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Tropical Medicine at the University of Tübingen

In 1956 the Institute of Tropical Medicine of the University of Tübingen was founded. Created as a small institute in post-war Germany, it has become a leading institution in its field in the German speaking countries and beyond within the last decade. After a long time of local separation of the institute's clinical department and the research laboratories, the institute was recently reunified in one building in the centre of Tübingen.

The institute has the mandate to cover research, clinical duties in treatment and prophylaxis as well as training and education for students and postgraduates in the areas of tropical medicine, human parasitology and travel medicine.

The main and most longstanding collaborations within Europe exist with the Division of Infectious Diseases and Tropical Medicine at the University Clinics in Vienna, the Division of Infectious Diseases at the St. George's Medical School in London and the Department of Parasitology at the University of Leiden. In Africa the main partner is the Albert Schweitzer Hospital in Lambaréné [1] and additionally, the University of Libreville, Gabon [2] and the Regional Hospital in Sokode, Togo [3].

In the following lines I would like to highlight a few scientific achievements of our institute in the last years in the field of malaria research, mainly in interventional studies and parasites and allergy.

Our group developed quinine-clindamycin as an *ad-hoc* combination therapy for *Plasmodium falciparum* malaria [4–6]. It is used today in several European countries as a therapy of choice for inpatient malaria.

The key studies in the clinical development of atovaquone-proguanil for therapy [7, 8] and prophylaxis [9, 10] were performed by our group. By us tafenoquine was first shown to be a very potent chemoprophylaxis against malaria [11]. The development of tafenoquine as a chemoprophylactic drug was temporarily stopped by the company due to safety concerns from preclinical trials, however, the clinical studies with this promising drug have been taken up again.

We also coordinated the phase III WHO sponsored trial for the development of amodiaquine-artesunate, the first artemisinin based antimalarial combination for Africa [12], which became the recommended therapy for malaria in children in most African countries subsequently. We highlighted at the same time the safety issues surrounding malaria therapy with chlorproguanil-dapsone [13, 14].

Fosmidomycin-Clindamycin have been developed clinically, successfully by us throughout from the beginning to the end of phase II clinical trials, where we stand today [15–19].

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Our groups in Tübingen and Lambaréné were leading a Bill and Melinda Gates funded consortium together with other academic centres over many years for testing the safety and efficacy of intermittent preventive treatment with sulfadoxine-pyrimethamine in infants against malaria and anaemia [20–22].

Different malaria vaccines are currently tested and we are actively looking into a few of them [23–25].

We have been intiators and co-leaders of the consortium for severe malaria in African children [26], which conducted the biggest trials on severe malaria ever, including more than 26,000 children with severe malaria. There we investigated different prognostic markers for death [27] and finally developed via a simplified organ dysfunction score [28], the very simple and highly predictive Lambaréné organ dysfunction score consisting of prostration, coma and deep breathing [29].

In a study called 1/95C we enrolled 100 children with severe malaria and 100 matched controls with mild malaria and investigated them closely over a period of seven years with two visits monthly [30]. Malaria severity and frequency of malarial attacks in individual cases were analysed in relation to immunological and genetic host and parasitic factors as well as environmental factors.

Among others polymorphisms in the genes of nitric oxide synthase 2 [31, 32], mannose binding lectin [33, 34], NADPH oxidase [35] and in several genes relevant for erythrocytes [36–38] were found to be associated with protection against malaria. In addition, oxygen radical production and interferon gamma production were also shown to be beneficial against malaria [39, 40].

In a series of studies in Gabon we were able to demonstrate the inhibitory influence of parasitic infections on the development of atopic reactions and allergy [41–45] as well as on the immunogenicity of vaccines [46].

This supplement appears for the reunification of our institute. Scientific group leaders present their work in a short report each.

Akim Adegnika is being appointed as one of my codirectors of our research centre in Lambaréné and he is starting a junior group in Tübingen. His research focusses on immunological aspects of parasitic infections [47, 48].

Meral Esen heads a group mainly dealing with clinical vaccine trials [24].

Matthias Frank is continuing our research on var genes of *Plasmodium falciparum* [49–51].

Wolfgang Hoffmann is starting a group looking into immunological and pathological variables of coinfections in animal experiments [52].

Saadou Issifou is my codirector in Lambaréné and leading a series of clinical trials there [53, 54].

Carsten Köhler is my vice-director caring for project management and heading our Baden-Württemberg centre of competence for tropical medicine.

Andrea Kreidenweiss is currently establishing her own group in our institute [55].

Jürgen Kun, my vice-director is leading a group looking into genetic factors of men and parasites influencing the outcome of infectious diseases [32, 56–58].

Bertrand Lell is my longstanding codirector in Lambaréné and has formed the research centre there, as it is today, a world class unit for clinical and basic research in Central Africa [9, 11, 25, 59].

Benjamin Mordmüller is a group leader successfully conducting research both in Tübingen as well as Lambaréné from basic to clinical research [60, 61].

Francine Ntoumi is leading a group in Tübingen and additionally heading the Multilateral Initiative for Malaria as well as the Central African Network of Tuberculosis, AIDS and Malaria [62, 63].

Peter Soboslay is leading a group in Tübingen and heading the research group in Sokode looking into immunological aspects of worm infections [3, 64].

Philipp Zanger is heading a recently created group mainly looking into staphylococcal infections in travellers and in the tropics [65].

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Conflict of interest

The author declares that there is no conflict of interest.

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