Contribution ID : **3** Type : **Oral**

Novel structure of SARS-CoV-2 Nsp1/5′-UTR complex: Incites viral translational regulation and implications for potential therapeutics, vaccines

The SARS-CoV-2 virus is the cause of the ongoing Coronavirus disease 19 (COVID-19) pandemic, which causes pneumonia and lower respiratory tract infections (ARDS). To understand the pathogenicity and mode of action of SARS-CoV-2, it is important to portray the whole repertoire of expressed viral proteins. Recent studies showed that the SARS-CoV-2 leader protein Nsp1 has a role in shutting down host protein production. However, how Nsp1 modulates host translation is still unknown. Here, we present a structure of Nsp1 from SARS-CoV-2 in complex with the SL1 (RNA) region of the SARS-CoV-2 5′UTR, as well as evidenced with experimental binding affinity, demonstrating its involvement in translation by bipartite mechanism. We also employed molecular dynamics and simulations to model the real-time stability and functional dynamics of the Nsp1/SL1 complex. The studies also identify potential inhibitors and their modes of action for inhibiting viral protein/RNA complex formation. This advanced our understanding of the mechanism of the first viral protein synthesised in a human cell to regulate self and host translation. Understanding SARS-CoV-2 Nsp1 structure and function, as well as its interactions with viral RNA and the ribosome, will pave the way for the development of live attenuated vaccines and possible therapeutic targets for this disease.

Level of Expertise

Early Career <5 Years

Presenter Gender

Man

Pronouns

He/Him

Which facility did you use for your research

Australian Synchrotron

Students Only - Are you interested in AINSE student funding

Do you wish to take part in the Student Poster Slam

Condition of submission

Yes

Primary author(s) : Dr VANKADARI, Naveen (Monash University); Ms JEYASANKAR , Nandhini Nisha (Monash University); Ms JEROME, Lopes Wilma (Monash University)

Presenter(s) : Dr VANKADARI, Naveen (Monash University)

Session Classification : Biomedicine, Life science & Food Science

Track Classification : Biomedicine, Life science & Food Science