

# Current research

Snippets on research students are currently undertaking

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## Investigating genetic adaptations in pneumococcal bacteria which allow the bacterium to cause pneumonia and other invasive diseases

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**P**neumococcus is a bacterium which colonises the nose and throat of humans, mostly living harmlessly causing no symptoms of disease. Despite this, pneumococcus is the biggest cause of pneumonia worldwide, the most common cause of death in young children. Some strains of pneumococcus can infect sterile parts of the body, such as the blood or the brain, leading to serious diseases like sepsis and meningitis.

There are currently two vaccines available for pneumococcal infection, given to those most vulnerable; the elderly and young children. There are lots of types of pneumococcus, with great genetic diversity, due to a high mutation rate which allows the development of beneficial adaptations. Pneumococcus is also able to transfer small portions of DNA between bacteria in a process called horizontal gene transfer. Having lots of different types of pneumococcus means that neither of the vaccines protect against all pneumococcal types, current vaccines are not effective enough to prevent the burden of pneumonia.

The aim of this project is to identify what genetic adaptations allow certain strains of pneumococcus to cause pneumonia in the host. I will do this by growing pneumococcus in the lab, comparing harmless strains of the bacteria with disease-causing strains. This will allow identification of the genes that allow development of pneumonia in some hosts. This project will help us to understand what it is that allows pneumococcus to cause disease and could lead to developing a more effective vaccine, by targeting bacterial proteins that are essential for the pathogen to cause disease.