



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 professor wins prestigious award to tackle TB



Associate Professor Suraj Parihar

Photo: Supplied

Associate Professor Suraj Parihar from the University of Cape Town's (UCT) Department of Pathology, who is also a member of the Institute for Infectious Diseases and Molecular Medicine (IDM), has been awarded a National Institutes of Health (NIH) Emerging Global Leader Award to build capacity in immune-metabolic and immune-genetic research at the university.

"This prestigious award is offered to early career scientists from low- or middle-income countries and is aimed at providing intensive, mentored research career development experience. Parihar is one of only seven UCT researchers to receive this accolade in the past five years," said Dr Rob Huddy of UCT's Faculty of Health Sciences (FHS) Research Development team.

Countries in the Global South face a disproportionate burden of global health challenges such as HIV, TB, and Type 2 diabetes. However, the sophisticated scientific skills and equipment needed to tackle these diseases effectively tend to be concentrated in the Global

North. Both TB and Type 2 diabetes are leading causes of death in South Africa, and commonly co-occur. Furthermore, Type 2 diabetes increases the risk of developing TB.

Parihar's research, for which he received the NIH award, seeks to understand TB-diabetes co-morbidity better, using an immune-genetics and immune-metabolism approach. This work will bring new research skills and techniques to UCT and build capacity for a new research specialisation.

Identifying genetic factors for TB infection

Critical to Parihar's work is identifying genetic factors linked to individuals developing TB symptoms.

"Most people living in low-and middle-income countries (LMICs) will be exposed to TB at some point in their lives," says Parihar. "But only 5-10% of people exposed get sick. Particularly those with weaker immune systems resulting from HIV infection. This means that there is something in the immune system of the rest of us that can control this disease."

Through findings of previous studies, Parihar believes the answer lies in a specific gene pathway that affects the function of macrophages in the body. Macrophages are specialised blood cells that fight against bacterial invasion, detecting and destroying them through inflammation. Parihar and his colleagues believe they have identified a gene pathway that reduces the inflammatory response to TB bacteria, making the body unable to clear the infection and subsequent inflammation.

"Through our previous research, we looked at the status of this gene pathway in TB patients, as well as patients with a TB-diabetes comorbidity," said Parihar. "We found that the expression of this gene pathway is increased in TB patients, but when those patients are put on therapy, the expression of that gene pathway drops, suggesting the pathway may be associated with the survival of TB."

The research, funded through this NIH award comprises three parts. The first is to measure the status of the gene pathway in the patient samples to identify how the expression of the pathway differs between patients with TB only, those with diabetes only, and those living with both. This step also measures to what extent the gene influences the functions of the macrophages in how they react to TB. This work will be done in collaboration with, and under the mentorship of, Professor David Russel at the Department of Microbiology and Immunology at Cornell University in New York. Professor Russel is a pioneer in understanding the immuno-metabolic aspects of macrophages in TB infections.

The second part of the project looks at whether any mutation in the gene can influence the outcome of the disease in patients, whether it makes it more susceptible or resistant to the progression of TB and/or diabetes in the co-morbidity setting. This work will be done in collaboration with a world leader in genetic research in TB, Professor Thomas Hawn, who is in the Department of Medicine at the University of Washington in Seattle. The idea is to disrupt the gene in question and look for what if any, immune responses take place in the macrophages.

If all goes well and the findings are positive, the third aspect of the research would be to use a gene inhibitor already in the clinical trials and begin trialing this as a potential treatment for TB.

Building capacity in Africa

The key to this NIH Award is to build capacity in Africa. This means that rather than the complex science being done in the United States, where the skills and the equipment already exist, it will be done by Parihar and his team at UCT under the mentorship of Professors Russel and Hawn. Parihar has procured the necessary equipment through UCT's University Equipment Committee Grant and will travel with his students to the USA for additional training. This will ensure that the equipment is used to its full potential and that the skills learned are returned to the IDM.

As part of this mentored career development award, Parihar will also be supported by a UCT-based mentor, Professor Robert J Wilkinson, director of the Wellcome Centre for Infectious Diseases Research in Africa.

This award is an excellent opportunity for Parihar to carve out his own research niche in the IDM.

"Nobody at the IDM is currently working on immuno-genetics or immuno-metabolism. Through this award, I am going to be able to build my own research identity, advancing my research career, and training students and colleagues in the use of these new research skills," he said.

ENDS

Issued by: UCT Communication and Marketing Department

Sisi Qavane

Media Liaison & Monitoring Graduate Intern
Communication and Marketing Department
University of Cape Town
Rondebosch
Cell: (060) 565 6017
Email: Sisi.Qavane@uct.ac.za
Website: www.uct.ac.za