School of Molecular Sciences
Arizona State University

SMS Fall 2021 Seminar Series

Friday Oct 15 | 2:30pm | Virtual*

Mechanisms and Applications of CRISPR-Cas RNA Sensors

Bacteria are armed with a diverse repertoire of immune systems that allow them to specifically sense the presence of foreign genetic material. CRISPR systems are adaptive immune systems driven by RNA guides to seek out foreign genetic material and interfere with its replication through targeted nuclease activity. In the last few years, CRISPR-based diagnostics have emerged as powerful tools for the programmable detection of RNA. In this presentation, I will discuss our work to better understand the molecular mechanisms of CRISPR-Cas RNA sensors. Equipped with these molecular insights and inspired by the biology, I will describe how we have implemented CRISPR-based systems for the detection and diagnosis of SARS-CoV-2 infection – the causative agent of COVID-19.

Gavin Knott, PhD

Research Fellow, Biomedicine Discovery Institute

Monash University, Australia

Gavin obtained his Ph.D. from the University of Western Australia where he was trained as a structural biologist and researched the mechanisms of long non-coding RNA binding proteins. After completing his Ph.D., Gavin accepted a position in the lab of Prof. Jennifer Doudna at the University of California Berkeley. During his postdoctoral years he described structures of RNA targeting CRISPR Cas13 systems, methods for RNA diagnostics, the mechanisms evolved by phage to overcome CRISPR immunity, and the molecular basis for precision CRISPR Cas9 genome editors. During this time, Gavin received the Sir. Keith Murdoch Fellowship from the American Australian Association (2018) and an NHMRC Investigator Grant (2020), the latter of which attracted him home to Australia. In early 2021, Gavin accepted a position in the Department of Biochemistry and Molecular Biology at Monash University Biomedicine Discovery Institute. His lab uses structural biology and nucleic acid biochemistry to uncover the molecular details of how immune systems specifically sense foreign DNA and RNA to protect against infection. By uncovering how these remarkably diverse systems function, they hope to better understand their evolution and enable the development of next generation biotech tools for diagnostic and therapeutic applications.

**ZOOM: https://asu.zoom.us/j/87081218152*