors. Immediately after *i.t.* injection (40 μg), we observed a PA signal at 710 nm. However, after 24 h, we did not detect the signal intratumorally, suggesting a fast biodistribution of AuNP. Blue circle highlight tumor approximately.