

# University of KwaZulu-Natal HIV Pathogenesis Programme



Translating science  
into global health impact

A multidisciplinary HIV pathogenesis research program that seeks to rapidly provide an extensive understanding of the immune responses that are effective in the control of HIV infection



The University of KwaZulu-Natal HIV Pathogenesis Programme (UKZN-HPP) was established in 2002 at the University of KwaZulu-Natal in collaboration with Harvard Medical School in the U.S., and the University of Oxford in the U.K. HPP is a multidisciplinary HIV pathogenesis research program with a focus on immunology research aimed at understanding the immune responses that are effective in the control of HIV infection.

The HPP has been involved in studies of HIV-1 immunopathogenesis for over two decades. This collaborative program, initially funded by the Doris Duke Charitable Foundation, now attracts funding from other international and local funding agencies such as IAVI; the Bill & Melinda Gates Foundation; Wellcome Trust; Howard Hughes Medical Institute; U.S. National Institutes of Health; International Development Research Centre; National Research Foundation; the Victor Daitz Foundation; Simon Fraser University; and the Ragon Institute of MGH, MIT and Harvard.

HPP is also training the next generation of African scientists in basic and translational research.

Since 2010, IAVI has been working in partnership with HPP and has contributed to strengthening the program's capacity for HIV vaccine and biomedical prevention research. UKZN-HPP is now a center of excellence in HIV molecular virology due to its capacity to conduct studies that enable understanding of HIV at a molecular level, and identification of early HIV infection and acute HIV infection, both of which are important to understanding disease progression.

The HPP team has published over 200 manuscripts in peer-reviewed journals since 2004. HPP attracts an international student body, with most publishing papers in peer-reviewed journals as first authors. Collaborations with Africa Health Research Institute have

been established to enhance the training experience for HPP students, most of whom go on to complete additional training at various leading international institutions.

HPP has seven clinic sites in KwaZulu-Natal, and several satellite clinics located around the primary sites, from which study participants are recruited, offered free medical consultations, support, and care from an experienced team of doctors, nurses, and counsellors.



Women in the FRESH study cohort

## Laboratory capacity

HPP's state-of-the-art laboratory is based at the Doris Duke Medical Research Institute and covers approximately 992 square meters of combined space on two levels. It serves as both a facility for exploratory pathogenesis and translational research into HIV and tuberculosis, as well as a sample repository for all HPP study samples. The HPP's laboratory is dedicated to studying host-virus interactions, antiviral immune responses, and biomedical interventions applicable to resource-limited settings. The lab includes state-of-the-art equipment, office space for staff and students, as well as space for visiting scientists.

The lab's exploratory research capacity includes peripheral blood mononuclear cell isolation and sample storage, collection and processing of different sample types, including genital mucosal and

lymph node samples. The lab also has a capacity for genomic isolation, amplification, processing, and analysis, as well as platforms for cell imaging and cellular analysis.

## People

Thumbi Ndung'u, BVM, Ph.D., is the scientific director of HPP, and oversees over 60 personnel including faculty members, clinicians, laboratory technicians, nurses, counsellors, administrative staff, students, and visiting and local scientists. Collaborators who have greatly facilitated local capacitation include Bruce Walker, M.D., Ph.D., who holds a joint appointment as Professor of Medicine at the Nelson Mandela School of Medicine and at Harvard Medical School, and Philip Goulder, FRCPCH, D.Phil., FMedSci, who also holds joint faculty positions at UKZN and the University of Oxford.

## IAVI/HPP collaboration

IAVI's collaboration with HPP is focused on the HPP FRESH project (Females Rising Through Education Support and Health), a longitudinal study to identify and analyze participants immediately after they are infected with HIV. The FRESH project enrolled more

than 2,000 young women (18-23 years old from Umlazi Township in South Africa).

To address the underlying poverty of participants that puts them at risk of HIV, study staff is concurrently providing an intensive empowerment, life-skills, and job readiness curriculum ('FRESH-start'). The "FRESH-Start" core curriculum consists of twice-weekly, three-hour sessions focused on three segments: (1) self-exploration and risk assessment to create a talent-needs profile, which will inform referrals and guide job and educational planning, (2) development of 'hard skills' including typing, computer basics, accounting, and exposure to income-generating options, and (3) job-readiness, which includes interview skills, attire, professionalism, CV preparation, and selection of work internships.

### IAVI-supported activities

- Acute HIV infection
- Research preparedness and engaging communities and cohorts
- B-cell immunogen design and assessment
- Strengthening capacity for HIV vaccine and biomedical prevention research

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