

## ***One- and Two-Photon Responsive “AIE + ESIPT Induced DDSs and AIE-active PDT Agents” for Cancer Therapy***

Our main focus is to develop one-and two-photon responsive photoremovable protecting groups (PRPGs) for spatio-temporal uncaging of biological entities upon irradiation of light within the ‘phototherapeutic window’ (600-950 nm), and use these PRPGs to develop drug delivery systems (DDSs) for cancer therapy.

The thesis entitled ***One- and Two-Photon Responsive “AIE + ESIPT Induced DDSs and AIE-active PDT Agents” for Cancer Therapy*** consists of five chapters. **Chapter 1** Overview of one and two-photon responsive photoremovable protecting groups (PRPGs) and their applications as drug delivery and PDT (Photodynamic Therapy) agents for cancer treatment. **Chapter 2** Discuss the design and development of one- and two-photon responsive AIE + ESIPT induced drug delivery system based on *p*-hydroxyphenacyl tagged naphthyl moiety phototrigger, with uncaging ability in the phototherapeutic window (650-950 nm) for cancer treatment. **Chapter 3** Demonstrates a green light activated AIE + ESIPT induced nano drug delivery systems, which uncages two equivalents of the anticancer drug (valproic acid) in a spatial and temporal controlled manner. **Chapter 4** Discuss the design, synthesis, photophysical, photochemical, and biological studies of newly designed lipid-droplets targeted NIR light-responsive anticancer drug delivery models. **Chapter 5** Deals with a nano-AIEgen dihydropyrrolo[3,2-b]pyrrole-3,6-dicarbaldehyde (DPPC) photosensitizer for effective photodynamic therapy.

