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Techniques for the identification and exploitation of novel antimicrobial targets

Ali Ryan
Kingston University, UK

With the ever increasing prevalence of multi-drug resistant bacterial strains identification of novel targets for antimicrobial therapy is of vital importance for both *Mycobacterium tuberculosis* and *Pseudomonas aeruginosa*. *M. tuberculosis* remains the second highest cause of death from a single infectious agent killing 1.7 million people in 2012. Cholesterol catabolism fuels mycobacterial survival inside macrophage, an important part of the life cycle. HsaD is part of the cholesterol metabolism operon (Rv3567-3570) in *M. tuberculosis*. Gene deletion mutants of HsaD prevent bacterial replication within macrophage. Inhibitor studies of HsaD to date have utilized both mechanism based inhibitors of the serine protease-like catalytic triad and using fragment based drug discovery. *P. aeruginosa* is a common nosocomial infection and a leading predictor of morbidity in cystic fibrosis. Azoreductases are ubiquitous flavoproteins found in a range of microorganisms. Although their physiological function is unclear studies using gene deletion mutants have shown they play an important role in resistance to a range of antibiotics in *P. aeruginosa* and are also important for bacterial host colonization. The methods used to characterize and identify inhibitors of these targets will be discussed and include techniques in molecular biology, protein chemistry, structural biology and medicinal chemistry.

Biography

Ali Ryan completed his PhD in structural biology at Imperial College, London, studying protein ligand interactions. He was a postdoctoral researcher at the University of Oxford with Prof Edith Sim where he identified a novel enzyme mechanism of bacterial azoredictases. In 2011 he moved to Kingston University where he established a biotechnology core facility for the newly formed Faculty of Science Engineering and Computing. His group's research focuses on protein structure and the identification and exploitation of novel targets for antimicrobial therapy.

A.Ryan@kingston.ac.uk