

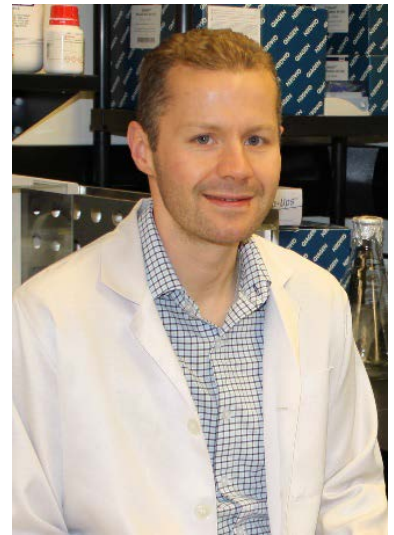
COVID-19: Recreating a purified version of the SARS-CoV-2 virus could enable future studies to develop a vaccine

Dr. Gareth Williams

The Williams lab's COVID-19 related research came about due to interactions with Dr. Alexei Savchenko's lab in the Snyder Institute and Department of Microbiology, Immunology & Infectious Diseases. The Savchenko lab specializes in structure-function studies of pathogen-host interactions and proteins that promote pathogenesis. Through his involvement in an NIH-funded structural genomics consortium, Dr. Savchenko is aiming to produce purified SARS-CoV-2, the virus causing the COVID-19 outbreak, proteins to determine their 3D structures and to make them available for various assays done in other consortium member labs.

Some of the SARS-CoV2 proteins require recombinant expression in eukaryotic cells and due to the Williams lab's expertise in protein expression and purification from insect cells, Dr. Savchenko asked if my lab would be willing to try and make some of these proteins. The two main targets we are initially trying to make are the Spike protein and the RNA-dependent RNA polymerase machiGareth Winery.

The spike glycoprotein is the major surface antigen of SARS-CoV-2 and is critical for infection because it binds to the host cell receptor and promotes membrane fusion between the virus-host. Patients who have recovered from COVID-19 illness can acquire their immunity by producing antibodies that bind the spike protein and neutralize the infectivity of SARC-CoV-2. There is a recent crystal structure of the receptor binding domain of the SARS-CoV-2 in complex with an antibody, which may help in designing a vaccine to combat COVID-19 (<https://science.sciencemag.org/content/368/6491/630/tab-pdf>). However, there is still much to learn about how the spike protein binds to receptors to promote infection and if this could be an effective target for the development of antiviral medicines to treat COVID-19.



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