



### In this Issue

The feature story in this issue focuses on a laboratory-based model that demonstrates the relationship between inflammation and HIV susceptibility.

On page 2 we congratulate Prof Salim Abdool Karim on his appointment as an Adjunct Professor at Harvard and the CAPRISA HVTN team for their outstanding contribution in the HVTN Vaccine trials. We also congratulate NICD PhD student, Vincent Hlatshwayo, who was awarded the best poster at the VEME workshop in Hong Kong.

We announce Prof Quarraisha Abdool Karim's appointment as an advisor on CARI and feature Prof Jerome's Singh's interview published in *Global Health Matters*. CAPRISA Research Placement, Kapil Narain, is congratulated on his selection as a recipient of the Changemaker Scholarship.

## A threshold level and specificity of inflammation determines HIV susceptibility

A recent study, published in *Frontiers in Immunology*, shows that a threshold level and specificity of inflammation may be protective against HIV infection.

This study assessed how inflammation, simulated by adding bacterial or viral components into a cellular model to stimulate Toll-Like receptors (TLRs), caused cells to secrete inflammatory proteins, activate cells and impact HIV infection of target T cells.

Two major factors favour HIV infection, high levels of inflammation gauged by measuring soluble inflammatory proteins and increased activation of HIV target T cells.

In this laboratory model, immune cells isolated from blood were stimulated with various bacterial and viral components and then infected with HIV. Soluble inflammatory proteins produced by immune cells and cellular activation and infection states of HIV target cells were measured. Specifically, it was found that TLR4-stimulation reduced rather than increased

HIV susceptibility of target T cells, did not cause exaggerated activation and reduced CCR5 expression of T cells, despite the potent inflammatory environment it created (Figure).

These findings indicate that TLR agonists play a powerful although complex role in the dynamics of HIV infection and that a threshold level and type of inflammatory response may be protective against HIV.

The immunological processes that govern inflammation are therefore critical and may tip the balance between protection versus susceptibility to HIV infection.

This research further highlights the potential therapeutic use of these TLR agonists to combat HIV infection.

### For further reading:

Cromarty R, et al. Diminished HIV infection of target CD4+ T cells in a Toll-Like Receptor 4 stimulated in vitro model. *Frontiers in Immunology* 2019; 10:1705. doi: 10.3389/fimmu.2019.01705. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6664077/>

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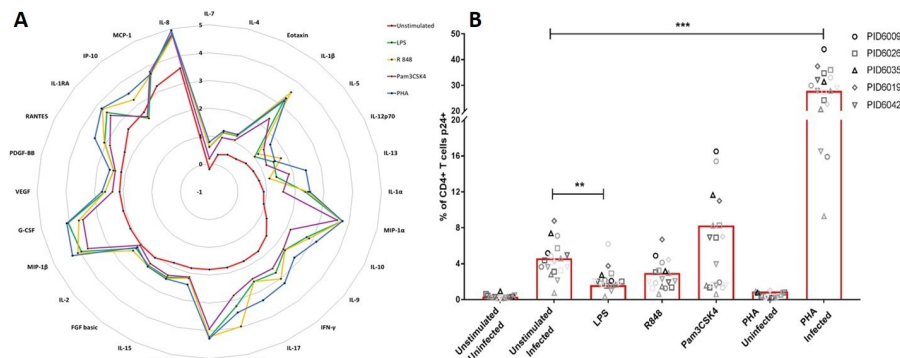
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**Figure A:** Radial spider plot of soluble inflammatory mediators secreted from immune cells after stimulation with TLR agonists LPS (green), R848 (orange) or Pam3CSK4 (purple) or the positive control PHA (blue) or left unstimulated (red). **B:** Histogram representing HIV infection rates of target cells (CD4+ T cells) for unstimulated, LPS, R848, Pam3CSK4 or PHA stimulated conditions.



# CAPRISA Director appointed Adjunct Professor of Immunology and Infectious Diseases at Harvard



**W**e congratulate Professor Salim Abdool Karim, Director of CAPRISA, on his appointment as an Adjunct Professor in Immunology and Infectious Diseases at Harvard University. As an adjunct honorary appointment, his responsibilities at Harvard are mainly related to research and occasional teaching.

Abdool Karim conveyed his deep gratitude to Quarraisha Abdool Karim, his family, the Board of Control

and Scientific Advisory Board members, the excellent CAPRISA research team and his friends and colleagues, saying that “this achievement would not have been possible without their strong support and encouragement.”

This appointment is a major accolade for CAPRISA and Abdool Karim’s accomplishments as its Director. “It reflects the excellence achieved in research at CAPRISA,” he said.

## CAPRISA Vaccine team recognised for excellence



*Photo: The CAPRISA HVTN team at the CAPRISA eThekweni Research Clinic in Durban. The team received awards for excellent data submission and high participant retention at the HVTN Full Group Meeting held in Washington.*

**T**wo landmark HIV vaccine trials, the HVTN 702 (Uhambo) and HVTN 705 (Imbokodo) efficacy trials successfully completed enrolments earlier this year. The HVTN 702 trial, investigating a clade C vaccine, enrolled a total of 5407 men and women from South Africa, while HVTN 705, a mosaic vaccine trial, recruited 2622 young women from across Africa. Dr Nivashnee Naicker (Site-Principal Investigator for HVTN702) said that the CAPRISA team at the eThekweni Research

Clinic made a substantial contribution by enrolling more than 400 participants into these trials. The team was acknowledged at the Full Group Meeting held in Washington where they received awards for ‘Excellent Data Submission’ and high participant retention. Dr Nigel Garrett, Head of Pathogenesis and Vaccine Research at CAPRISA, presented the results of the HVTN 108 study, a Phase 1 study investigating the safety and immunogenicity of a DNA vaccine, in the plenary session at the meeting.

## Best Poster Award for PhD candidate



**V**incent Hlatshwayo, a NICD PhD student supervised by Prof Penny Moore and Dr Cathrine Scheepers, attended the 24<sup>th</sup> VEME workshop and the Croucher Summer Course held in Hong Kong (4-9 August, 2019), which took place despite ongoing political turmoil. This workshop, which is recognized as one of the best international virology

bioinformatics courses, provided 90 virologists from different countries around the world with intensive training in the mathematical principles and computer applications used in the study of virus evolution and for conducting detailed molecular epidemiological investigations. Vincent was awarded the prize for the best poster.



## Quarraisha Abdool Karim invited to serve on CARI

Professor Quarraisha Abdool Karim, Associate Scientific Director at CAPRISA has been invited to serve as an advisor on the Coalition for African Research and Innovation (CARI) that focuses on advancing scientific capacity in the development of sub-Saharan Africa.



Dr Felix Dapare Dakora, President of the African Academy of Sciences and Dr Francis Collins, Director National Institutes of Health said they were “especially interested in discussing measures and incentives to create sustained public and private investment in African research institutions and to achieve the Sustainable Development Goals’ health targets by 2030.” “Scientific innovation in Africa is on the rise, and momentum is building for new measures to strengthen and sustain the capacity of African universities and research institutions to become an effective force for economic growth and local solutions for health and development challenges.”

Abdool Karim said it was a privilege to contribute and advance CARI’s vision in this important initiative on the African continent.

CARI is the strategic partnership of the African Academy of Sciences, African Union Development Agency, U.S. National Institutes of Health, Wellcome Trust, and the Bill & Melinda Gates Foundation to explore opportunities and galvanise support to create a strengthened, sustainable, and autonomous African biomedical research enterprise.

## Q&A with CAPRISA’s Head of Ethics and Law



Professor Jerome Singh, CAPRISA’s Head of Ethics and Law speaks about the phenomenal impact of being a Fogarty fellow which was “life-changing”.

In an interview featured in the NIH Fogarty International Centre’s newsletter, *Global Health Matters*, Jerome Singh who became Head of Ethics and Law at CAPRISA after completing a year-long training program in bioethics which was supported by Fogarty’s AIDS International Training and Research Program (AITRP).

In addition to his role at CAPRISA, he teaches at the University of Toronto’s School of Public Health and serves as a consultant to several United Nations entities including the WHO, UNAIDS and UNICEF.

He is also a co-chair of the HIV Prevention Trial Network’s ethics working group, Singh serves as a consultant on health law to the South African Law Reform Commission. To read the Q&A with Singh click on this link: <https://www.fic.nih.gov/News/GlobalHealthMatters/july-august-2019/Documents/fogarty-nih-global-health-matters-newsletter-july-august-2019.pdf>

## Prestigious scholarship for student



Photo: Kapil Narain, CAPRISA Research Placement with Dr Tedros Adhanom Ghebreyesus, DG of Health in Geneva.

CAPRISA congratulates Kapil Narain, a CAPRISA Research Placement and a fifth-year medical student at UKZN, who is one of four students selected globally as a recipient of the Changemaker Scholarship programme funded by the Alliance for Health Systems and Policy at the WHO. Narain attended the 72<sup>nd</sup> World Health Assembly (WHA) and the IFMSA Youth Pre- World Health Assembly workshop (PreWHA) in Geneva, Switzerland . He said

that meeting Dr Tedros Adhanom Ghebreyesus, Director-General of the WHO was a highlight.

Narain said he was honoured to be part of CAPRISA and “each and every day I am constantly inspired and stimulated by the sheer degree of scientific rigour, novelty, clinical relevance and innovation.”



## Scientific papers published in 2019

- 54\* Dobra A, Bärnighausen T, Vandormael A, **Tanser F**. A method for statistical analysis of repeated residential movements to link human mobility and HIV acquisition. *PLoS One* 2019; 14(6):e0217284. doi: 10.1371/journal.pone.0217284.
- 55 Dwyer-Lindgren L, Cork MA, Sligar A, Steuben KM, Wilson KF, Provost NR, Mayala BK, VanderHeide JD, Collison ML, Hall JB, Biehl MH, Carter A, Frank T, Douwes-Schultz D, Burstein R, Casey DC, Deshpande A, Earl L, El Bcheraoui C, Farag TH, Henry NJ, Kinyoki D, Marczak LB, Nixon MR, Osgood-Zimmerman A, Pigott D, Reiner RC, Ross JM, Schaeffer LE, Smith DL, Davis Weaver N, Wiens KE, Eaton JW, Justman JE, Opio A, Sartorius B, **Tanser F**, Wabiri N, Piot P, Murray CJL, Hay SI. Mapping HIV prevalence in sub-Saharan Africa between 2000 and 2017. *Nature* 2019; 570(7760):189-193.
- 56 **Baxter C, Ngcapu S**, Blackard JT, Powell EA, Penton PK, **Abdool Karim SS**. Frequency of Hepatitis B Virus Resistance Mutations in Women Using Tenofovir Gel as Pre-Exposure Prophylaxis. *Viruses* 2019; 11(6):E569. doi: 10.3390/v11060569.
- 57 Davis S, Toledo C, **Lewis L**, Maughan-Brown B, Ayalew K, **Kharsany ABM**. Does voluntary medical male circumcision protect against sexually transmitted infections among men and women in real-world scale-up settings? Findings of a household survey in KwaZulu-Natal, South Africa. *BMJ Global Health* 2019; 4(3):e001389. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6570991/>
- 58 Darboe F, Mbandi SK, **Naidoo K, Yende-Zuma N, Lewis L**, Thompson E, Duffy F, Fisher M, Filander E, van Rooyen M, Bilek N, Mabwe S, **McKinnon L**, Chegou NN, Loxton AG, Walzl G, Tromp G, **Padayatchi N, Govender D**, Hatherill M, **Abdool Karim SS**, Zak D, Penn-Nicholson A, Scriba T. Detection of tuberculosis recurrence, diagnosis and treatment response by a blood transcriptomic risk signature in HIV-infected persons on antiretroviral therapy. *Frontiers in Microbiology* 2019; 10:1441. doi: 10.3389/fmicb.2019.01441.
- 59 **Samsunder N, Ngcapu S, Lewis L, Baxter C**, Cawood C, Khanyile D, **Kharsany ABM**. Seroprevalence of hepatitis B virus: findings from a population-based household survey in KwaZulu Natal, South Africa. *International Journal of Infectious Diseases* 2019; 85:150-157.
- 60 Wong EB, Gold MC, Meermeier EW, Xulu BZ, Khuzwayo S, Sullivan ZA, Mahyari E, Rogers Z, Klooverpris H, Sharma PK, Worley AH, Laloo U, Baijnath P, Ambaram A, Naidoo L, Suleman M, **Madansein R**, McLaren JE, Ladell K, Miners KL, Price DA, Behar SM, Nielsen M, Kasproicz VO, Leslie A, Bishai WR, Ndung'u T, Lewinsohn DM. TRAV1-2(+) CD8(+) T-cells including oligoclonal expansions of MAIT cells are enriched in the airways in human tuberculosis. *Communications Biology* 2019; 2:203. doi: 10.1038/s42003-019-0442-2.
- 61 **Mahomed S, Garrett N**, Capparelli E, **Baxter C, Yende-Zuma N, Gengiah T, Archary D, Moore P, Samsunder N**, Barouch DH, Mascola J, Ledgerwood J, **Morris L, Abdool Karim SS**. Assessing the safety and pharmacokinetics of the monoclonal antibodies, VRC07-523LS and PGT121 in HIV negative women in South Africa: study protocol for the CAPRISA 012A randomised controlled phase I trial. *BMJ Open* 2019; 9(7):e030283. doi: 10.1136/bmjopen-2019-030283.
- 62 **Cromarty R, Sigal A, Liebenberg LJ, McKinnon LR, Abdool Karim SS, Passmore JS, Archary D**. Diminished HIV infection of target CD4+ T cells in a Toll-Like Receptor 4 stimulated in vitro model. *Frontiers in Immunology* 2019; 10:1705. doi: 10.3389/fimmu.2019.01705.

\*continuation from previous newsletter



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

CAPRISA hosts a DoH-MRC Special Initiative for HIV Prevention Technology



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