

Covid-19 vaccine research ALIVE and thriving at Wits

13 July 2021 - Wits University

The Wits African Leadership in Vaccinology Expertise (ALIVE) has awarded research grants for cross-disciplinary Covid-19 vaccine-related projects.

ALIVE and the University Research Committee awarded funding to three Covid-19 vaccine-related projects during February and April 2021, in virology, human genetics, and public health respectively.

Investigating how the Covid-19 virus dodges human defences



Contact an expert

If you are a journalist looking for a Wits academic or researcher to provide comment and analysis, find an expert here.

The SARS-CoV-2 spike protein is the main target of neutralizing antibodies. It's this spike protein – the 'corona' crown of the virus – that facilitates entry into host cells and infection. This spike protein is also continually mutating and 'escaping' the antibody response that our bodies produce to fight off infection.

Understanding how this spike protein behaves as it mutates, and how this affects the antibodies we need, is important to vaccine design because these mutations may alter the effectiveness of vaccines and therapeutics currently in development.

Dr Thandeka Moyo-Gwete in Virology, School of Pathology at Wits and a Senior Medical Scientist in the Centre for HIV and STIs at the National Institute for Communicable Diseases leads a project on mapping SARS-CoV-2 spike determinants of escape from antibodies.

"This project harnesses our existing highly successful HIV-focused expertise and established methodologies in our lab to rapidly identify key viral mutations emerging in SARS-CoV-2 and to determine the neutralizing responses to these viral strains in the context of the Covid-19 epidemic in South Africa," says Moyo-Gwete, whose research interests started in understanding the nature of broadly neutralizing antibodies that target HIV and HIV vaccine development.

The results from this study will provide insight into the effectiveness of SARS-CoV-2 vaccines in the presence of several viral variants circulating in South Africa.

This research grant facilitated the postgraduate work of Ms Bliss Musvosvi, an MSc (Med) Vaccinology candidate at Wits. "My goal is to serve and help achieve public health objectives through reduction in the mortality and morbidity of vaccine preventable diseases. Other areas of interest include vaccines for the prevention and control of emerging and re-emerging infectious diseases," she says.

How does the genetic variation of South Africans influence Covid-19 infection and severity?

Michèle Ramsay, Director of the Sydney Brenner Institute for Molecular Bioscience (SBIMB) and Professor in the Division of Human Genetics at Wits, along with Dr June Fabian, nephrologist and Research Director at the Wits Donald Gordon Medical Centre (WDGMC) are co-Principal Investigators on the *Host genomic susceptibility to COVID-19 in Black South Africans (COVIGen-SA)* project.



The way an individual experiences and responds to Covid-19 differs from person to person; some people get severe disease, some die, and others present with very mild symptoms or are asymptomatic. These varying clinical outcomes are due partly to the genetic factors of the host (infected person).

Understanding how genetic variation affects the way people respond to Covid-19 could inform vaccine development, and improve disease management and therapeutics. Research studies in this area relate to the field of genomic medicine, where the approach to treatment is informed by the person's genetic variation.

Globally, efforts are underway to describe the role that host genetic variation plays in infection by the novel coronavirus and progression to Covid-19. However, African populations are historically under-represented in global host genetic studies, and this threatens to worsen existing health inequalities.

The COVIGen-SA project is a unique and dedicated initiative to understand the role of host genetic factors in Black South Africans.

"Through collaborations, we aim to collect DNA samples from over 5000 Black South African participants, with varying Covid-19 disease severity. This will serve as a resource for current and future studies investigating the role of host genetics in Covid-19 and could inform more effective treatment and prevention strategies," says Ramsay, who is a Research Chair on Genomics and Bioinformatics of African populations.

Dr Harriet Etheredge is a medical bioethicist and health communication specialist at the Wits Donald Gordon Medical Centre. She is responsible for implementing and overseeing a robust ethical and regulatory structure for COVIGen-SA.

Dr [Andrew May](#), a postdoctoral fellow in the SBIMB will coordinate the COVIGen-SA project. May's [research](#) interest is in how genetic variation impacts individual differences in health and behaviour.

Ms [Heather Seymour](#) will conduct doctoral research in the COVIGen-SA project. Her PhD in the SBIMB follows her MSc (Med) [dissertation](#) on *Mutation profiling in South African patients with Cornelia De Lange syndrome phenotype using targeted next generation sequencing*.