Electronic Supplementary Information

A novel strategy for low level laser-induced plasmonic photothermal therapy: the efficient bactericidal effect of biocompatible AuNPs@ (PNIPAAM-co-PDMAEMA, PLGA and Chitosan)

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Supplementary Experimental Section

Figure 1: Au nanoparticles were synthesized by following a citrate reduction process. (a) Before citrate addition, (b) After citrate addition, (c), 1 minute after citrate addition, (d) 5 minute after citrate addition. Color solution was changed from golden to wine red.
Figure 2: FT-IR spectra of chitosan confirm the successful modification of AuNPs with medium MW chitosan. Unique absorption bands can be found at 1554 cm\(^{-1}\) (\(-\text{NH}_2\) bending), 1081 cm\(^{-1}\) (C-O), 2925 cm\(^{-1}\) (CH\(_2\)), and 1695 cm\(^{-1}\) (Au-N), 3452 cm\(^{-1}\) (symmetric NH\(_2\)) and (OH) at 889 cm\(^{-1}\).

Figure 3: zeta-potential of chitosan-AuNPs is about +17.8mv.
Figure 4: zeta-potential of PDMAEM-co-PNIPAM-AuNPs is nearby -0.66mV.

Figure 5: FT-IR spectroscopic analysis of PDMAEM-co-PNIPAM approves the successful polymerization on gold nanoparticles surface. Specific absorption bands in spectrum were found at: 1095 cm\(^{-1}\) (C=O), 1454 cm\(^{-1}\) (NH bending bond), 1556 cm\(^{-1}\) (amide NH), 1650 cm\(^{-1}\) (NH-C=O), 1731 cm\(^{-1}\) (O=C-O), 2869 cm\(^{-1}\) (symmetric stretching of the CH\(_2\)), 2920 cm\(^{-1}\) (asymmetric stretching of the CH\(_2\)) and 3413 cm\(^{-1}\) (NH).
Figure 6: FT-IR spectroscopic analysis of PLGA approves the successful polymerization on gold nanoparticles surface. Specific absorption bands in spectrum were found at: 1101 cm$^{-1}$ (C-O), 1731 cm$^{-1}$ (O=C-O), 2111 cm$^{-1}$ (SH), 2871 cm$^{-1}$ (asymmetric stretching of the CH) and 3519 cm$^{-1}$ (OH).
Figure 7. *P. aeruginosa* treated groups after 2h incubation with Chitosan + radiation (a-c). (a) Control with chitosan, (b) Chitosan+20J NIR radiation (c) Chitosan+50J NIR radiation. After 2h incubation with PNIPAAM-co-PDMAEMA + NIR radiation (d-f). (d) Control (e) PNIPAAM-co-PDMAEMA + 20J NIR radiation (f) PNIPAAM-co-PDMAEMA + 50J NIR radiation. After 2h incubation with PLGA+ NIR radiation (h-j). (h) Control (i) PLGA+ 30J NIR radiation (j) PLGA+ 50J NIR radiation.
**Figure 8:** A. baumannii. Treated groups after 2h incubation with Chitosan + NIR radiation. (a) Control W.O chitosan (b) control with chitosan (c) Chitosan+20J NIR radiation (d) Chitosan+50J NIR radiation. After 2h incubation with PNIPAAM-co-PDMAEMA + NIR radiation. (e) Control (f) PNIPAAM-co-PDMAEMA + 20J NIR radiation (g) PNIPAAM-co-PDMAEMA + 60J NIR radiation. After 2h incubation with PLGA+ NIR radiation. (h) Control (i) PLGA+ 10J NIR radiation (j) PLGA+ 30J NIR radiation (k) PLGA+ 70J NIR radiation.