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ABSTRACTS

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Photo-responsive PNIPAM-Gold Nanorods Hydrogel For Biomedical Applications

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Stimuli-responsive drug delivery systems are gaining a lot of interest due to their numerous advantages, especially when compared to conventional pharmaceutical dosage forms. One of the examples is photo stimulation that together with nanometer size agents, having high absorption in the near-infrared region, generate heat due to the interaction with light. Stimuli-responsive hydrogels with gold nanorods (AuNRs), that are used as photothermal converters, can aid in releasing drugs on-demand with a fast release rate through different mechanisms.

Here we report an easy method for preparing AuNRs encapsulated in a poly(N-isopropylacrylamide) (PNIPAm) hydrogel that release water-soluble drugs due to photo stimulation. PNIPAm-AuNRs demonstrated remote, pulsatile drug release and *ex vivo* action after irradiation using a NIR laser. Morphological and chemical characterization as well as drug release studies were carried out to confirm the material's ability to supply different doses of drugs on demand and to study the release mechanism. By combining the photothermal property of AuNRs and thermal-responsive effect of PNIPAm, the hydrogel shows fast thermal/photoresponse, high heating rate, high structural integrity and increased drug release due to phase change mechanism.

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References

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