INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Thesis Title: Design of C5-Substituted 2'-Deoxyuridines, Small Fluorescent Molecule and Study of Photophysical/Biophysical Properties

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SHORT ABSTRACT

The dissertation entitled "**DESIGN OF C5-SUBSTITUTED 2'-DEOXYURIDINES, SMALL FLUORESCENT MOLECULE AND STUDY OF PHOTOPHYSICAL/BIOPHYSICAL PROPERTIES**" is an embodiment of research aimed towards the synthesis and studies on photophysical/biophysical properties of (a) nucleosides containing triazolyl donor/acceptor aromatics at C5 position of 2'-deoxyuridine, (b) study of interaction of fluorescently labeled nucleoside/fluorescent unnatural nucleoside with model protein biomolecule (BSA), (c) nucleosides containing fluorene aromatics at C5 position of 2'-deoxyuridine and (d) studies on the interaction of an AIE fluorescent probe, pyrenylamido triazolyl aromatic amino acid **PyAm-^{Ar}TAA,** with short abasic DNAs. Towards this journey, few fluorescent C5-substituted 2'-deoxyuridine nucleosides have been synthesized and their photophysical properties evaluated. The biophysical properties of two triazolyl nucleoside, one tetrazolyl nucleoside and one triazolyl aromatic amino acid have been investigated.

Thus, this thesis contains a total of 5 Chapters including one Review Chapter (**Chapter 1**). Each chapter contains its individual experimental and reference sections. **Chapter 1** is a review of the applications of various types of fluorescent and non-fluorescent C5-substituted 2'-deoxyuridines. **Chapter 2** deals with the synthesis of a post-synthetically modifiable universal linker, 4-(Propynyl(methyl)amino)phenylacetylene, containing 2'-deoxyuridine nucleoside and then to generate fluorescent C5- donor/acceptor aromatics substituted 2'-deoxyuridine nucleosides. The study of photophysical properties of such nucleosides has also been included in this chapter. **Chapter 3** deals with the studies on the interaction of a ratiometric fluorescent probe, pyrene-labeled dual fluorescent 2'-deoxyuridine, and a tetrazolylpyrene unnatural fluorescent nucleoside with BSA. **Chapter 4** focuses on the synthesis of fluorescent C5-triazolylfluorene-labeled 2'-deoxyuridines and studies on their photophysical/biophysical properties. **Chapter 5** deals with the studies on the interaction of an AIE fluorescent probe, pyrenylamido triazolyl aromatic amino acid **PyAm-^{Ar}TAA,** with short abasic DNAs.