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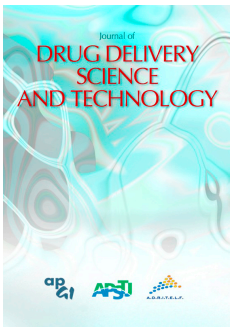


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ACCEPTED MANUSCRIPT

# Understanding Plasmonic Heat-Triggered Drug Release from Gold based Nanostructure

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## Abstract

Targeted drug delivery in a spatiotemporal fashion with high specificity could aid numerous therapeutic applications having reduced nonspecific cytotoxicity. In a typical nanoconstruct, gold nanoparticle synthesized using folic acid as reducing agent is conjugated with stearic acid coupled Pluronic F-127. The pluronic F-127 can hold 5-FU on its hydrophilic corona of the micelle, acting as a drug reservoir and the folic acid reduced Au NPs on its outer surface ensures the targeting ability as well as provides surface plasmon resonance induced plasmonic heating required for triggered drug release. Thus, engineered nanostructure has high stability and ability to load 73.07% of 5-FU. *In-vitro* drug release profile with and without laser irradiation at plasmonic resonance wavelength of 532 nm (50 mW commercial laser) was studied and found the nanoconstruct was effective for controlled drug release via laser induced plasmonic heating from Au NPs. *In-vitro* biocompatible studies proves the nanocarrier was nontoxic and the drug loaded nanocarrier was effective towards A549 lung cancer cells. The overall results of the study reveals that the multifunctional nanoconstruct based on gold nanoparticle can find promising therapeutic application in targeted triggered drug release and has the potential application during oncosurgical pocedures via (i) laser triggered targeted drug release, (ii) Photothermal therapy, (iii) SERS based onsite detection and imaging of cancer cells.

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