

## Design and Development of First- and Second-generation Photoremovable Protecting Groups for Biological Applications

Our main focus is to design new first- and second-generation PRPGs having desired properties for the biological applications. Secondly, we are also interested to utilize our designed first- and second-generation PRPGs for (i) the uncaging of functional groups like carboxylic acids and alcohols, (ii) sequential release of two different functional groups, and (iii) for the release of bioactive molecules like, drugs, cosmeceuticals, etc.

The thesis entitled as “*Design and Development of First- and Second-generation Photoremovable Protecting Groups for Biological Applications*” consists of five chapters. **Chapter 1** provides an overview of first- and second-generation photoremovable protecting groups and their application in biology. **Chapter 2** deals with ESIPT-induced fluorescent *o*-hydroxycinnamate: self-monitoring photoremovable protecting group for prompt image-guided uncaging of alcohols. **Chapter 3** illustrates *push-pull* stilbene: visible light activated photoremovable protecting group for alcohols and carboxylic acids with fluorescence reporting employed for drug delivery. **Chapter 4** describes rhodamine: water-soluble photoremovable protecting group activated by green light for mitochondria-specific anticancer drug delivery and **Chapter 5** describes *o*-hydroxycinnamate for sequential photouncaging of two different functional groups and its application in releasing cosmeceuticals.

