INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student	:	**SRIBASH DAS**
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Programme of Study	:	**Ph.D.**

Thesis Title: **Design and development of synthetic anion transporters: Towards therapeutic prospects**

Name of Thesis Supervisor(s)	:	**Prof. Debasis Manna**
Thesis Submitted to the Department/ Center	:	**CHEMISTRY**
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Keywords for description of Thesis Work	:	**Synthetic Chloride transport**, **Medicinal Chemistry**

SHORT ABSTRACT

The thesis, titled "***Design and development of synthetic anion transporters: Towards therapeutic prospects***," provides a brief description of several kinds of novel anionophores that exhibit significant promise for therapeutic applications. This thesis includes insights on the recognition, transportation across cell membranes, and potential therapeutic applications. The thesis is divided into four chapters based on experimental findings obtained during the research periods.

Chapter 1: *Primarily explored the many possible applications of anionophores in addressing a wide variety of therapeutic diseases. It additionally reviewed their probable mode of action by a comprehensive review of current research.*

Chapter 2: *Developed a new class of amino acid (tryptophan) based derivatives. The tryptophan-based receptors selectively transport the Cl^- ions across the lipid bilayer. Detailed transport activity and mechanistic study of the receptors are discussed.*

Chapter 3: *Explores the synthesis and characterization of a 4-aminoquinazoline analog, an anion-induced molecular switch, and pH-responsive anionophore. The compound's pH-switchable nature is crucial in the acidic microenvironment of cancer cells. Its transport activity is assessed under various physiological conditions, showing increased efficacy in facilitating chloride ion transport under acidic conditions. Further exploration includes antibacterial studies on gram-positive and gram-negative bacterial cell lines.*

Chapter 4: *This work focuses on designing and synthesizing multi-stimuli responsive proanionophore molecules using a novel class of sulphonium-based water-soluble proanionophores. The aim is to improve the efficiency and specificity of anion transport mechanisms by addressing conventional challenges such as poor deliverability, selectivity, and uptake.*