



# CAPRISA

CENTRE FOR THE AIDS PROGRAMME OF RESEARCH IN SOUTH AFRICA

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## New CAPRISA antibody identifies a novel vaccine target

### In this Issue

Our feature article this month focuses on a study that describes the isolation of a novel broadly neutralising antibody called CAP248-2B that spans both gp120-gp41 interfaces in a manner that is distinct from known HIV antibodies.

On page 2 and we congratulate Drs Jinal Bhiman and Kurt Wibmer on obtaining their PhDs and Dr Izukanji Sikazwe on her appointment as the CEO of the Centre for Infectious Disease Research in Zambia.

The CAPRISA scientists who were awarded 2017 Thuthuka grants share their research plans on page 3

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A preventative HIV vaccine will likely need to generate broadly neutralizing antibodies that are able to recognize diverse viruses from across the globe. Such antibodies have not yet been elicited by vaccination, but develop in some HIV-infected individuals during chronic HIV infection. A better understanding of the regions on the HIV envelope trimers targeted by broadly neutralizing antibodies may contribute to HIV vaccine design.

In a paper published in *PLoS Pathogens*, PhD student Kurt Wibmer, who is supervised by Professors Lynn Morris and Penny Moore, described the isolation of an antibody called CAP248-2B, and characterized its epitope using X-ray crystallography, and negative-stain electron microscopy. This novel epitope spanned both gp120-gp41 interfaces in a manner that is distinct from known HIV antibodies, extending the interface target to include the gp120 C terminus, encircling the base of native pre-fusion trimers.

The study, which is a collaboration between NICD, CAPRISA, the

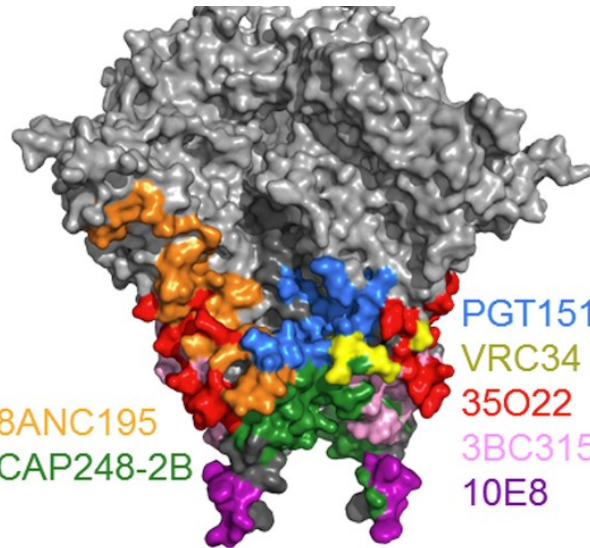
NIH Vaccine Research Center and UCT, also characterized viral escape pathways from the CAP248-2B Ab. Sequence analysis identified unusual mutations in the gp160 cleavage sites that allowed the virus to escape these antibodies. Surprisingly, these mutations made HIV viruses 10-100-

fold more sensitive to antibodies targeting another highly conserved epitope, the membrane-proximal external region. Incorporating these mutations into vaccine candidates could therefore improve the immunogenicity of gp41, and

inform HIV immunogen design.

Kurt has recently taken up a post-doctoral fellowship at the Scripps Research Institute in San Diego, USA.

For more information see:  
*CK Wibmer, et al. Structure and Recognition of a Novel HIV-1 gp120-gp41 Interface Antibody that Caused MPER Exposure through Viral Escape 2017. PLoS Pathogens. DOI:10.1371/journal.ppat.1006074.*



Viral Membrane



## PhD Graduates Dr Jinal Bhiman and Dr Kurt Wibmer

**C**ongratulations to Kurt Wibmer and Jinal Bhiman who obtained their PhD degrees on 12 December 2016 at the University of the Witwatersrand. Kurt's PhD focused on the identification, isolation and characterization of HIV-1 neutralizing antibodies, resulting in 2 publications in *PLoS Pathogens*, one in *Journal of Virology* and a review article. Jinal's studies defined virus-antibody interplay during the development of HIV-1 neutralizing antibodies to inform vaccine design, and published her findings in *Nature*, *Nature Medicine* and the *Journal of Virology*. Both won the Faculty Research Prize during their studies, which were supervised by Professors Lynn Morris and Penny Moore at the NICD. Their graduation was also attended by Dr Elin Gray, previously of the NICD and now based in Australia who first supervised Kurt for his Master's degree. Kurt and Jinal (who also married while pursuing their PhDs!) have since moved to San Diego in the United States to pursue Postdoctoral careers at the Scripps Research Institute. We wish them all the best!



*From (L-R): Dr Elin Gray, Professor Lynn Morris CAPRISA Research Associate, Dr Kurt Wibmer, Dr Jinal Bhiman and Professor Penny Moore CAPRISA Research Associate.*

## M.I.T. students at CAPRISA for the day



**S**tudents from MIT in Boston, accompanied by Dr Bruce Walker Director of the Ragon Institute of MGH, MIT and Harvard, visited CAPRISA's Vulindlela Research Clinic and headquarters on 19th January 2017. The students had an interactive session with CAPRISA scientists on the PrEP demonstration project, and the AMP and HPTN 077 studies. On the return trip to the CAPRISA headquarters in Durban the students viewed the memorial at the Nelson Mandela capture site (Above: photo at the capture site). At the CAPRISA headquarters Professor Slim Abdool Karim lectured to the students on HIV prevention: prospects and challenges.

## Infectious disease expert at the helm of the CIDRZ

**C**APRISA congratulates Dr Izukanji Sikazwe on her appointment as the CEO of the Centre for Infectious Disease Research in Zambia (CIDRZ). Commenting on her appointment Professor Salim Abdool Karim Director CAPRISA congratulated CIDRZ on its achievements under Dr Charles Holmes and wished Dr Sikazwe every success. "I have no doubt that CIDRZ is in good hands, as Dr Sikazwe is an impressive scientist and a strong research leader, who has in the past been involved in advising CAPRISA on its research", he said. Dr Sikazwe is a Zambian infectious disease specialist with a keen interest in HIV research, clinical care and training of healthcare providers.



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## New CAPRISA Thuthuka grant awards

**C**APRISA congratulates three of its scientists who were recently awarded Thuthuka grants. These grants are from a joint National Research Foundation (NRF) and the Department of Science and Technology (DST) initiative. The Thuthuka Programme is part of the Human and Infrastructure Capacity Development Directorate of the NRF and aims to develop institutional research capabilities and infrastructure in parallel with human capital to drive the research and development strategies.



*Dr Eliza Govender*

**C**APRISA Social and behavioural scientist Eliza Govender (PhD) is also an honorary lecturer and research associate with the Centre for Communication, Media and Society (CCMS) at UKZN. Her research will focus on user readiness for oral pre-exposure prophylaxis. This study explores the key determinants for user readiness to optimize the demand for oral PrEP. "Optimizing user readiness interventions requires an understanding of the perceptions of risk of potential users within localised cultural contexts, identifying opportunities and psycho-social barriers to PrEP implementation and exploring a user-driven perspective to effective PrEP adoption, said Dr Govender. The study will adopt a participatory research approach to explore the perceptions, acceptability and motivations for oral PrEP initiation with adolescent girls and young women (ages 18-30) and young men (ages 23-35) in Vulindlela in KwaZulu-Natal.

**D**r Sinaye Ngcapu (PhD) is a basic scientist in the CAPRISA HIV Mucosal Immunology Laboratory and an honorary lecturer in the Department of Medical Microbiology at UKZN. His research is focused on the longitudinal role of vaginal microbial dybiosis in HIV acquisition, genital inflammation, and HIV shedding South African women. "The proposed project will use 16S sequencing to isolate and characterize bacterial microbiome in longitudinal genital samples from high-risk South African women who later seroconverted versus controls who remained HIV seronegative", said Dr Ngcapu.



*Dr Sinaye Ngcapu*



*Dr Derseree Archary*

**D**erseree Archary (PhD) is a Scientist at CAPRISA and also an Honorary Lecturer at the School of Laboratory Medicine and Medical Sciences at UKZN. Her main research interests are in defining the immune correlates of protection and risk to HIV-acquisition in the female genital tract. The research being funded by the Thuthuka grant will investigate non-neutralizing antibody effector function in the female genital tract. The study will evaluate the diverse functions of the binding or non-neutralizing antibodies in the genital tract to understand whether prior pre-exposure prophylaxis (PrEP) also impacts antibody functionality. "Understanding the effect of PrEP on the humoral immune system is important, particularly in an era where PrEP and HIV vaccines may be used together to prevent HIV infection," explained Dr Archary.

## Quarraisha featured in The Financial Times Women of 2016

Professor Quarraisha Abdool Karim was featured in The Financial Times, the UK's leading business-focused newspaper, as one of the "Women of 2016". The Financial Times identified nineteen women from across the globe in politics, sport, economics and science acknowledging their relentless and significant contributions in their respective fields.





## Scientific papers published in 2017

- 1 **Wibmer CK**, Gorman J, Ozorowski G, **Bhiman JN**, Sheward DJ, Elliott DH, Rouelle J, Smira A, Joyce MG, Ndabambi N, Druz A, Asokan M, Burton DR, Connors M, **Abdool Karim SS**, Mascola JR, Robinson JE, Ward AB, **Williamson C**, Kwong PD, **Morris L**, **Moore PL**. Structure and Recognition of a Novel HIV-1 gp120-gp41 Interface Antibody that Caused MPER Exposure through Viral Escape. *PLOS Pathogens* 2017 13(1): e1006074.
- 2 Power RA, Parkhill J, **de Oliveira T**. Microbial genome-wide association studies: lessons from human GWAS. *Nature Reviews Genetics* 2017; 18(1):41-50.
- 3 **Ntombela N**, Mashamba-Thompson TP, **Mtshali A**, Voce A, **Kharsany AB**. The dynamics of HIV transmission in out of school young heterosexual men in South Africa: a systematic scoping review protocol. *Systematic Reviews* 2017 Jan 17; 6(1):9.
- 4 Dobra A, Bärnighausen T, Vandormael A, **Tanser F**. Space-time migration patterns and risk of HIV acquisition in rural South Africa. *AIDS* 2017; 31(1):137-145.
- 5 Tanko RF, Soares AP, Müller TL, **Garrett NJ**, **Samsunder N**, **Abdool Karim Q**, **Abdool Karim SS**, Riou C, **Burgers WA**. Effect of Antiretroviral Therapy on the Memory and Activation Profiles of B Cells in HIV-Infected African Women. *Journal of Immunology* 2017; 198(3):1220-1228.
- 6 **Chopera DR**, Ntale R, Ndabambi N, **Garrett N**, **Gray CM**, Matten D, **Abdool Karim Q**, **Abdool Karim SS**, **Williamson C**. Early evolution of HLA-associated escape mutations in variable Gag proteins predicts CD4+ decline in HIV-1 subtype C infected women. *AIDS* 2017 ; 31(2):191-197.
- 7 Selhorst P, **Masson L**, Ismail SD, **Samsunder N**, **Garrett N**, **Mansoor LE**, **Abdool Karim Q**, **Abdool Karim SS**, **Passmore J-AS**, **Williamson C**. Cervicovaginal inflammation Facilitates Acquisition of less infectious HIV variants. *Clinical Infectious Diseases* 2017; 64(1):79-82.

## Scientific Reviews

Abstracts submitted for review		Manuscripts submitted for review		Ancillary studies submitted for review	
Total#	Cumulative <sup>^</sup>	Total#	Cumulative <sup>^</sup>	Total#	Cumulative <sup>^</sup>
12	382	1	211	1	74

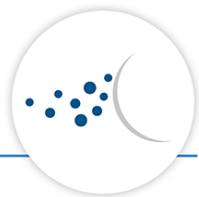
# for month, <sup>^</sup> since committee initiation

12<sup>TH</sup> INTERNATIONAL WORKSHOP ON

**HIV TRANSMISSION**

PRINCIPLES OF INTERVENTION

PARIS, FRANCE • 21-22 JULY 2017



Don't miss the opportunity to attend the 12<sup>th</sup> International Workshop of HIV Transmission, which is scheduled to take place on July 21 and 22, 2017 in Paris, France, prior to IAS 2017. Should you wish to attend, please contact Cheryl Baxter [Cheryl.baxter@caprisa.org](mailto:Cheryl.baxter@caprisa.org)



National Research Foundation

CAPRISA hosts a DST-NRF Centre of Excellence in HIV Prevention



UNAIDS

CAPRISA is the UNAIDS Collaborating Centre for HIV Research and Policy



CAPRISA hosts a MRC HIV-TB Pathogenesis and Treatment Research Unit

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