

DNA Aptamer Conjugated Gold Nanostructures For Molecular Recognition and Photothermally Destruction of Methicillin-Resistant Staphylococcus Aureus

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In this work, we reported the use of MRSA aptamer functionalized Au NPs and Au NRs (MRSA Apt@Au NPs and MRSA Apt@Au NRs) for destruction of MRSA bacteria with targeted photothermal therapy (PTT). Although both MRSA Apt@Au NPs and MRSA Apt@Au NRs specifically bind to MRSA bacterial cells, only MRSA Apt@Au NRs effectively kill the cells through hyperthermia due to their much excellent longitudinal absorption of NIR light and strong photothermal conversion capability compared to Au NPs. The MRSA aptamers used in this current work were selected against whole live and fixed MRSA cells in our previous study. Au NRs acted as nanopatform for MRSA aptamers immobilization and they also provided multivalent effect for increasing binding strength and affinity to the target cells. We claim that using MRSA aptamer and multivalent effect are equally important to the contribution of killing efficiency in PTT. We demonstrated with results that MRSA Apt@Au NRs are very effective and promising system for specific cell recognition and selectively enhanced PTT *in vitro* study.

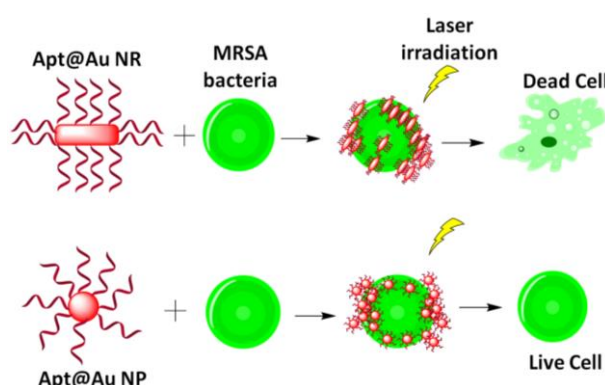


Figure 1. Illustration of the binding of Apt@Au NPs and Apt@Au NRs to the MRSA and cell destruction through PTT.

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