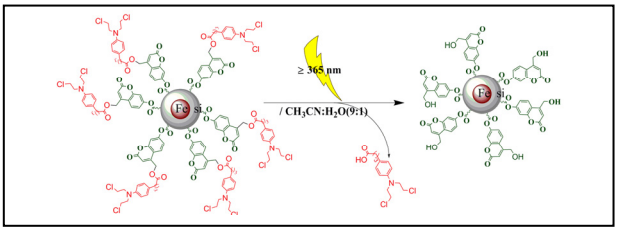
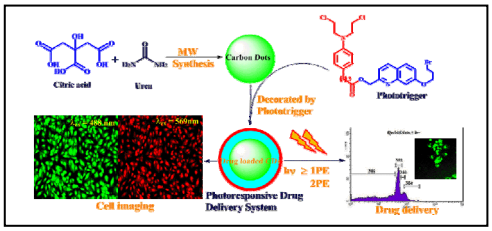
Multifunctional Photoresponsive Image Guided Drug Delivery Systems for Anticancer Drugs

Our main focus is to develop multifunctional photoresponsive image-guided drug delivery systems for anticancer agent. With this intention, we synthesized fluorescent organic phototriggers based on coumarin, quinoline, o-nitrobenzyl which can operate at one photon or two photon irradiation for regulated release of the active molecule. Further, we anchored these organic phototriggers on biocompatible nanoparticles like Fe_2O_3 nanoparticles, carbon dots, mesoporous silica, and polymeric nanoparticles for imaging and improved biological activity.

The thesis entitled "Multifunctional Photoresponsive Image Guided Drug Delivery Systems for Anticancer Agents" consists of six chapters. **Chapter 1** describes the overview of responsive nanocarriers for anticancer drug delivery. **Chapter 2** describes multifunctional magnetic nanoparticles tethered with coumarin as a photoresponsive nanocarrier for regulated release of anticancer drug at ≥ 365 nm. **Chapter 3** illustrates quinoline decorated fluorescent carbon dots for imaging and regulated drug release at 1photon (PE) and 2PE. **Chapter 4** elaborates the charge reversal property of quinoline tethered mesoporous silica for nuclear targeted and regulated drug delivery. **Chapter 5** describes the H_2O_2 assisted photoresponsive coumarin polycaprolactone organic nanoparticles for dual anticancer drug delivery. **Chapter 6** describes the synthesis of dually locked targeted photoresponsive system for image-guided drug delivery and real time monitoring of prodrug.



Chapter 2



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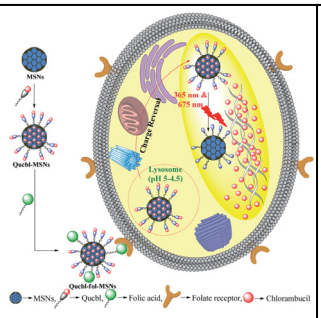

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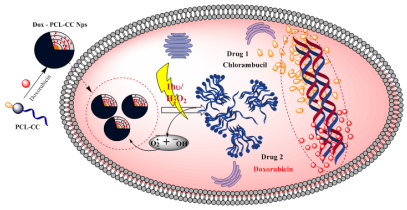
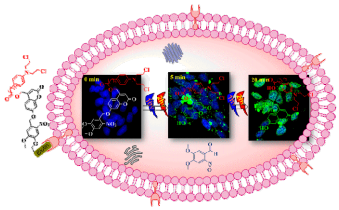


Chapter 5



Chapter 6