



UNIVERSITEIT VAN PRETORIA  
UNIVERSITY OF PRETORIA  
YUNIBESITHI YA PRETORIA

**31 August 2022**

**Embargo: 17h00, SAST, Pretoria**

## **MEDIA RELEASE**

### **Study reveals aggressive prostate cancer linked to ancestral heritage**

Two pioneering studies published simultaneously today in [Nature](#) and [Genome Medicine](#) have identified genetic signatures explaining ethnic differences in the severity of prostate cancer, particularly in sub-Saharan Africa.

Through genetic sequencing of prostate cancer tumours from Australian, Brazilian and South African donors, the team identified a new prostate cancer taxonomy (classification scheme) and cancer drivers that not only distinguish patients by genetic ancestry, but also predict which cancers are likely to become life-threatening – a task that currently proves challenging.

“Our understanding of prostate cancer has been severely limited by a research focus on Western populations,” said senior author Professor [Vanessa Hayes](#), genomicist and Petre Chair of Prostate Cancer Research at the [University of Sydney’s Charles Perkins Centre](#) and [Faculty of Medicine and Health in Australia](#). “Being of African descent, or from Africa, more than doubles a man’s risk for lethal prostate cancer. While genomics holds a critical key to unravelling contributing genetic and non-genetic factors, data for Africa has till now, been lacking.”

“Prostate cancer is the silent killer in our region,” said the [University of Pretoria’s Professor Riana Bornman](#), an international expert in men’s health and clinical lead for the Southern African Prostate Cancer Study in South Africa.

“We had to start with a grassroots approach, engaging communities with open discussion, establishing the infrastructure for African inclusion in the genomic revolution, while determining the true extent of prostate disease.”

Through sophisticated whole genome sequencing (a way of mapping the entire genetic code of cancer cells), over two million cancer-specific genomic variants were identified in 183 untreated prostate tumours from men living across the three study regions.

“We found Africans to be impacted by a greater number and spectrum of acquired (including cancer driver) genetic alterations, with significant implications for ancestral consideration when managing and treating prostate cancer,” said Professor Hayes.

“Using cutting-edge computational data science which allowed for pattern recognition that included all types of cancer variants, we revealed a novel prostate cancer taxonomy which we then linked to different

disease outcomes,” said [Dr Weerachai Jaratlerdsiri](#), a computational biologist from the [University of Sydney](#) and first author on the [Nature](#) paper.

“Combining our unique dataset with the largest public data source of European and Chinese cancer genomes allowed us to, for the first time, place the African prostate cancer genomic landscape into a global context.”

As part of her PhD at the [University of Sydney](#), [Dr Tingting Gong](#), first author on the [Genome Medicine](#) paper, painstakingly sifted through the genomic data for large changes in the structure of chromosomes (molecules that hold genetic information). These changes are often overlooked because of the complexity involved in computationally predicting their presence, but are an area of critical importance and contribution to prostate cancer.

“We showed significant differences in the acquisition of complex genomic variation in African and European derived tumours, with consequences for disease progression and new opportunities for treatment,” said Dr Gong.

This cancer genome resource is possibly the first and largest in the world to include African data.

“Through African inclusion, we have made the first steps not only toward globalising precision medicine, but ultimately to reducing the impact of prostate cancer mortality across rural Africa,” explained Professor Bornman.

“A strength of this study was the ability to generate and process all data through a single technical and analytical pipeline,” added Professor Hayes.

The research featured in the [Nature](#) and [Genome Medicine](#) paper is part of the legacy of the late [Archbishop Emeritus Desmond Tutu](#). He was the first African to have his complete genome sequenced, data which would be an integral part of genetic sequencing and prostate cancer research in southern Africa.

The results of the sequencing were published in [Nature](#) in 2010.

“Diagnosed at age 66 with advanced prostate cancer, to which he succumbed in late December 2021, the Archbishop was an advocate not only for prostate cancer research in southern Africa, but also the benefits that genomic medicine would offer all peoples,” recollected Professor Hayes. “We hope this study is a first step to that realisation.”

The international research team included academics from the University of Sydney in Australia, and affiliated institutions at [St Vincent’s Hospital](#), [Royal Prince Alfred Hospital](#), [Garvan Institute of Medical Research](#) and [Chris O’Brien Lifehouse](#); in South Africa from the [University of Pretoria](#), [University of Limpopo](#), and [Sefako Makgatho Health Science University](#), and including the [Dr George Mukhari Academic Hospital](#), [Kalafong Academic Hospital](#), and [National Health Laboratory Services](#); in Brazil from [Universidade Federal do Rio Grande do Sul](#), and from the [University of Manchester](#) in the United Kingdom, with additional contributions for the [Genome Medicine](#) paper from the [University of Melbourne](#) and the [Walter and Eliza Hall Institute](#) in Australia.

Professor Hayes acknowledges the foresight of [The Petre Foundation](#) and donor Daniel Petre, who has supported her vision for inclusive genomic research for over eight years.

Caption 1: Prof Vanessa Hayes examining a blood sample from a prostate cancer patient that was used in the study. Picture credit: Stefanie Zingsheim

Caption 2: Prof Riana Bornman and colleagues discussing the project with the Vhembe community in South Africa. Picture credit: Hanna Jacobs

Read the *Nature* paper: <https://www.nature.com/articles/s41586-022-05154-6>

DOI: 10.1038/s41586-022-05154-6

Read the *Genome Medicine* paper: <https://link.springer.com/article/10.1186/s13073-022-01096-w>

DOI: 10.1186/s13073-022-01096-w

#### Media enquiries:

##### Michelle Blowes

University of Sydney, Australia

M: +61 478 303 173

E: [michelle.blowes@sydney.edu.au](mailto:michelle.blowes@sydney.edu.au)

##### Ivy Shih

University of Sydney, Australia

M : +61 439 160 475

E : [ivy.shih@sydney.edu.au](mailto:ivy.shih@sydney.edu.au)

##### Prim Gower

University of Pretoria, South Africa

P: 083 229 9011

E: [Primarashni.gower@up.ac.za](mailto:Primarashni.gower@up.ac.za)

---

#### About University of Sydney, Australia

As Australia's first university – founded in 1850 – the University of Sydney has a proud history of global leadership in education and research and inspiring people from all backgrounds to contribute to positive real-world change. We're a world-renowned teaching and research institution – our research combines the expertise and talents of scholars from many disciplines.

[Learn more](#)

#### About the University of Pretoria, South Africa

The University of Pretoria (UP) is one of the largest contact and residential universities in South Africa, with its administration offices located on the Hatfield Campus, Pretoria. This 114-year-old institution is also the largest producer of research in South Africa.

Spread over seven campuses, it has nine faculties and a business school, the Gordon Institute of Business Science (GIBS). It is the only University in the country with a Faculty of Veterinary Science, which is ranked top in Africa. UP has 120 academic departments and 92 centres and institutes, accommodating more than 56 000 students and offering about 1 100 study programmes.

UP is one of the top five universities in South Africa, according to the 2019-2020 rankings by the Center for World University Rankings. The QS World University Rankings also placed UP among the top 100 universities worldwide in three fields of study (veterinary science, theology, and law), and UP is in the top 1% in eight fields of study (agricultural sciences, clinical medicine, engineering, environment/ecology,

immunology, microbiology, plant and animal sciences and social sciences), according to the Web of Science Essential Indicators.

For more information, go to [www.up.ac.za](http://www.up.ac.za)