Infectious Diseases Labs

ID LABS

Dr Joy Xiang

Genome Institute of Singapore
A*STAR, Singapore

Thursday, 27th July 2023
10:00am to 11:00am (SGT)

Venue: Codon A & B @ Matrix Level 5

Reverse and forward engineering of protein-RNA interactions for studying virus-host interactions and virus biology

COVID-19 was caused by SARS-CoV-2, a positive sense single-stranded RNA virus. We investigated SARS-CoV-2 protein interactions with viral and host RNAs. From genome-wide mapping of viral protein-viral RNA interactions, we identified structured regions in the RNA genome that are essential for viral fitness. Unexpectedly, SARS-CoV-2 proteins interact with thousands of unique host RNAs, including pro-viral mRNAs that are selectively stabilized or translated. SARS-CoV-2 proteins interacting with nuclear-localized intronic RNAs are also associated with decreased nuclear export of target RNAs, a viral countermeasure in dampening inflammatory responses. Our extensive viral protein-RNA interaction profiling data provides a resource for understanding viral-host interactions and identification of potential therapeutic targets.

Beyond SARS-CoV-2, there is an extensive network of protein-RNA interactions shaping the host-virus response. However, current methodologies are resource-intensive and limited in isoform sensitivity, leaving the majority of these protein-RNA networks uncharacterized. I will briefly describe our ongoing research, which leverages high-throughput protein-RNA profiling to investigate this crucial aspect of host-virus interactions. Additionally, I will also discuss molecular engineering efforts aimed at developing virus protein RNA biosensors for diagnostics and potential nucleic acid-based therapeutics.

Dr Joy Xiang is a Junior Principal Investigator / GIS Fellow at the Genome Institute of Singapore. She developed high-throughput strategies for engineering RNA biosensors in Prof. Christina Smolke's lab at Stanford University for her PhD. Post-PhD, she profiled protein-RNA interactions of SARS-CoV-2 in Prof. Gene Yeo's lab at University of California San Diego. Currently, she is developing platform sequencing technologies to study ribonucleoprotein complexes in infection, and to engineer RNA-based diagnostics and RNA-targeting therapeutics.

Hosted by Prof Marco Vignuzzi

Seminar is open to all. No registration required.

Questions? Contact us at **seminars@idlabs.a-star.edu.sg**

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