## Supplementary Information

## Light-responsible DNA hydrogel-gold nanoparticle assembly for synergistic cancer therapy

Jaejung Song<sup>1</sup>, Sekyu Hwang<sup>2</sup>, Kyuhyun Im<sup>3</sup>, Jaehyun Hur<sup>4</sup>, Jutaek Nam<sup>3</sup>, Sungwoo Hwang<sup>3</sup>, G-One Ahn<sup>5</sup>, Sungjee Kim<sup>1,2\*</sup> and Nokyoung Park<sup>3\*</sup>

<sup>1</sup>School of Interdisciplinary Bioscience and Bioengineering, Pohang University of Science & Technology (POSTECH), San 31, Hyojadong, Namgu, Pohang 790-784, South Korea

<sup>2</sup>Department of Chemistry, POSTECH, San 31, Hyojadong, Namgu, Pohang 790-784, South Korea

<sup>3</sup>Samsung Advanced Institute of Technology, Samsung Electronics, Yongin, Gyeonggi-do 446-712, South Korea

<sup>4</sup>Department of Chemical and Biological Engineering, Gachon University, Seongnam, Gyeonggi-do, South Korea

<sup>5</sup>Division of Integrative Biosciences and Biotechnology, POSTECH 790-784, Republic of Korea

Corresponding authors:

\*Sungjee Kim; e-mail: sungjee@postech.ac.kr, Tel: +82-54-279-2108, Fax: 82-54-279-1498 \*Nokyoung Park; e-mail: n2010.park@samsung.com, Tel: +82-31-280-6804

## **Supplementary Figures**



**Fig. S1**. EDS data of AuNP-Dgel assembly. Phosphorous element signal was from DNA phosphate backbones.



Fig. S2. (a) SEM and (b) Digital camera Image of AuNPs assembled on bulk Dgel.



Fig. S3. (a)  $\sim$  (c) SEM images and (d) TEM images of AuNP-Dgel assemblies.



Fig. S4. SEM image of uncontrolled (salt induced) AuNP aggregates.



**Fig. S5.** (a) Absorption spectra of AuNPs-Dgel, Dox, and Dox-AuNPs-Dgel. (b) Absorption spectra of Dox solution and absorption of the supernatant after the centrifugation at 18,000 g for the Dox complexed Dox-AuNP-Dgel sample. The amount of loaded Dox was calculated using the absorbance decrease at 480 nm found in the supernatant against the Dox solution before loading to Dox-AuNP-Dgel complex.



**Fig. S6.** Normalized absorption spectra of the Dox-AuNP-Dgel supernatant measured after laser irradiations at different power densities followed by centrifugation at 18,000 g.



**Fig. S7**. Fluorescence measurements of released Dox triggered by laser irradiation. Quantified Dox fluorescence signals from microscopic images at Fig. 5b.