

Synergistic effect of chemo-photothermal therapy using gold nanorod- cored thiol end capped diblock copolymers

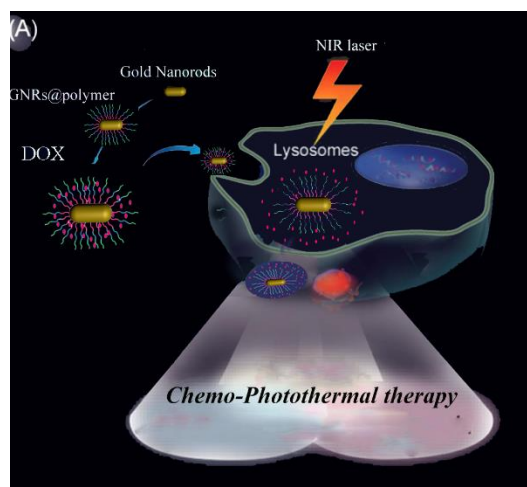
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Light-based therapies including photothermal therapy have been validated clinically for curative and palliative treatment of solid tumors. However, these monotherapies can suffer from incomplete tumor killing and have not displaced existing ablative modalities. The combination of photothermal therapy and chemotherapy, when carefully planned, has been shown to be an effective cancer treatment option clinically and preclinically^[1-4]. According to these facts, gold nanorod-cored biodegradable micelles were prepared by coating gold nanorods (GNRs) with a synthesized thiol-end capped AB diblock copolymer poly(itaconic acid)-*block*-poly metacrylic acid-*block*- poly (caprolactone)-SH (PIA-*b*-PMAA-*b*-PCL-SH). Furthermore, the anti-cancer drug doxorubicin (DOX) was conjugated onto the gold nanorod-cored micelles (GNR@polymer) by electrostatic force and the nanocomposites formed were named GNR@polymer-DOX. The success of the coating was investigated by TGA, FTIR, AFM, XRD, TEM, UV-vis and DLS. The in vitro therapy effect was comprehensively evaluated among free DOX, GNR@polymer, and GNR@polymer-DOX, with or without NIR light irradiation to improve the curative effect of GNR@polymer-DOX led by the combination of chemotherapy and photothermal therapy.



Schem1: Schematic illustration of the GNR@polymer-DOX conjugate for NIR light triggered chemo-photothermal therapy.

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