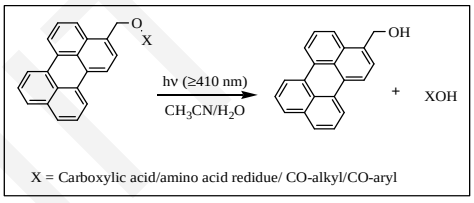
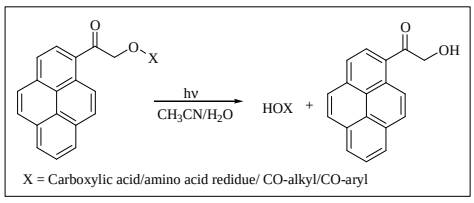
Fluorescent Photoremovable Protecting Groups: Design, Development and Biological Applications

Our main focus was to design and synthesis of new fluorescent photoremovable protecting group (FPRPG) having improved photophysical and photochemical properties. With this intention, we targeted polycyclic aromatic and polycyclic heteroaromatic chromophore having fluorescent properties e.g. perylene, pyrene and acridine to perform as FPRPGs. We employed these FPRPGs for the controlled release of several carboxylic acids, amino acids, alcohols and biologically relevant molecules. Further, we were also interested to explore one of these FPRPGs as a photoresponsive nanocarrier for anticancer drug release.

The thesis entitled "*Fluorescent Photoremovable Protecting Groups: Design, development and Biological Applications*" consists of five chapters. **Chapter 1** describes the general introduction about photoremovable protecting groups. **Chapter 2** describes fluorescent photoremovable protecting group based on perylen-3-ylmethyl chromophore for release of carboxylic acids including amino acids and alcohols by visible light (≥410 nm). **Chapter 3** elaborates the ability of 1-acetylpyrene chromophore to act both as a solvent-sensitive fluorophore and fluorescent photoremovable protecting group for release of carboxylic acids, amino acids and alcohols. **Chapter 3** also explains 1-acetylpyrene caged fluorescent adenosine as a new phototrigger for efficient release of adenosine and for cellular imaging studies. **Chapter 4** describes pH sensitive fluorophore 9-methylacridine, as a fluorescent photoremovable protecting group for release of carboxylic acids and amino acids and its application for *in vitro* cell imaging studies. **Chapter 5** describes the application of fluorescent photoremovable protecting group based on perylen-3-ylmethyl chromophore as a photoresponsive nanocarrier for anticancer drug release.



Chapter 2



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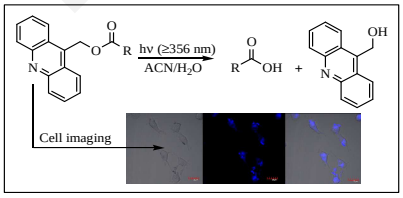

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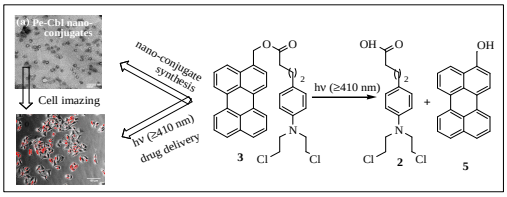

Chapter 5