

Supplementary Table S1. Detailed Sequences of single-stranded DNA for the synthesis of tFNAs

SsDNA	Direction	Sequence
S1	5' to 3'	ATTATCACCCGCCATAGTAGACGTATCACCAGGCAGTTGAGACGAACATTCCAAGTCTGAA
S2	5' to 3'	ACATGCGAGGGTCCAATACCGACGATTACAGCTTGCTACACGATTGAGACTTAGGAATGTTTCG
S3	5' to 3'	ACGGTATTGGACCCTCGCATGACTCAACTGCCTGGTGATACGAGGATGGGCATGCTCTTCCCCG
S4	5' to 3'	ACGGTATTGGACCCTCGCATGACTCAACTGCCTGGTGATACGAGGATGGGCATGCTCTTCCCCG
Cy5-S1	5' to 3'	cy5-ATTATCACCCGCCATAGTAGACGTATCACCAGGCAGTT GAGACGAACATTCTTAAGTCTGAA

The detailed sequences of single-stranded DNA for the synthesis of tFNAs are presented in Table S1. Four distinct single-stranded DNA (ssDNA) sequences (S1, S2, S3, and S4) were used in the synthesis process, with the specific sequences provided in the supporting materials. For the creation of Cy5-labeled tFNAs, S1 strands were substituted with Cy5-S1 strands to enable fluorescence tracking.

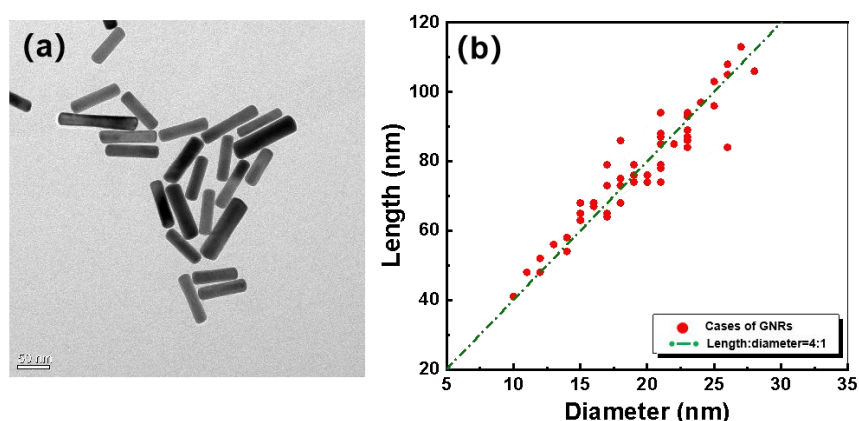
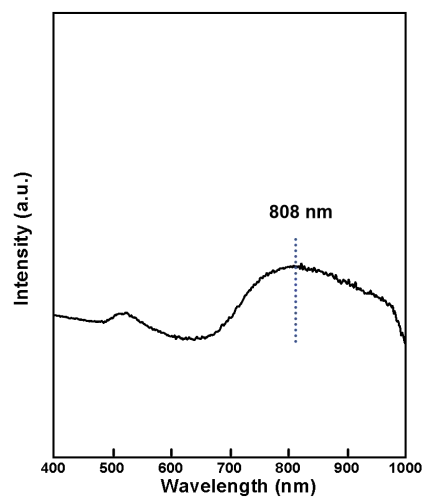
**Supplementary Figure S1.** Additional characterization of gold nanorods (GNRs) (a) Transmission electron microscopy (TEM) of GNRs; (b) Morphology Analysis of GNRs.

Figure S1 shows the Additional characterization of GNRs, exhibiting a uniform rod-shaped morphology. To understand the uniformity of these GNRs, we conducted further statistical analysis of the diameter and length of a substantial number of gold nanorods using electron microscopy results. Our findings revealed that the aspect ratio of length to diameter closely resembled the 4:1 example. Consequently, our nanorods demonstrate excellent morphological uniformity and are anticipated to possess uniform optical properties.



Supplementary Figure S2. UV-Vis spectrum of GNRs, displaying the highest absorption peak located at 808 nm.

Figure S2 presents the UV-Vis spectrum of GNRs, showing the highest absorption peak at 808 nm, consistent with the laser irradiation used for photothermal-based antitumor therapy.