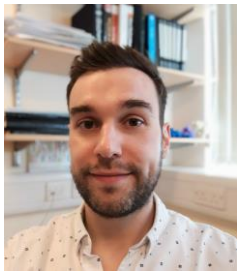
The Lister Institute of Preventive Medicine

Nurturing the future leaders in biomedical research

Lister Institute Prizewinners 2019

Dr Tim Blower, Durham University

Applications of bacteriophage-bacteria interactions



Bacteria and their viral parasites, called bacteriophages, have co-evolved for millennia. Though outnumbered, bacteria can repel bacteriophages using an arsenal of bacteriophage-resistance mechanisms. Past studies of bacteriophage-resistance mechanisms have generated vital tools for DNA cloning and gene editing, such as the CRISPR-Cas systems. My lab uses biochemical and structural biology techniques to investigate new resistance mechanisms, to develop their functionality and better understand the intricate interplay between host and virus. This knowledge is increasingly relevant as bacteriophages continue to be adopted as a viable means to treat antibiotic-resistant bacterial infections.

Dr Ross Chapman, University of Oxford

Genome stability: DNA repair mechanisms in cancer and genome diversification

The accurate repair of DNA breaks is fundamental for protecting our genomes against cancer-causing mutations, however, the B and T lymphocytes of our immune systems deliberately induce and repair DNA breaks in a mutagenic fashion in order to adapt and diversify antigen receptor molecules. My group is interested in how cells and different tissues strike an appropriate equilibrium between accurate and mutagenic DNA repair mechanisms, so that we can understand why faults in this regulation lead to cancer, and devise innovative strategies to exploit these faults in cancer therapies."

Dr Joanne Konkel, University of Manchester

Delineating mechanisms of immune cell tailoring at the oral barrier

Highly tailored networks of immune cells are vital for maintaining barrier integrity, however little is known about how cells resident within the gingiva, a key oral barrier, are locally educated to safeguard barrier function. Our recent work has shown that a novel mechanism trains gingival immune function, identifying that low-level but chronic damage, arising as a result of mastication, tailors immune cell functions at this site. Our on-going work delineates other mechanisms active at this unique barrier capable of impacting immune cell functionality and ensuring barrier integrity.

Dr Michelle Linterman, The Babraham Institute

Tertiary lymphoid structures in health and disease

Germinal centres are induced within tissues such as the tonsils, spleen and lymph nodes after infection or immunisation, here B cells proliferate and differentiate into long-lived antibody-secreting plasma cells and memory B cells that provide protection against subsequent infection. Because of this, a potent germinal centre response is critical for a successful response to vaccination. Our research aims to understand the basic biology of the germinal centre response and to use this knowledge to enhance the response to vaccination in cases where vaccine efficacy is poor.

Dr Will McEwan, University of Cambridge

Protein-level knockdown as a new frontier for biological and biomedical sciences

Half of people born this decade in the UK are predicted to develop a neurodegenerative disease such as Alzheimer's disease. Despite this there are currently no effective treatments. During disease progression, certain proteins such as tau and alpha-synuclein form dense aggregates which ultimately results in the death of neurons. Our group investigates how processes that normally protect against viral infection can intercept the process of protein aggregation. This will lead to a better understanding of protein aggregation itself and may uncover new routes towards therapeutics.