

Clive Gray



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The Director of Immunopaedia, Clive Gray, winner of the [2023 Harry Oppenheimer Fellowship](#) was presented with the award in July 2024. He will use the fellowship to investigate events in the placenta related to angiogenesis and identify a biomarker that can predict premature birth as well as understand how the placenta functions to ensure the health and well-being of both infant and mother. Professor Gray currently heads the Reproductive Immunology Research Consortium in Africa (RIRCA) at Stellenbosch University. This is a consortium of immunologists and paediatricians conducting research into markers and mechanisms of poor birth and perinatal outcomes,

with a focus on children who are born to mothers with HIV and other infectious diseases.

“Professor Gray’s research has the potential to revolutionise our understanding of how the human placenta functions and, from that, uncover new pathways to improving mother-child health. We are excited to watch this story unfold, as we have witnessed the stories of previous Harry Oppenheimer Fellows change the game in fields from biochemistry and biology to engineering, history, and zoology to mention a few” says Oppenheimer Memorial Trust (OMT) chair Rebecca Oppenheimer. [1]

Clive holds the position of Professor of Immunology at Stellenbosch University and is an Emeritus Professor at the University of Cape Town. He is the Chair of the International Union of Immunological Societies (IUIS) Education Committee which oversees immunology courses run in low-to-middle income countries. **Most importantly, Clive is the founder and Director of Immunopaedia – see his [previous interview](#).**

“Gray’s seminal research in HIV immunology represents a pinnacle of scientific accomplishment on the African continent, offering a beacon of hope for mothers and children impacted by HIV. The prestigious Harry Oppenheimer Fellowship Award conferred upon Gray stands as validation of the substantive contributions he has made to the field of HIV science over the course of his distinguished career,” said Stellenbosch University Faculty of Medicine and Health Sciences dean Professor Elmi Muller. [2]

Clive also leads the NIH-funded D43 consortium “Next generation training in HIV Research: Immunity in the First 1000 days in mother-infant dyads (TIGRIS).” This consortium aims to enhance training in reproductive immunology and HIV for investigators and educators across Africa, North America, and Europe – [SU awarded R28 million grant to investigate](#). He is also one of the partners of the [BRAINS](#) consortium, a

mobility programme aiming to enhance scientific enquiry within the African continent.

How does receiving the Harry Oppenheimer Fellowship Award impact your research?

“Receiving this award is very meaningful. It’s recognition of the work that I and my research group have been doing over many years. That OMT acknowledges the importance of what we do is very gratifying and rewarding.” [1]

How will the R2.5-million grant accompanying the fellowship be used?

We need to know how diseases such HIV in pregnant women interferes with the growth of the placenta and how this, in turn, impacts adverse birth outcomes and disrupts maternal health. These adverse outcomes have a devastating effect on South African society, where impaired child and maternal health is linked with deprived early childhood development. The funds will go towards using imaging technology and spectral flow cytometry to identify the cellular composition of the placenta in minute detail.

One of the main areas we will focus on is the link between long-term antiretroviral treatment and premature birth. Our research group has identified an immune molecule in the placenta that is responsible for poor placental blood vessel formation and potentially related to poor heart problems in the mother. The Harry Oppenheimer award will help us establish and validate this hypothesis.

Please briefly explain the research that led to receiving the Harry Oppenheimer Fellowship Award.

While antiretroviral (ARV) treatment given to mothers with HIV has been successful in preventing viral transmission from mother to child, many challenges remain.

A lot of the babies born to HIV+ mothers on ARV are not as healthy as their counterparts who are born to uninfected mothers. These babies often suffer from stunted growth, viral and bacterial infections and some are born prematurely.

Our research team is investigating whether ARV drugs play a role in these outcomes, or whether these conditions are related to a combination of their mother's HIV status and the effects of the medication.

We have found that women living with HIV who initiate ARV drug treatment before they become pregnant have a condition known as maternal vascular malperfusion – poor placental blood vessel development.

This condition elevates these mothers' risk of a premature birth and of their infants being of low birth weight. Generally, the mothers also suffer high blood pressure that can lead to increased risk of cardiovascular difficulties leading to major heart problems.

The molecule we have found is responsible for poor placental blood vessel formation and is potentially related to cardiovascular health in the mother. The novelty of this award is that we will link events in the placenta with maternal health postnatally.

How do you envision your research influencing public health policies in South Africa?

We need to find out how diseases, such as HIV, in pregnant women interfere with the growth of the placenta and how this impacts adverse birth outcomes and disrupts maternal health.

These adverse outcomes have a devastating effect on South African and global society.

What is the Reproductive Immunology Research Consortium in Africa (RIRCA)?

RIRCA is a research group that I formed 3 years ago at the Biomedical Research Institute on the Tygerberg campus, Stellenbosch University. We perform laboratory investigations into the placenta and we work very closely with the Department of Obstetrics and Gynaecology at Tygerberg Hospital. We also work in the community, notably in Khayelitsha, where we collect placentae from pregnant people living with HIV and uninfected mums, giving birth to healthy babies. We aim to understand what happens in the placenta when exposed to HIV and antiretroviral drugs and attempt to link events in the mother with immune events in the placenta. We think that if events in the placenta go wrong, then this sets the scene for poor birth outcomes and poor health in infancy. If we can find what goes wrong, we can then identify a predictive biomarker, but also it lays a foundation for identifying an intervention.

How do you plan to train the next generation of scientific leaders?

A large focus of RIRCA is capacity-building of South Africa's scientific research community, through the involvement of master's, doctoral students, MD-qualified personnel and post-doctoral fellows. I have a long history of training going back for almost 30 years. I am currently using the BRAINS mobility program, the D43 TIGRIS training grant and other funded research grants to train the next generation of scientific leaders, while building a greater capacity to improve mother and child health.

How do you envision the Immunopaedia Foundation contributing to education and community outreach?

I started Immunopaedia as a small project 20 years ago after I won the International Leadership Award from the Elizabeth Glaser Pediatric AIDS Foundation. It was originally designed to educate paediatricians through case studies around the immunological aetiology behind an HIV-related presenting condition. We have since grown and is now the official on-line

learning site of the International Union of Immunology Societies (IUIS) and we have trained over 1000 young scholars in immunology through various courses over the past 10 years. These are in-person courses where Immunopaedia is used as pre-course immunology learning. There are also thousands of new users per month to the site and through this, we help many researchers, students and teachers understand the complexities of the immune system.

What message would you like to convey to young researchers aspiring to have influence in the field of immunology?

Immunology is a fast moving field and can be daunting to get to grips with all the terms and nomenclature. The best way to understand immunology is by doing a research project and attaching yourself to a dynamic group so you can learn from your peers and a good mentor. Reading the literature and understanding current thinking is also key, going to meetings and building up a network of fellow immunologists. Immerse yourself and never give up – persistence and a willingness to learn are key ingredients.

Interview by Bonamy (Bon) Holtak

Sources:

1. News – Prof Clive Gray receives prestigious Harry..., <https://www.sun.ac.za/english/Lists/news/DispForm.aspx?ID=10723>.
2. Harry Oppenheimer Fellowship Award recognises vital HIV research of ..., <https://www.engineeringnews.co.za/article/harry-oppenheimer-fellowship-award-recognises-vital-hiv-research-of-stellenbosch-immunologist-2024-07-04>.