

## Honours projects:

### 1. *Haemophilus influenzae* and acid stress.

The role of maintaining external and internal pH is known to be key in the ability of many pathogenic bacteria to survive within the human host. The systems used in acid stress by *H. influenzae* is novel. This project will examine the role of Urease in Rd KW20 and other *ure*+ve *Hi* strains, involve the phenotypic analysis of *ure* knock-out strain and its resistance against reactive species and include analysis of urease and nickel regulation (ie PmlR/Nik signal activation and repression, the Urease operon (*ureABCureEFGH*); its expression profile and the Urease operon structure and promoter analysis. We will also examine Urease negative clinical isolates acid response and acid response in clinical isolates.

### 2. The ability of *Haemophilus influenzae* to grow with limiting nutrients.

#### A. Nickel

This project will examine the Nickel efflux regulation (*rcnA*) and its gene expression under different conditions and the homeostasis of nickel ions in response to oxidative stresses. It will include the protein purification and then analysis of metal binding and DNA binding.

### 3. *Staphylococcus aureus*; growth and its response to oxidative stress.

This project will study the novel gene regulator NmlRsa and the role of its target AKR. We will knock-out these genes and study the phenotypes of the mutant strains. It will include AKR enzyme assays and NmlRsa protein purification and characterization.