

NEWS FROM:



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UCT PhD research advances understanding of TB

Tuberculosis remains a significant cause of morbidity and mortality in countries with high HIV prevalence, such as South Africa. Three PhD candidates devoted their PhD research to studying different aspects of TB treatment and immunity responses. Two of these studies looked specifically at TB in relation to HIV-infected patients. The graduands described here will receive their degrees on Thursday, 9 June 2011 at 15h00.

Keren Middelkoop's thesis, *The effect of HIV and an antiretroviral treatment programme on tuberculosis transmission, incidence and prevalence in a South African township*, describes the epidemiology of TB in a high HIV- and TB-prevalent community from 1997 to 2008, and assesses the effect of HIV and its treatment on the TB epidemic in this setting. The study community was a typical South African township, with substantial burdens of both TB and HIV disease. Data were drawn from a number of sources, including population surveys, TB notification registers, and HIV and highly active anti-retroviral therapy databases. The risk factors associated with TB transmission to children on residential plots were analysed using adult and childhood TB cases extracted from the community TB notification register and tuberculin survey results. Molecular epidemiology and geographic information systems were used to investigate TB transmission between adults, as well as the interaction between the HIV-associated and HIV-unassociated TB epidemics.

Middelkoop obtained her MBCHB degree from UCT. She has been a Senior Investigator and Research Fellow at the Desmond Tutu HIV Centre in the Institute of Infectious Disease and Molecular Medicine and was awarded a Clinical Infectious Diseases Research Initiative Grant in 2011. She has co-authored many scientific publications, presented at international conferences and been the primary author of eight scientific papers during her PhD studies. Her supervisor is Professor Robin Wood of the Medicine Department. She will receive her PhD in Medicine.

Nontobeko Tena-Coki's thesis, *Investigations of mycobacteria-specific memory/effector T cell responses in HIV-infected children receiving antiretroviral therapy (ART)*, examines the

effects of anti-retroviral therapy (ART) on the development of immune responses to antigens which could be contained in new anti-TB vaccines. The antigens used in the laboratory tests were shown to induce strong immune responses in all groups of children, whether infected with HIV or not. This finding is encouraging news to employ these antigens in improved anti-TB vaccines for children in the future. The level of responses is weaker in HIV-infected children than in those who are not HIV-infected. Tena-Coki shows that the degree of responsiveness to the antigens in children with HIV is directly correlated with their general T-cell immune function, measured by CD4 T cell count, but not with antigen-specific T cell responses. She hypothesised that the numbers and qualitative function of such antigen-specific T cells might be enhanced through ART, and she followed this group of children for 12 months, measuring the immune responses every three months. As expected, the introduction of ART led to enhanced CD4 T cell counts, but not to increased antigen-specific responses, since most changes were seen in the non-antigen specific T cell populations. Her experiments did however show an increased ability to contain mycobacteria in an *in vitro* model, which she also employed in the laboratory to simulate the natural infection. Her citation said: "[Tena-Coki's] project contributes to our detailed understanding of T cell responses in children in the context of mycobacterial infection."

Tena-Coki obtained an MSc from UCT. She has been conducting work for her PhD thesis at UCT since 2006, as part of a Wellcome Trust funded project in collaboration with Imperial College, London, UK, where she is a visiting scientist. Tena-Coki's co-supervisors at UCT are Professor Willem Hanekom of the Institute of Infectious Disease and Molecular Medicine, and Dr Thomas Scriba of the South African Vaccine Tuberculosis Initiative. Tena-Coki will receive her PhD degree in Clinical Science and Immunology.

Nasiema Allie's thesis, *The role of cell specific tumour necrosis factor in the host's immune response against Mycobacterium tuberculosis infection*, contributes significant new knowledge about the human body's immune function reaction to the Mycobacterium tuberculosis. Her work carefully dissects how tumour necrosis factor (TNF) from innate immune cells such as macrophages, neutrophils and adaptive immune lymphocytic T-cells cooperate to provide optimum protection during immune protection. (According to the *Britannica Online Encyclopedia*, TNF is a naturally occurring protein that is produced in the human body by phagocytic cells known as macrophages. (The latter can engulf and destroy bacteria, viruses, and other foreign substances.) Her citation said: "On several fronts [Allie's] results are novel and include findings that contradict current existing accepted dogma, particularly with respect to the relative importance of TNF generated from phagocytic cells against Mycobacterium tuberculosis during initial innate immune responses."

Allie obtained BSc and a BSc (Med) (Hons) in Medicine from UCT. She joined the Division of Immunology at the UCT in 1998 as a member of staff and thereafter seized the opportunity to further her studies. Her accreditation with first and co-authorship of several publications over the years is testament to her invaluable contribution to the teaching and research activities of the division over the years. Her supervisor is Associate Professor Muazzam Jacobs of the Institute of Infectious Diseases and Molecular Medicine. She will receive a PhD in Clinical Science & Immunology.

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