



Eijkman Medal 2017

About Teun Bousema

Teun Bousema (1977; Woudsend, The Netherlands) has a diploma in Biomedical Sciences with a specialisation in infectious disease epidemiology. After working in Mbita, western Kenya, he defended his PhD thesis on the effects of drugs and immunity on the transmission of *P. falciparum* in 2007. Subsequently, he worked in Moshi, Tanzania, as post-doctoral epidemiologist on research and capacity building projects. In 2008, Teun joined the London School of Hygiene & Tropical Medicine and is now an honorary senior lecturer at this institute. Since 2012, he is a member of the Radboud

Institute for Health Sciences at Radboudumc where his team works on understanding and targeting malaria transmission. Concurrently, he aims to contribute to evidence-based malaria control at Médecins Sans Frontières (MSF). In 2013, Teun joined the prestigious Young Academy of the Royal Netherlands Academy of Arts and Sciences.



Teun Bousema during a mosquito feeding workshop in Cameroon

Malaria as public health problem

Malaria continues to be the most important parasitic disease with ~ 212 million cases and over 500,000 deaths annually. Since 2010, the burden of malaria has decreased by an estimated 21% and a growing number of countries are embarking on ambitious malaria elimination programmes. Recent achievements in malaria control are threatened by the development and recent spread of drug-resistant malaria and resistance of malaria-transmitting Anopheles mosquitoes to insecticides. Both the containment of drug-resistant malaria and worldwide efforts to eliminate malaria depend on a solid understanding of malaria transmission and transmission-reducing interventions.

Understanding and preventing the transmission of malaria

The transmission of malaria starts with the production of specialised malaria transmission stages (gametocytes) that are taken up by blood-feeding Anopheles mosquitoes. Teun has played an important role in understanding the production and infectivity of gametocytes in natural malaria infections. He pioneered the application of sensitive RNA-based diagnostics to quantify gametocyte production and maturation in symptomatic and asymptomatic malaria infections and is one of the world-leading experts on assessing natural infectivity to mosquitoes. His work demonstrated that very low densities of *P. falciparum* gametocytes can result in successful mosquito infections. His work in several African settings uncovered that relying on microscopy or rapid diagnostic tests is inappropriate when aiming to identify all individuals who contribute to onward malaria transmission to mosquitoes. Teun's recent work demonstrated that whilst individuals may remain infectious to mosquitoes for several weeks after antimalarial treatment, the use of low dose primaquine can render patients non-infectious within 48 hours. In a parallel line of research, he demonstrated that antimalarials can be safely combined with the mosquitocidal compound ivermectin to minimize transmission potential. Teun is currently testing operational strategies to better implement these interventions for malaria elimination.



An *Anopheles* mosquito takes a blood meal in an experimental membrane feeding assay



Stichting Het Eijkman Medaille Fonds

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About Martin Grobusch

Martin Peter Grobusch (*1964, Oberhausen/Germany) is an internist/infectious diseases/tropical medicine specialist. Following civil service and medical studies in Germany and specialisation and sub-specialisations in the above disciplines mainly in Berlin/Germany and London/UK, he worked for several years as physician-researcher with focus on epidemiological, clinical and control aspects of malaria at the Institute of Tropical Medicine in Tübingen/Germany and the medical research unit (CERMEL) of the Albert Schweitzer Hospital in Lambaréné/Gabon.

Following an Associate Professorship in Tübingen in early 2004, he was appointed Full Professor/Chair of Infectious Diseases and Head of the Infectious Diseases Unit at the Faculty of Health Sciences of the University of the Witwatersrand, Johannesburg, South Africa, in 2005. In 2010, he moved on to the position of Full Professor/Chair of Tropical Medicine and Travel Medicine at the Academic Medical Center (AMC) of the University of Amsterdam, the Netherlands, and Head of the AMC's Tropencentrum. Martin is Visiting Professor at the University of Tübingen/Germany; Adjunct Member and Professor at the Institute of Infectious Diseases and Molecular Medicine of the University of Cape Town/South Africa; Clinical Work Group Leader at CERMEL in Lambaréné/Gabon; and Director of the recently-founded Lion Heart Medical Research Unit in Yele/Sierra Leone.

Linking teaching, research and clinical care in Infectious Diseases and Tropical Medicine

Considering the task of a Professor in Tropical and Travel Medicine as to represent the broad spectrum of the discipline, Martin considers the three main elements of academic work, teaching, research and clinical care as closely intertwined with each other.

The mainstay of his and his team's clinical work lies with the Tropencentrum, where considerable numbers of travellers are seeking advice, vaccines and prophylactics for disease prevention, as well as in caring for travellers who return ill. Of increasing research interest in the Netherlands is the complex care for immune-compromised travellers, and vaccination immunology questions in the immune-compromised patient in general.

With his senior team members, a large group of Bachelor, Master and particularly PhD students (currently more than two dozen; half from outside Europe, mostly from across sub-Saharan Africa; half from Europe, mainly the Netherlands), clinical (often with interdisciplinary elements) tropical research topics are pursued in locations in South America, Asia but mainly sub-Saharan Africa. Key research activities are in the area of malaria (control optimization tool development such as ITPI, post ACT era drug development, novel flow-cytometric in vivo resistance tests), tuberculosis (MDR-TB diagnosis in paediatric patients, M/XDR-TB drug development and treatment optimization) and HIV (complexity of co-infections); the list includes arboviral (e.g. Zika epidemiology and arboviral outbreak geosatellite mapping), viral-haemorrhagic (Ebola clinical care and vaccine development) and helminthic infections (e.g. hookworm vaccine development) but also expands to other infectious diseases as encountered at the Tropencentrum and as of considerable global public health concern (e.g. leptospirosis epidemiology in Africa).

Teaching activities reach from having been the Director of South Africa's DTM&H course, and having led the design and implementation of South Africa's Infectious Diseases Fellows Programme; and, to date, training undergraduates and postgraduates in clinical infectious diseases and tropical medicine, including the 'tropenartsen in opleiding' at the KIT.

Martin is Fellow of the Royal College of Physicians in London/UK and ECCMID Fellow, has published broadly across the field, is Chair of the Research Committees of the International Society of Travel Medicine (ISTM) and since recently also of the NVTG. He is member of a number of Editorial Boards, serves on various Infectious Diseases and Tropical Medicine related committees, contributes to several African-European tropical medicine research consortia devoted to capacity building and - above all - enjoys life with his wife and children.

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