Indian Institute of Science

Centre for BioSystems Science and Engineering

BSSE Seminar

4th February 2019, 4:00 PM, MRDG Seminar Hall, 1st floor, Biological Sciences Building.

PhageShift: Improving treatment of bacterial infections through novel modifications to conventional phage therapeutics

Speakers: **iGEM**

Abstract

Bacteriophages have long been proclaimed as the answer to antibiotic-resistant bacterial infections. However, simultaneous resistance to phages and antibiotics is a concerning possibility. Anticipating this problem, we worked on developing an in-silico protein modification algorithm that hard-codes mutual exclusion of antibiotic and phage resistance. Using this algorithm, we sought to develop engineered phage with high affinity for phosphoethanolamine - the molecule that confers colistin resistance. This system has potential applications in drug delivery, ligand extraction, and study of bacterial membrane proteins.

We also worked on building a phage-mediated immune recruitment system that ensures removal of the pathogen without significant toxin release - a fatal condition in immuno-compromised individuals. This was accomplished by a monocyte chemokine encoded into a lysis deficient phage genome that recruits phagocytic immune cells to the site of infection. Combined with our outreach activities, the project seeks to address problems with phage therapy before they arise.

About iGEM

iGEM is a worldwide synthetic biology competition that celebrates this field with students from all parts of their career - be it high school, undergraduate or Post-graduate - coming together to create projects that aim to solve both global and local critical problems. IISc as an institute has now been participating in the competition for three years, bagging a bronze medal in 2016 and gold medals in 2017 and 2018. Every year, the competition has acted as a platform for multiple start-ups and companies that are now big names in the field of synthetic biology.