



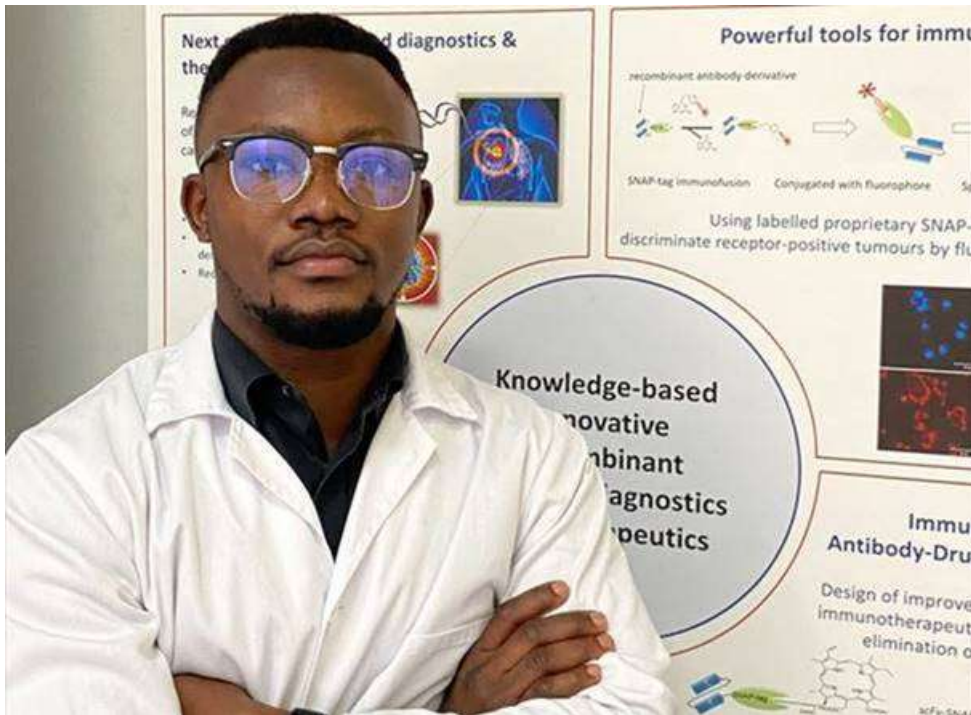
Communication and Marketing Department
Isebe loThungelwano neNtengiso
Kommunikasie en Bemerkingsdepartement

Private Bag X3, Rondebosch 7701, South Africa
Welgelegen House, Chapel Road Extension, Rosebank, Cape Town
Tel: +27 (0) 21 650 5427/5428/5674 Fax: +27 (0) 21 650 5628

www.uct.ac.za

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UCT Health Sciences student only African recipient of Google Fellowship in subfield



Dennis Dogbey

Photo: Emmanuel Fajemisin

PhD student Dennis Dogbey, from the Medical Biotechnology and Immunotherapy Research Unit at the University of Cape Town's (UCT) Institute of Infectious Disease and Molecular Medicine based at the Faculty of Health Sciences was recently awarded a 2021 Africa PhD Google Fellowship for Human-Computer Interactions – as this year's only African recipient in this subfield.

Viral vectors are molecular tools used by scientists to deliver genetic material into cells. They have been used successfully for the treatment of many hereditary diseases and show great promise for the development of future anti-cancer therapies. Though about four viral vector-based gene therapies have been approved for use in patients, with several hundred currently being tested in clinical trials, various technological hurdles must be overcome to realise the full extent of their clinical impact.

One of the main bottlenecks with the use of viral vectors, especially in the context of cancer gene therapy, is how to selectively deliver these vectors into target tissue and organs in the body. Due to their relatively small size and natural ability to transfer genetic material between cells in more than one tissue, the targeted systemic delivery of viral vectors to distant organs is currently impossible.

In Dogbey's project, the surface of viral vectors will be decorated with disease-specific antibodies using state-of-the-art computational and protein engineering methods. This novel approach will allow selective delivery of viral vectors to identified diseased cell populations. When used for cancer gene therapy, these viral vectors will allow the targeted delivery of toxic anti-cancer genes into tumour cells without harming normal cells.

Dogbey explained: "Certain cancer types continue to be a significant burden – especially in Africa, where treatment is done through conventional strategies like chemotherapy, surgery, and radiation therapy. These often cause severe negative effects and can make the patient resistant to the treatment.

"Our aim is to integrate commonly used viral vectors to develop a targeted drug-delivery system, based on a knowledge-driven and innovative approach."

According to Dogbey, this line of research is particularly challenging because of several shortfalls that are associated with the modification of most viral vectors. For example, previous work has shown that the biology of most viral vectors can easily be compromised by the insertion of foreign structural sequences into the viral genome. In other instances, modification of viral vectors with antibodies can result in very low viral titres (yields) during production, resulting in insufficient quantities for preclinical or clinical testing.

"The deliverables from this project will include a portfolio of antibody-based targeted gene delivery vectors engineered to make an impact in the cancer gene therapy landscape," said Dogbey.

The Google Fellowship is offered in Africa, Australia, Canada, East Asia, Europe, India, New Zealand, South-east Asia and the United States. Five other fellowships were awarded in Africa under different subfields.

According to the fellowship mandate, the award is designed to directly support graduate students as they pursue their PhDs, as well as to connect them to a Google Research Mentor to nurture and maintain strong relations with the academic community.

The fellowship was created to recognise exceptional graduate students conducting cutting-edge and innovative research in areas relevant to computer science and related fields, who also hold an ambition to influence the future of technology.

ENDS

Issued by: UCT Communication and Marketing Department

Ridovhona Mbulaheni

Media Liaison Assistant
Communication and Marketing Department
University of Cape Town
Rondebosch
Tel: (021) 650 2333

Cell: (064) 905 3807
Email: ridovhona.mbulaheni@uct.ac.za
Website: www.uct.ac.za