The Arms Race Between Bacteria And Their Phage Foes.

Professor Peter Fineran
Molecular Microbiologist
Alexander von Humboldt Experienced Research Fellow
University of Otago
New Zealand

Abstract
Bacteria have evolved ‘immune systems’ as a result of their constant exposure to foreign mobile genetic elements, including bacteriophages and plasmids. For example, an estimated $10^{23}$ bacteriophage infections occur every second. Other mobile genetic elements can harbour antibiotic resistance or pathogenicity determinants, which influence bacterial evolution and our ability to treat infectious diseases. To thwart these invaders, bacteria have many resistance strategies, including innate immunity, such as restriction-modification and abortive infection systems, and adaptive immunity provided by the CRISPR-Cas systems. Recently, there have been major advances in our understanding of these systems and the different strategies that phages have to evade these immune mechanisms. In this talk I will present aspects of our recent research into bacterial CRISPR-Cas systems, how they are regulated and the evasion strategies used by phages to avoid these adaptive immune systems.

Selected Publication

Biography
Peter Fineran is a Professor in the Department of Microbiology and Immunology at the University of Otago, New Zealand. Peter has established an international reputation for his research on the interactions between bacteriophages and other mobile elements and their bacterial hosts. A major focus of his lab are the CRISPR-Cas adaptive prokaryotic immune systems. He obtained a BSc (Hons) in Biochemistry from the University of Canterbury, NZ. He completed his PhD at the University of Cambridge, UK followed by a Post-Doc fellowship. He has made critical contributions to understanding CRISPR-Cas systems, such as how these systems acquire new immune memories and mechanisms of CRISPR-Cas regulation. Peter has received many awards in recognition of his research contributions, most recently as an Alexander von Humboldt Experienced Research Fellowship and as the recipient of the Fleming Prize from the Microbiology Society, UK.