

Research Theme: Infectious diseases, Protein structure and function for drug designing
Research Project Title: Structural and biochemical studies of Mycobacterial biosynthetic enzymes
Principal Investigator/Supervisor: Asst/Prof Shashi Bhushan
Co-supervisor/ Collaborator(s) (if any): Not at this moment
<p style="text-align: center;">Project Description</p> <p>a) Background: Tuberculosis is a wide spread infectious disease caused by Mycobacterium tuberculosis. There are a number of potential drugs available against mycobacteria. However, there is a constant need to find new drugs as mycobacteria is rapidly getting resistance to these known drugs. Mycobacteria possess a thick cell wall known as mycomembrane. Composition of this mycomembrane is unique which provide Mycobacterium tuberculosis resistance against host immune system. There are a number of unique enzymes required to synthesize the constituent of this mycomembrane. Some of them have been proposed as solid drug target to stop the growth and kill the pathogenic mycobacteria. We are interested in studying the structure and function of these enzymes. We use cryo-electron microscopy (cryo-em) with single particle analysis to determine high-resolution structure of potential drug targets in mycobacteria. High-resolution structures are prerequisite to design new drugs using structure based drug designing. Structure determination with cryo-em offers one very important advantage over X-ray crystallography namely that atomic resolution can be achieved with smaller amounts of protein samples without crystallization. Since no crystallization is required with cryo-em, structure determination is fast and possible on low abundance challenging proteins such as of Mycobacterium tuberculosis.</p> <p>b) Proposed work: Our lab is well equipped for modern techniques of molecular biology, protein expression and purification, state of the art modern cryo-electron microscope and advanced computing clusters. PhD students will be trained with molecular biology and cryo-EM to carry out routine genetic engineering, protein expression, protein purification, high-resolution 3D structure determination with cryo-electron microscopy, image processing with single particle analysis and structure based drug designing. Work is mostly interdisciplinary where all the modern techniques of molecular biology, protein chemistry and computational biology will be combined to reach the project aim.</p>
Supervisor contact: If you have questions regarding this project, please email the Principal Investigator: sbhushan@ntu.edu.sg
<p style="text-align: center;">SBS contact and how to apply: Associate Chair-Biological Sciences (Graduate Studies) : AC-SBS-GS@ntu.edu.sg Please apply at the following: http://admissions.ntu.edu.sg/graduate/R-Programs/RWhenYouApply/</p>