Pneumonia is still a common disease in Ireland and is the most frequent cause of deaths worldwide. With increased use of invasive surgical processes and immunosuppression, the incidence is likely to increase in the years ahead.

Prof Neil Rowan

Fighting pneumonia with STEM cells and immune-stimulating fungal bioactives

Despite advances in medicine, pneumonia is still a common disease accounting for 5% of deaths in Ireland and is the most common cause of acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) where there currently remains no specific therapy. This exciting and timely HRB-funded project investigates use of alternative therapeutic interventions to tackling this problem. Specifically, this collaborative AIT and NUI Galway project combines the research expertise of leading international researchers to explore novel use of medicinal fungi and STEM cells for inactivation of proven multi-antibiotic resistant bacteria where currently other conventional approaches have been unsuccessful.

Prof Neil Rowan, Principle Investigator at AIT and Adjunct Professor of School of Medicine, Nursing and Biomedical Science at NUI Galway stated “Despite staggering advances in medicine, pneumonia is still a common disease in Ireland and is the most frequent cause of deaths worldwide. With increased use of invasive surgical processes and immunosuppression, the incidence is likely to increase in the years ahead. ALI/ARDS are devastating disease processes characterised by life-threatening respiratory and multiple organ failure for which there is no treatment. In Ireland, 19% of intensive care patients suffer from ALI/ARDS, with associated mortality comparable to HIV infection or breast cancer. It confers a considerable long-term illness and disability burden on the individual and society as a whole. There is therefore a pressing need to develop novel strategies to treat ALI/ARDS.”
Prof John Laffey (co-investigator on the project) along with Anesthesiologist-in-Chief at St Michael’s Hospital, Toronto, Professor of Anesthesia and Physiology at the University of Toronto and principal investigator at the Regenerative Medicine Institute, at NUI Galway, stated “This next-generation therapeutic-project is an exciting development combining the complementary expertise of AIT and NUI Galway where it is envisaged that outcomes will have a profound influence on patient care and quality of life.”

Dr Claire Masterson, Lead Postdoctoral Researcher at AIT, stated “Cell therapies may have applications in treating disorders including myocardial infarction, sepsis, hepatic and acute renal failure. Recent international published findings including those from team have suggested that bone marrow-derived mesenchymal stem cells (MSCs) reduce mortality sepsis and lung injury. It is proposed that combined use MSCs with fungal-derived polysaccharides has the potential to reduced or eliminated bacterial sepsis in rodent models mainly through stimulation of the immune system along with weak antimicrobial activity”.

Dr Dan O’Toole (co-investigator on project and Senior Research Fellow, School of Medicine, Nursing and Biomedical Sciences, stated ‘It is envisaged that this project will unravel the potential antimicrobial and immuno-modulatory properties of this new therapeutic intervention where there is a clear vision for enterprise to actualise potential and opportunities in healthcare’.

The project is also enriched with an extended team of staff and researchers at AIT include Dr Gary Stack (Bioscience Research Institute), Dr Ian Major (Materials Research Institute) and Ms Emma Murphy (postgraduate researcher). This frontier project is strategically aligned with AIT and NUI Galway’s core research strengths and data generated will pump-prime many related cross-cutting projects in emerging priority areas for Ireland.