INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student	:	**Suraj Kumar Mandal**
Roll Number	:	**146106004**
Programme of Study	:	**Ph.D.**

Thesis Title: **Structural and Functional Studies of Metal Ion ABC Transporters in Prokaryotes**

Name of Thesis Supervisor(s)	:	**Prof. Shankar Prasad Kanaujia**
Thesis Submitted to the Department/ Center	:	**Department of Biosciences and Bioengineering**
Date of completion of Thesis Viva-Voce Exam	:	**27-09-2021**
Key words for description of Thesis Work	:	**Thermus thermophilus, Mycobacterium tuberculosis, Crystallography, Biophysical study, Functional study.**

SHORT ABSTRACT

Metalloproteins, one of the most diverse class of proteins, require metal ions such as iron, manganese, nickel, zinc, and others for their regulatory, catalytic and structural activities making them inevitable for survival of an organism. Cells adapt different strategies to acquire these metal ions maintaining their homeostasis. One of the most efficient systems of acquiring metal ions inside a bacterial cell is the ATP-binding cassette (ABC) transporter; further classified into importers and exporters. Structurally, ABC importers comprise of a transmembrane domain (TMD), a nucleotide binding domain (NBD) and a substrate binding protein (SBP) for substrate acquisition. Being specific to prokaryotes and often accountable for their pathogenicity, SBPs are recognized as potential drug targets. Understanding the exact mechanism of substrate binding by the SBPs becomes critical aspect in order to design inhibitors against pathogens. Thus, structural studies of SBPs becomes essential for structure-based drug development. Despite a plethora of structural data, several questions about the metal transport systems remain unanswered. Thus, in this thesis work, metal-binding proteins of ABC transporters were selected for structural and functional elucidation. The preliminary analysis of the structural data obtained through this thesis work suggests that cells employ multiple ABC importers for different metal ions.