

BATTLING TO BOOST OUR DEFENCES AND REPAIR DAMAGE

Our researchers investigate what drives tissue damage and repair in immune-related diseases such as multiple sclerosis (MS). We lead world-class research around microbes resistant to antibiotics. We investigate lung infections associated with a range of illnesses.

Professor Denise Fitzgerald has made a major discovery in the fight against neurological diseases: finding that specific cells from the immune system are key players in brain repair.

This has been hailed as a landmark study in unravelling the mysteries of how the brain repairs damage. It has opened a new path in the fight against a range of neurological diseases, particularly MS, which affects 2.3m people worldwide and more than 4,500 people in Northern Ireland.

This pioneering research, led by Queen's, is an exciting collaboration of top scientists. By bringing together experts in immunology, neuroscience and stem cell biology under the banner of the Wellcome-Wolfson Institute, we have been able to make this important breakthrough.

Professor Jose Bengoechea, Director of the Institute, is a world leader in the fight against *Klebsiella pneumoniae*. One of the deadliest hospital superbugs, it is a multi-drug resistant microbe that has mortality rates of 25-60 per cent.

While it has been widely recognised that *Klebsiella* is becoming resistant to the last-line antibiotic, the precise underlying molecular explanation has not been understood – until now. Professor Bengoechea and his colleagues are also uncovering how *Klebsiella* counteracts our body's defences. To fight this infection, the team is exploring the potential of boosting our own defences so that we may have a long-term solution and avoid a future pandemic.

Dr Ultan Power and **Professor Mike Shields** are engaged in research into one of the biggest causes of lung disease in young infants worldwide – respiratory syncytial virus (RSV).

RSV attacks the epithelial cells lining the airways. Our researchers have developed novel 3D cultures that replicate the airway epithelium in infants. Designed in partnership with colleagues in England, Scotland and Switzerland, these cultures allow them to study the consequences of RSV infection with or without allergen exposure to generate a comprehensive understanding of the causes of bronchiolitis and asthma. The research will play an important role in helping to prevent or treat these major medical conditions.



Dr Ultan Power and Professor Mike Shields



“We continue to work together to advance knowledge and push the boundaries of scientific knowledge for the benefit of patients and society, in a bid to change lives for the better, across the globe.”

Professor Denise Fitzgerald



Professor Jose Bengoechea