

# BERNHARD NOCHT INSTITUTE FOR TROPICAL MEDICINE



SCIENTIFIC REPORT 2016/2017



**EUROPEAN UNION**  
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## INHALT

■ Preface	03
■ Board of Directors, Board of Trustees, & Scientific Advisory Board	13
■ Research	17
■ Of mosquitoes and viruses	19
■ Viral Hemorrhagic Fever	29
■ Neglected Tropical Diseases	41
■ The Hideout of Malaria Parasites	53
■ Immunology	61
■ Methods	69
■ Snapshot	77
■ KCCR - Research in Africa	78
■ Report of the Bundeswehr Department of Tropical Medicine	82
■ Courses	85
■ Facts and Figures	95
■ Staff	99
■ Appendix	109
■ Publications	110
■ Lectures	118
■ Seminars	120
■ Staff Activities	120
■ BNITM in the Media	125
■ Chronicle	126
■ Imprint	134

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# Preface



Foto: Klaus Juerries

Rolf Horstmann

The Chinese would name 2016 and 2017 Year of the Renewable Board, Year of the Sumptuous Review or Year of the Honourable Guest. Indeed, nearly the entire Board of Directors was swapped. It started with business administration early in 2016. After ten years at the institute, Udo Gawenda returned to the Hamburg finance authority. As his successor, we were lucky to acquire Birgit Müller from the Faculty of Medicine of Hamburg University, a woman on Board at last. Birgit joined us in February, in the middle of a extensive audit. She took up the challenges and assumed responsibility from day one, familiarized herself with the topic literally overnight and provided invaluable help.

The next change followed by the end of 2016 when Bernhard Fleischer retired. Being the director from 1998 to 2007, he had successfully consolidated the institute after an occasionally turbulent era of reorganisation by Hans Müller-Eberhard. During Bernhard's term, the institute could celebrate internationally acknowledged scientific achievements like the identification of the SARS coronavirus and the discovery of a previously unrecognized stage of malaria parasites,

thereby substantially advancing the institute's global reputation. Not the least, he succeeded in attracting funds for the construction of an extension building, which, comprising a new biosafety-level 4 laboratory, a biosafety insectary and a timely animal facility, now provides the institute with excellent infrastructure.

When the medical faculty, upon our request and according to recommendations of the Leibniz evaluation in 2009, changed the denomination of Bernhard's professorship from immunology to epidemiology, it was heard that the institute's immunological research would be seriously weakened. The opposite happened. The existing immunological groups of Minka Breloer (helminth immunology) and Thomas Jacobs (protozoa immunology) received strong additions. By César Muñoz-Fontela, who, with support of the German Center for Infection Research (DZIF), moved to us from the Heinrich Pette Institute (HPI). His group focuses on the immune response to haemorrhagic-fever viruses and thereby sensibly complements both our immunological and virological groups. And by Hanna Lotter, who has gradually shifted from molecular parasitology to molecular immunology

in recent years and will be equipped with an own research group from 2018 on. An addition of the special kind was Marylyn Addo, who joined us with her group of the University Medical Center (UKE), thereby establishing an all clinically oriented immunological research and, by the way, opening up a new dimension of our cooperation with the UKE.

More or less vice versa, Tim Gilberger and nearly his entire department moved to the Centre for Structural Systems Biology (CSSB), which had started operations on the campus of the German Electron Synchrotron some months before. The department is jointly funded by BNITM and Hamburg University, and its move to CSSB will greatly strengthen our cooperation with the natural-sciences faculty.

The newly established W3 professorship for epidemiology was awarded to Jürgen May. Following an international call, he was selected as the prime and sole candidate with great support from the external members of the search committee, regardless of being an internal appointment – an extraordinary distinction of his scientific record

and personality. Being the representative of epidemiology in the tropics, which is of significant relevance to global health research, Jürgen henceforth bears an eminent responsibility for the institute.

In addition, two new W2 professorships substantially contribute to the epidemiological research of the institute. Both are assigned to the natural-sciences faculty and equipped with research groups in the institute. Esther Schnettler and her group address the molecular immunology of insects and – supported through DZIF – the vector competence of mosquitoes. Thereby, they superbly complement the work of Jonas Schmidt-Chanasit, who was appointed as a W2 professor for arbovirology, studying with his group the ecology and diagnostics of infections which are transmitted by mosquitoes.

Very recently, Michael Ramharter from Vienna has accepted our offer of a W3 professorship for clinical tropical medicine in my succession. He is an experienced infectious-disease clinician with a scientific record in clinical malaria studies in endemic countries, and has been a partner in large

international consortia and a close cooperator of our colleagues from Tübingen. In the University Medical Center, he will assume responsibility for outpatient and inpatient care in tropical medicine while BNITM will provide the resources for a research department. We very much look forward to again host a competent clinician and ambitious clinical scientist and hope that he will successfully represent the institute in international networks performing multi-centre clinical trials, another relevant component of global-health research.

2016, Year of the Sumptuous Review. It began with an audit of our major third-party funded project "Diagnostics in the Tropics" for the development of marketable diagnostic tests. As a public-private partnership with Altona Diagnostics Ltd, the project had been supported by the European Fund for Regional Development 2012-2015. Auditor was the Hamburg Science Ministry, i.e. our supervising authority, which through its auditing department wanted to make sure that a possible assessment by the EU would not raise any complaints. The audit was highly detailed and exceedingly labour intensive. As a result, a considerable number of shortcomings were identified, mostly related to time

sheets of part-time staff assigned to the project. All mistakes have been corrected before submitting the final report and closing the budget. And we completed a crash course in betterment prohibition, contract law and job descriptions. Then pure praise by the State Accounting Office. It critically reviewed the fees we request from attendees of our training courses. All fees were considered appropriate, without any comments – a true honour in such cases, insiders say.

Finally, in autumn 2016, the comprehensive evaluation of the institute by the Leibniz Association. As usual, several staff members were busy for months to provide the requested statistics, to write reports and collect documents. The Review Board assessed the performance of our 15 departments and research groups with an average grade of "very good". The crucial result was, however, that the Board recommended to the federal and state authorities to continue their joint funding of the institute without restrictions. Nevertheless, it was somewhat disappointing that our application for a "Sondertatbestand" (extraordinary matter) requesting a substantial enhancement of the institute's basic funding,

has not been supported for the time being. The application was based on the strategic plan of 2008, which proposed a strengthening of epidemiology and intervention research in the institute. This strategy had been evaluated very positively in 2009, but has so far not been reflected in any increase in the institute's basic funding. Notwithstanding, epidemiology at the BNITM has been strengthened by extra-mural funds from the DZIF and supported by the appointment of Jürgen May to full professor. In contrast, intervention research could not be implemented due to lack of funds. As a result, the institute may continue to provide essential prerequisites for improving health care by applied laboratory and epidemiological research, but has not been enabled yet to take the next and most relevant step to use the findings for studies on preventive and therapeutic interventions. Unfortunately, the Leibniz Senate followed the recommendation by the Review Board and finally recommended to re-submit an application modified according to the concept of the future BNITM Board. Thus, although in essence supported by all reviews, the ten-year old concept must again wait for some more years.

An ideal site also for intervention research would be the Kumasi Centre for Collaborative Research (KCCR) in Ghana. In October 2017, the term of the State Agreement, which had been filed by the Hamburg Senate and the Ghanaian government for the establishment and operation of KCCR twenty years ago, ended. Already in 2014, we had provided a draft for an amendment of the Agreement, which passed the Ghanaian Ministry of Health a few months later. It took until the summer of 2017 to discuss the draft in the panels and committees of Kwame Nkrumah University in Kumasi before it, with minor modifications, received the university's blessing. Presently, it is being inspected by the office of the Ghanaian parliament while the assessment by the Hamburg authorities has meanwhile been finished. Good that the old Agreement is still valid because none of the contracting parties shows any interest seeing it end.

After years, our efforts to strengthen interdisciplinary infection research in Hamburg's universities seem to be bearing fruit, at least for the time being. The Hamburg Ministry of Science, Research and Equality and Hamburg University have agreed to establish infrastructures and funding

schemes at the University with the aim to develop, together with the local Leibniz institutes BNITM, HPI and the Research Center Borstel, a cluster for infection research in Hamburg. It seems that this effort had received a fresh impetus from a visit of Mayor Olaf Scholz to our institute in October 2016. The Mayor proved to be knowledgeable and interested and had given the visit an amicable and at times humorous atmosphere.

Thereafter, initiated by the Senate's Office and the Hamburg Ministry for Science, we developed, together with colleagues from the natural-sciences faculty, UKE and HPI a concept, which was subsequently adapted by the faculties' Vice-Deans for Research. Finally, the University President himself took on the issue and insisted to design the concept broadly interdisciplinary by including humanities and social sciences right from the start – in the best interest of BNITM. It will be inspiring to see how this endeavour will develop further.

Our relationship with the Hamburg Ministry for Economics began on a journey with State Secretary Dr. Rolf Böisinger to Brazil in November 2016, arranged by our former colleagues at Altona

Diagnostics Ltd. The journey paid off. Using reference samples at the FIOCRUZ institute of Rio de Janeiro, we could show that our new Zika tests are superior to the commercially available tests. More importantly, the Ministry got to know the economic potential of our scientific work and started to become interested. We consider close relations to the industrial economy indispensable in a future-oriented strategy for the institute. Because we expect our public sponsors to increasingly argue that research institutions should market their expertise in a professional manner to offset public budgets as much as possible. This notion is shared by Economics Senator Frank Horch, who showed his appreciation by choosing our institute to host his annual reception of the Hamburg consular corps in 2017.

The same day, the institute was honoured by a particularly illustrious group of visitors. The German Ambassador to the United Nations, Dr. Christoph Heusgen, had invited UN ambassadors of twenty sub-Saharan countries to visit Germany and had BNITM included in the programme. We had met Dr. Heusgen when meeting with Chancellor Merkel during the Ebola crisis in

2014. The visit of the ambassadors was absolutely positive. The African delegates showed great interest in our work, in particular in KCCR and our African projects, and finished the visit with a lively discussion and in best spirits. Later Dr. Heusgen, in a letter of thanks, emphasised that the visit to Germany has resulted in noticeable goodwill on the part of the African partners regarding the campaign of our government for a non-permanent seat in the UN Security Council.

Last but not least, Christos Stylianides, EU Commissioner for Humanitarian Aid and Crisis Management and Ebola co-ordinator of the EU at the time, paid us a visit in December 2017. He was interested in the operation of the European Mobile Laboratories (EMLabs), which, as he noted, had made a great contribution of Europe in the fight against the disastrous Ebola epidemic. For him, he emphasised, it was of outstanding importance that so many European countries had participated. It would show the particular strength of Europe if one succeeds in motivating and mobilising the community. To this end, the BNITM members involved merit a special appreciation, he said. About the same time we signed a contract with the

East African Community on a close cooperation for the establishment and training missions of nine mobile diagnostic laboratories, which will investigate infectious disease outbreaks cross-country in Burundi, Kenya, Rwanda, South Sudan, Tanzania and Uganda. The project is funded with € 10 million by the German Ministry for Economic Cooperation and Development through the German Development Bank.

A close relative of the Ebola virus is Marburg virus, which had been described in 1967, nine years before the discovery of Ebola. Together with colleagues from Marburg, we celebrated the 50th anniversary of its description by a small symposium in November 2017. In the presentations by the two virology veterans a bit of rivalry was still noticeable regarding which side had contributed the essential discovery at the time. Was it the Marburgers, who in an animal experiment had propagated the agent and had raised antibodies. Or the Hamburgers, who by electron microscopy had visualized a virus and had described its characteristic filiform structure, giving the name to the virus family?

Despite all appreciation, the institute is facing one of its greatest challenges in the near future. Our historic structure is crumbling. The main building needs redevelopment, and the prospective expenditures for renovation largely exceed the estimated costs of a new construction. Our proposal to refurbish the main building to merely provide office space and to move the laboratories to a new construction on the grounds of the former hospital building is currently being examined with regard to space requirements, costs, preservation orders, and demolition and building permits.

A possibly even greater challenge is the presently enormous interest for our field of work. During past years, tropical diseases, nowadays more appropriately termed poverty-related or poverty-sustained diseases, have gained further political relevance. After the topic had already been high on the agenda of the G7 summit at Elmau castle, rumours persisted among "commonly well informed circles" that the federal government plans to greatly fund research on global health in the coming parliamentary term. The Federal Ministry of Health installed an international consultancy committee for global health politics. Similarly the Federal Ministry

of Education and Research, which founded a separate administrative unit "Research for Global Health". Finally, working groups and round tables have been forming, drafting project proposals for hundreds of millions of Euros. BNITM cannot but further intensify its committee work. With regard to the relatively small staff level of the institute, it will be difficult to stay in the game without doing so at the expense of science.

Again, we received most valuable support from the members of our Scientific Advisory Board, who made particular efforts to advise us with great competence and engagement, especially for developing the strategic direction of the institute. Likewise, the Board is grateful to all staff of the federal and state authorities who contribute to guiding the institute. Most of all this holds true for State Secretary Dr. Eva Gümbel, the chairperson of our Board of Trustees, who served the interests of the institute with engagement and diligence.

We also thank the Board and all members of the Vereinigung der Freunde des Tropeninstituts (Association of Friends of the Institute), who again successfully acquired donations, performed

laborious sponsor assessments and updated the self-administration of the Association. But once again, the Board of Directors owes the greatest gratitude to all staff members for their continuous and extraordinary achievements, loyalty, and especially, for the great work atmosphere. And we would like to highlight those colleagues who have participated in panels such as the staff council and numerous other committees for their additional dedication.

Now, at the end of 2017, I will complete the generational change in our Board and retire. I'd like to take this opportunity to again express my sincere gratitude for the confidence and support I received for my work from many sides.

Rolf Horstmann



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Members of the Board of Directors 2017 (from left):  
Egbert Tannich, Birgit Müller, Rolf Horstmann

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# Research



## OF MOSQUITOES AND VIRUSES

Recently, alarming news have spread indicating that the amount of insects in Germany declined by 75%. Notwithstanding, insects remain one of the most dangerous sources of infectious diseases, in particular in this country where other routes of transmission have largely been curtailed by elaborate means of infection control. Three years ago, we have launched a biosafety insectary. Sealed by sluice and air shower, we can, for example, infect mosquitoes with viruses without risking that the beasts fly away and cause an outbreak. The investment paid off. Our scientists could answer urgent questions on the risks of an introduction of Zika and

West Nile viruses in the course of their recent transcontinental spreading.

*Figure:* Working at a flow bench in the biosafety insectary of the Institute.



Protective cold

## HARDLY A CHANCE FOR ZIKA VIRUSES

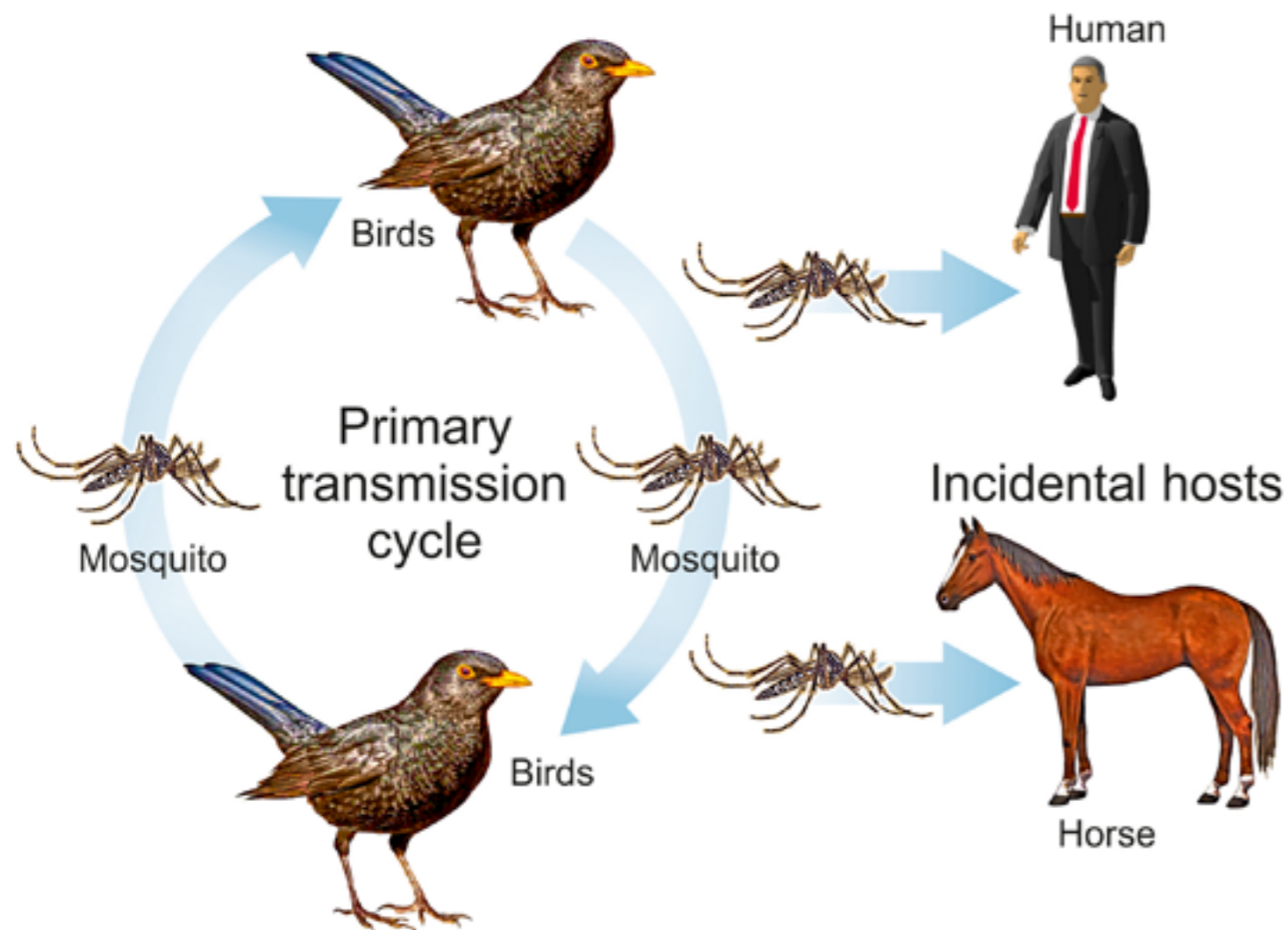
The Zika virus is of global concern since it spread epidemically in Latin America and caused severe birth deformities in pregnancies. In our biosafety insectary, we studied domestic mosquito species (*Culex spp.*) as well as the Asian tiger mosquito (*Aedes albopictus*), which is currently invading Germany from the south, with regard to their competence to transmit Zika viruses. None of the domestic mosquitoes was able to do so and *Aedes albopictus* only at temperatures above 27°C. These high temperatures have to be stable over two to three weeks to allow sufficient virus propagation, this only occurs in extraordinarily hot German summers. Additionally, for causing an outbreak, a person carrying Zika viruses in the blood must enter the country and must be bitten by one of these mosquitoes during such a period – an extremely unlikely event.

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Heitmann A. et al., *Euro Surveill* 2017, 22:pii=30437

Anna Heitmann, Stephanie Jansen, Renke Lühken, Mayke Leggewie, Marlis Badusche, Jonas Schmidt-Chanasit, Egbert Tannich and external co-operation partners (see publication)

*Figure:* Mosquitoes (*Culex pipiens*) in the laboratory feeding on Q-tips that have been soaked in virus-containing blood. Other mosquitoes feed on blood spots on surfaces (see cover), and still others like Anopheles mosquitoes only if they bite through membranes.



Not yet here

### WEST NILE VIRUS GROWS IN THE GERMAN "COMMON HOUSE MOSQUITO"

In the beginning of the century, West Nile virus spread all over North America within a few years and caused an estimated 100,000 disease cases and 1,500 fatalities. The virus is transmitted by mosquitoes, birds are the natural hosts, and it is assumed that migratory birds carry it across countries and continents. In southeast Europe, too, outbreaks are recorded, more recently also single cases in Austria. Germany remained unaffected as yet. Through studies in our biosafety insectary, we found that German domestic mosquitoes, like our "ordinary house mosquito" *Culex pipiens* and its subspecies, can take up and propagate the virus, at least under laboratory conditions. However, none of 300,000 free-living mosquitoes caught in Germany was found to carry the virus. Likewise, none of 2,000 hen's eggs collected in Southwest Germany was found to contain antibodies against the virus indicating that the hens were not infected, and only very few infected wild birds were detected. Obviously, our

migratory birds carry the virus only rarely, and therefore, no humans have been infected in Germany so far.

*Leggewie M. et al., One Health 2016, 2:88-94*

*Börstler J. et al., Trop Med Int Health 2016, 21:687-90*

Mayke Leggewie, Marlis Badusche, Martin Rudolf, Stephanie Jansen, Jessica Börstler, Ralf Krumkamp, Katrin Huber, Jonas Schmidt-Chanasit, Egbert Tannich, Stefanie Becker and external co-operation partners (see publication)

*Figure:* Mosquitoes transmit the West Nile virus to birds and mammals. But only in birds, the virus can multiply to an extent enabling further transmission by mosquitoes. Humans and in particular horses can be infected and fall sick but are a dead end for transmission because the number of viruses in their blood is too low to allow for multiplication in mosquitoes after a blood meal.

Genetic clock

## IMMIGRATION OF THE USUTU VIRUS

Like any other creature, viruses collect mutations in their genomes successively, only faster because, due to their short reproductive cycles, they multiply so rapidly. The mutations mostly have no functional effects but they can be used to construct family or pedigree trees: Related virus isolates carry the same mutations, and additional ones accumulate in subsequent generations. By determining the clock pulse, it even becomes possible to estimate the time points for branching of the pedigree tree. Using this method and together with our cooperation partners, we previously reconstructed the spread of the Ebola virus in West Africa (see Scientific Report 2014/2015, p. 21). Now, we tackled the family tree of the Usutu virus, which wiped out nearly 20% of blackbirds in southwest Germany last year and sporadically also infected humans in Germany. Their family tree shows that they emerged in Africa at least 500 years ago and

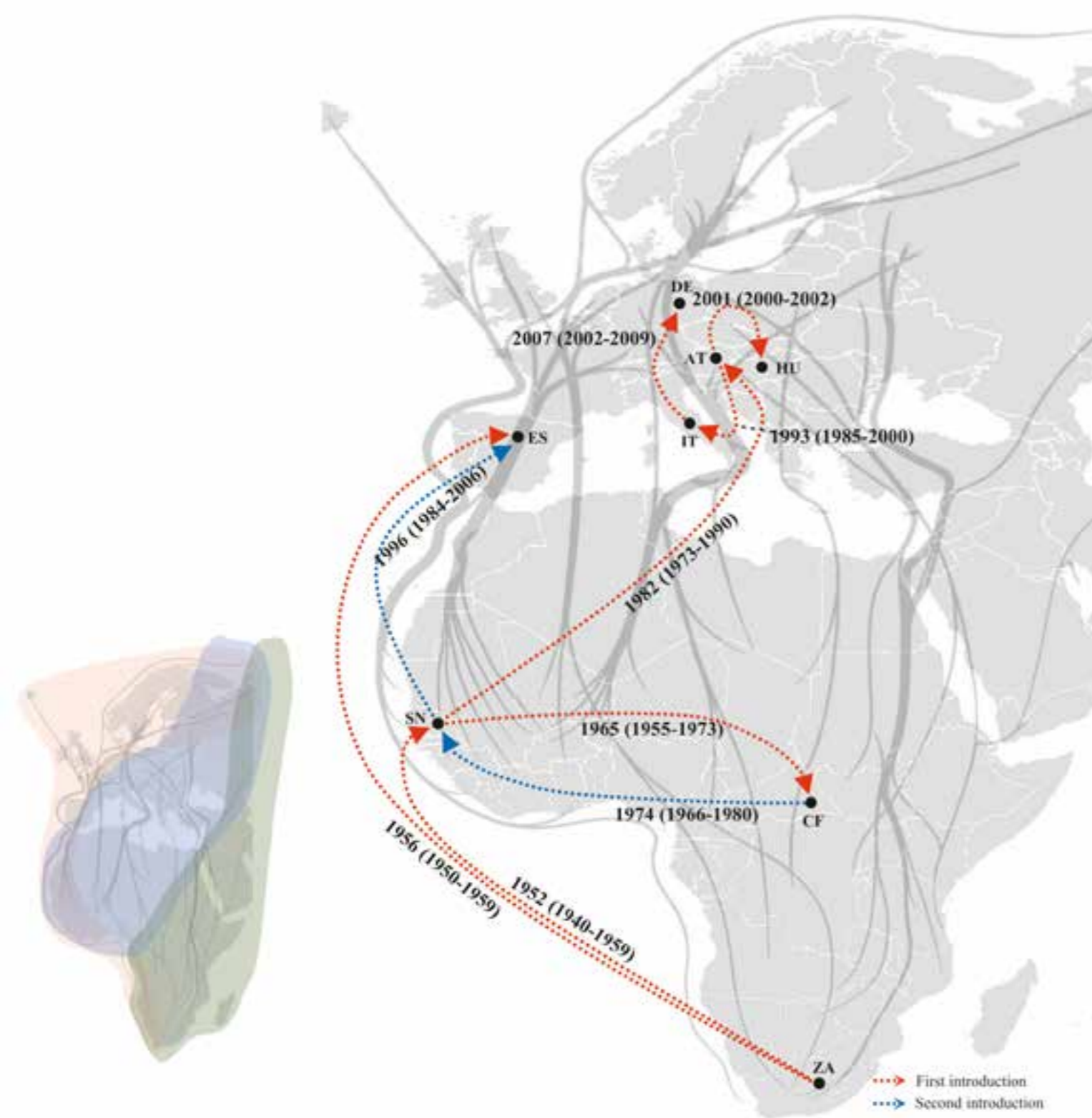
have been introduced into Europe by migratory birds several times in past decades.

*Engel D. et al., MBio 2016, 7:e01938-15*

*Cadar D. et al., Euro Surveill 2017, 22:pii=30452*

Dimitri Engel, Hanna Jöst, Jessica Börstler, Christina Czajka, Renke Lühken, Daniel Cadar, Egbert Tannich, Jonas Schmidt-Chanasit and external co-operation partners (see publication)

*Figure:* Reconstruction of first immigrations of Usutu viruses with migratory birds to Europe. Inset: Corridors of migration routes from migratory birds between Africa and Europe.



## PROTRACTED JOINT INFLAMMATION AFTER ROSS RIVER FEVER



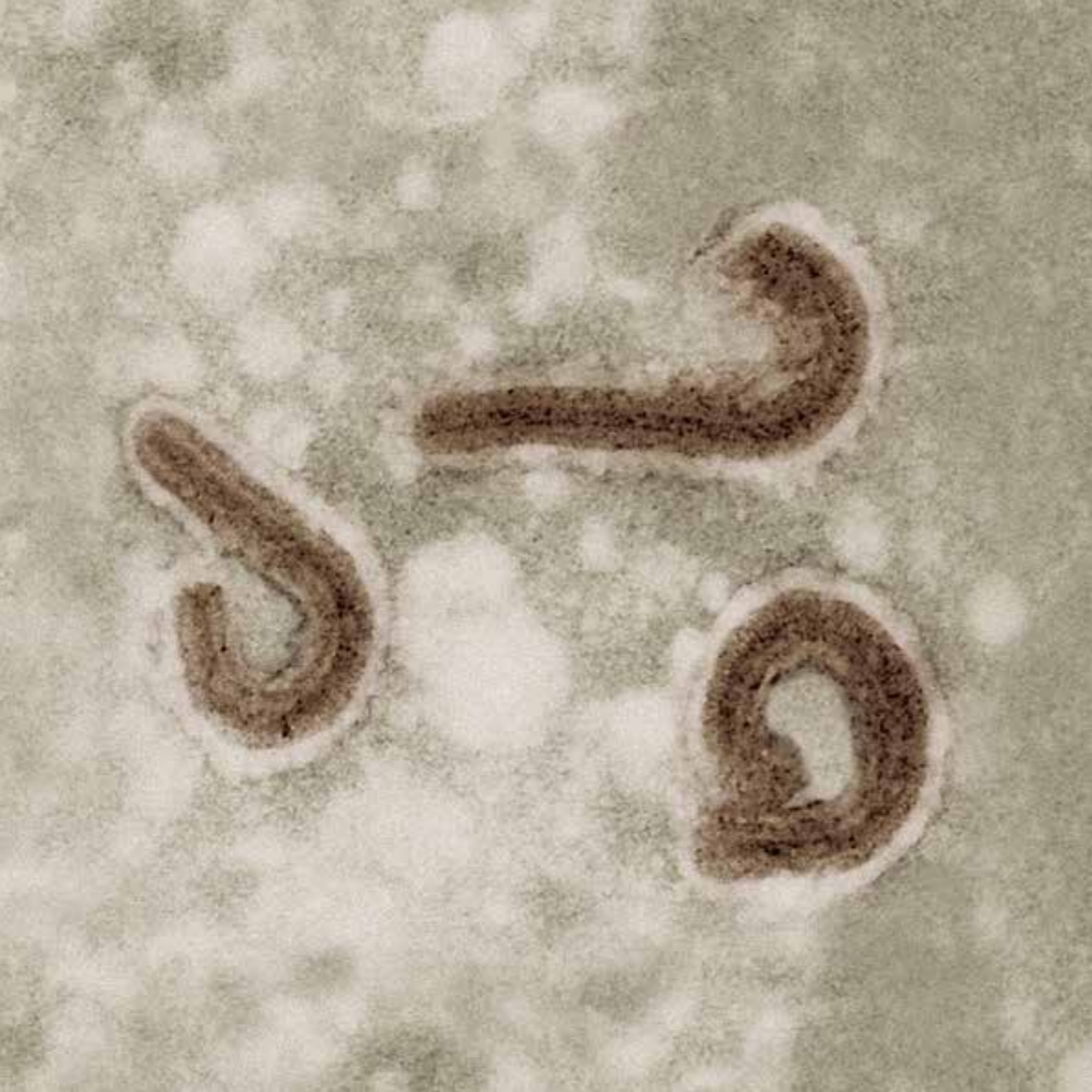
The Ross River virus, endemic in Australia and the Pacific region, is transmitted by mosquitoes. It causes flu-like symptoms, but often also joint inflammation, which may persist over surprisingly long periods and may repeatedly recur over years. In the blood of such patients, we found certain inflammatory proteins (so called cytokines) even prolonged times after the acute infection. They are signs of an uncured and persistent inflammatory reaction, which may even cause a loss of bone substance and subsequent fractures.

*Tappe D. et al., Emerg Infect Dis 2017, 23:702-704*

Dennis Tappe, Stephan Günther, Jonas Schmidt-Chanasit and external co-operation partners (see publication)

*Figure:* Warning sign in an area endemic for infections with the Ross River virus in Australia.





## VIRAL HAEMORRHAGIC FEVERS

On November 20, 2017, we celebrated with a small symposium the virological veterans Prof. Werner Slenczka, formerly Institute for Hygiene, Marburg, und Dr. Günther Müller, formerly BNITM, who discovered the Marburg virus 50 years ago. Our colleague Prof. Dennis Tappe used the occasion to again consider the role of BNITM in the discovery of the filoviruses. He found that the first documented outbreak of the Ebola virus had not taken place – unlike commonly reported – at the Ebola river in midsummer 1976 but in Southern Sudan already earlier in summer that year and had been studied by Dr. Jürgen Knobloch from BNITM and virologically characterized at the BNITM.

*Figure: Marburg virus electron microscopy*

In den Behringwerken:

# Mysteriöse Erkrankung von elf Angestellten

Gesundheitsbehörde betont: Kein Gelbfieber / Keine Impfungen

Die Mitarbeiter der Behringwerke sind seit dem 11. August an einer noch nicht abgeklärt, wahrscheinlich tropischen Infektion erkrankt, teilte gestern die Gesundheitsbehörde Marburg mit. Nach dem Mängelerkrankten sind bisher sieben weitere Mitarbeiter erkrankt. Die Überträger sind nicht bekannt.

# Noch drei Patienten eingeliefert

Vierzehn Angestellte der Behring-Werke liegen jetzt in der Isolierstation / Ärzte beschreiben 80 Personen

Ein großer Ausbruch der Erkrankung ist gestern mit fünf weiteren Patienten in der Isolierstation der Behringwerke festgestellt worden. Die Erkrankten sind das zweite Opfer der „Mysteriösen Krankheit“, die in der Behring-Werke vornehmlich durch gelbe Mischkulturen am Uganda angetrieben wurde. Eine Woche nach der Erkrankung der ersten Patientin, Prof. Dr. Martin, betonte: „In der Nacht zum Freitag sind drei weitere Angestellte der Behring-Werke in die Isolierstation eingeliefert worden.“ Damit erhöht sich die Zahl der Patienten auf 14. Bei dem ersten Patienten handelt es sich um einen 37-jährigen Vorkursen nach zwei Jahren im Alter von 11 und 12 Jahren. Das Gesundheitsamt der Marburg Patente hat sich nach Angaben der Ärzte keine Sorgen.

Prof. Martin, der Leiter der Medizinischen Klinik der Philipps-Universität Marburg, teilte die Art der Erkrankung mit. Er sagte, dass die Erkrankung an den Kindern in der Isolierstation, die einen sehr hohen Anteil hat, ebenfalls ein sehr ansteckendes Virus ist, das sich sehr leicht verbreiten kann. Auch die Erkrankung der ersten Patientin ist ein Beispiel für eine typische Erkrankung, welche fast immer ein Beispiel für eine typische Erkrankung ist.

# ner der Toten hinterläßt Frau und neun Kinder

Angestellte der Behringwerke gestorben / Ist es Gelbfieber? / Rat von englischem Tropenmediziner

Der 47-jährige Mann, der in der Isolierstation der Behringwerke in Marburg starb, hinterließ eine Frau und neun Kinder. Die Gesundheitsbehörde Marburg ist der Meinung, dass es sich um eine tropische Infektion handelt, die durch eine Mischkultur am Uganda angetrieben wird. Ein Rat von englischem Tropenmediziner ist ein Beispiel für eine typische Erkrankung, welche fast immer ein Beispiel für eine typische Erkrankung ist.



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# Ärztin liegt in der Isolierstation

Nach zwei Behring-Laboranten eingeliefert / Jetzt 18 Patienten / Leichte Besserungen

Die Gesundheitsbehörde Marburg hat gestern mitgeteilt, dass eine Ärztin in der Isolierstation der Behringwerke eingeliefert wurde. Die Ärztin ist die dritte Patientin der „Mysteriösen Krankheit“, die in der Behring-Werke vornehmlich durch gelbe Mischkulturen am Uganda angetrieben wurde. Eine Woche nach der Erkrankung der ersten Patientin, Prof. Dr. Martin, betonte: „In der Nacht zum Freitag sind drei weitere Angestellte der Behring-Werke in die Isolierstation eingeliefert worden.“ Damit erhöht sich die Zahl der Patienten auf 18.

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# Von Hamburger Forschern entdeckt:



# Todes-Virus

Geheimnis der großen Affen gelöst



# Die ersten Patienten nach Hause entlassen

Die 16 Erkrankten in der Isolierstation vornehmlich angetrieben

Die Gesundheitsbehörde Marburg hat gestern mitgeteilt, dass die ersten 16 Patienten der „Mysteriösen Krankheit“, die in der Behring-Werke vornehmlich durch gelbe Mischkulturen am Uganda angetrieben wurde, nach Hause entlassen wurden. Die Patienten sind die ersten Patienten der „Mysteriösen Krankheit“, die in der Behring-Werke vornehmlich durch gelbe Mischkulturen am Uganda angetrieben wurde.

Dangerous sisters, part 1

## DISCOVERY OF THE MARBURG VIRUS

Marburg, Germany - August 1967

In late summer 1967, keepers of primates (Green Monkeys) in the Behring Company came down with high fever, internal hemorrhages and organ failure. Five of the 25 patients died. Shortly thereafter, the infection was also reported from institutes in Frankfurt and Belgrade, which also kept Green Monkeys. Scientists in Marburg succeeded in growing in guinea pigs the infectious agent, which was characterized as a virus by electron microscopy at BNITM on November 20th, 1967. Since the virus was also found in blood samples from the patients, it was regarded as the causative agent.

Figure: Press reports on the first recognized outbreak of a filovirus disease in the Behring Company, Marburg, 1967 (Source: SFB 1021; RNA viruses: RNA metabolism, host response and pathogenesis).

# Mystery epidemic in Sudan

From MICHAEL DOBBS

Juba (Southern Sudan),  
September 30

The regional Government of Southern Sudan today imposed a strict quarantine on the province of Eastern Equatoria to try to contain a mysterious disease which has caused many deaths in the area.

The epidemic is centred on the town of Meridi, about 250 miles west of Juba, where doctors say at least 40 people have died in hospital alone over the past three weeks. Estimates by aid officials of known deaths in the surrounding area are high.

A team of West German road builders based in Meridi were evacuated to Juba last night and all roads leading through the province have been closed—including the main road to Wau, second largest town in Southern Sudan after Juba.

Health Ministry officials in Juba today described the disease as a viral infection but said laboratory tests to check for yellow fever, typhoid, and cholera had proved negative.

A team of experts, including representatives of the World Health Organisation (WHO), are planning to fly to Meridi tomorrow from Khartoum for further investigations.

Among the victims of the disease so far are the chief doctor of Meridi regional hospital and eight of his nursing staff. Four patients who were brought to Juba hospital for a check-up have also died, according to officials.

Dangerous sisters, part 2

## DISCOVERY OF THE MARIDI VIRUS (EBOLA-SUDAN VIRUS)

*Nzara, Sudan*

*(Today Republic of South Sudan) –*

*June 1976*

End of June 1976, from Nzara in southern Sudan, close to the border of former Zaire, several cases of a fatal disease had been reported, which had also affected the staff of the regional hospital at Maridi. In August 1976, WHO had requested international help for the deserted hospital. Dr. Juergen Knobloch from BNITM went on his own and later reported that he had been the only doctor in the hospital for quite some time. By the end of November, the death toll had risen to 230, four of them in Khartoum, after patients had been transferred there. Juergen Knobloch took many autopsy samples. In a few of them, which reached Hamburg after an adventurous journey, a virus was identified with great similarity to the virus from the

1967 outbreak in Marburg. The BNITM scientists named it Maridi virus.

*Figure:* Delayed press report on the outbreak of a fatal haemorrhagic fever in southern Sudan. Dr. Juergen Knobloch of BNITM had travelled to Maridi already in August. Apparently, his mission had not been reported or noticed.

### DISCOVERY OF THE EBOLA VIRUS

*Yambuku, Zaire  
(Today Democratic Republic of Kongo) –  
August 1976*

End of August 1976, WHO reported on cases of haemorrhagic fever at Yambuku, near the creek of Ebola in the north of former Zaire. Electron microscopic examinations of samples from the Nzara and Yambuku outbreaks in the US-American Centers for Disease Control and Prevention (CDC), Antwerp University and the Microbiological Research Establishment (MRE) in Porton Down, England, showed a high morphological similarity to each other and to the virus from the Marburg cases of 1967. Staining with patients' antisera revealed that the African viruses closely resembled each other but differed from those from Marburg. Following the Ministry of Health of Zaire, the virus from Yambuku was named after the Ebola creek.

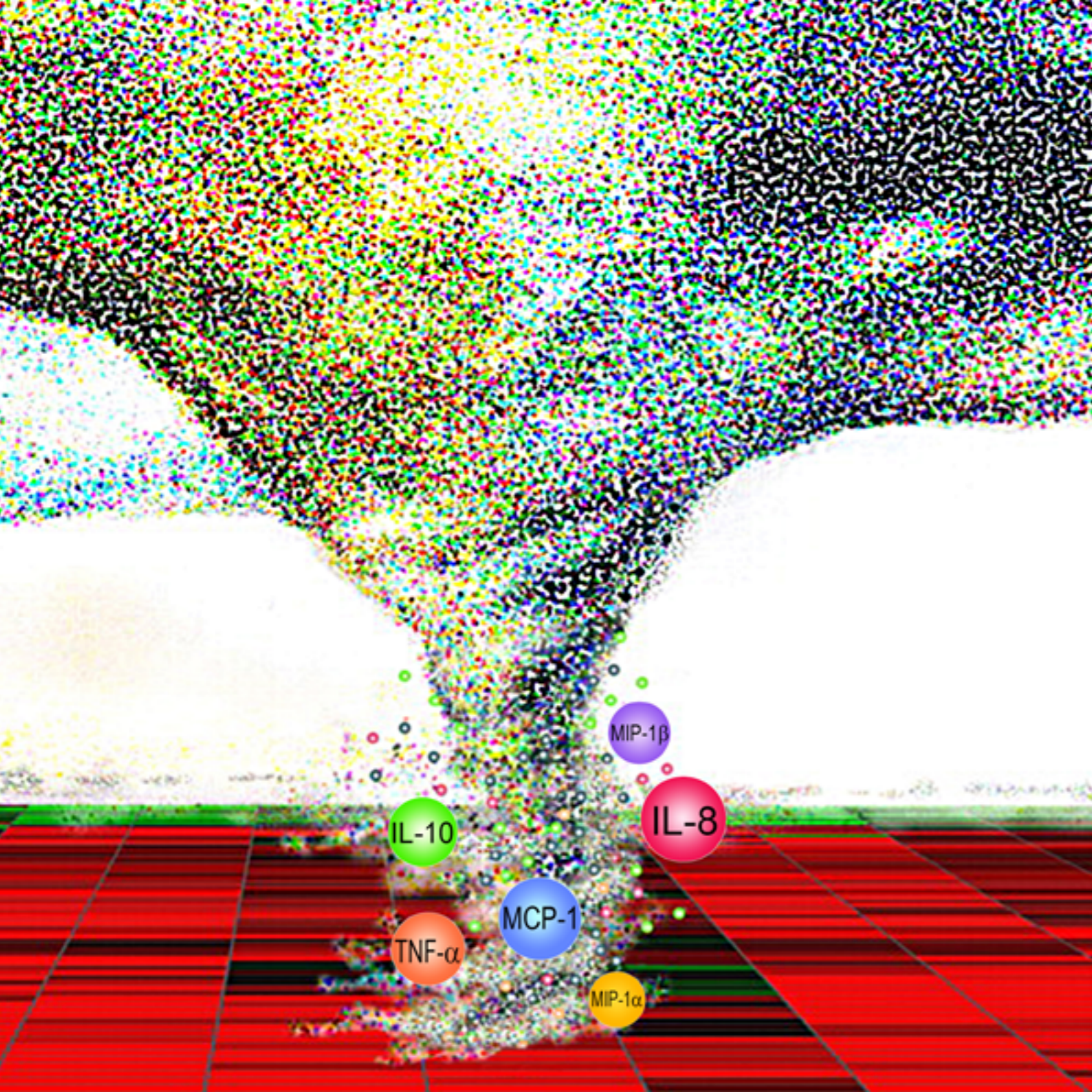
*Figure:* The old map shows that Nzara in southern Sudan and Yambuku in former Zaire, the sites of the first documented Ebola outbreaks, are not far apart. Inset: Naming of the Ebola virus by the Zairian Ministry of Health.



### Virus in Zaire Epidemic Named for Ebola River

KINSHASA, Zaire, Nov. 30 (Agence France-Presse) — The virus responsible for the recent epidemic of green monkey fever that claimed several hundred lives will be known as the Ebola Virus, after a river in the north, the Health Ministry announced today.

A statement said no direct link had been established between the virus that struck at Yambuku and the Marburg strain, which caused a similar epidemic in the Sudan earlier this year.



Too much and too little

## FATAL DYSREGULATION

During the operations of the "European Mobile Laboratories" (EMLabs) in the 2014-2016 Ebola epidemic, blood samples were taken from 157 Ebola patients shortly after hospital admission. We compared the immune responses between patients who survived and those who died in the course of the infection. While the numbers of activated helper T lymphocytes and cytotoxic T lymphocytes were found to be similarly elevated in both groups, patients with a fatal outcome had substantially higher serum concentrations of molecules (cytokines) that cause inflammatory reactions and strongly increased numbers of molecules that inhibit lymphocyte activation (CTLA-4, PD-1) on their lymphocytes. Apparently, fatal courses of human Ebola infections are accompanied by a combination of a strong inflammatory reaction and T-lymphocyte dysregulation.

*Ruibal P. et al., Nature 2016, 533:100-4*

Paula Ruibal, Lisa Oestereich, Anja Lüdtke, Beate Becker-Ziaja, David M. Wozniak, Romy Kerber, Mar Cabeza-Cabrerizo, Sophie Duraffour, Elisa Pallasch, Tobias Holm, Thomas Jacobs, Benno Kreuels, Martin Gabriel, Stephan Günther, César Muñoz-Fontela and external cooperation partners (see publication)

*Figure: Strong, presumably uncontrolled inflammatory responses appear to essentially contribute to fatal courses of bacterial blood infections and obviously also of Ebola virus disease. As they are mediated by an apparently uninhibited release of certain regulatory molecules, so called cytokines, experts speak of a "cytokine storm" (figure modified from Microbiol Mol Biol Rev 2012, 76:16-32).*



Snatch a cap

## ATOMIC STRUCTURE OF AN ESSENTIAL ENZYME FROM ARENA AND HANTA VIRUSES

RNA consists of chains of building blocks very similar to the genetic storage moiety DNA but is on one hand structurally more flexible and functionally more versatile and on the other much less stable. In order to protect it from unwarranted degradation, the first building block of certain RNA molecules, the messenger RNA, contains a chemical modification called "cap". Viruses can survive in the body only when their own messenger RNAs also contain this cap structure. Some viruses such as Influenza, Arena und Hanta viruses, which cannot produce these caps, force infected cells to produce an enzyme that cuts caps from the RNA of the cell and transfers it to the virus' own RNA. We have analysed the atomic structure of this protein from Lassa-like Arena and Hanta viruses by X-ray crystallography, in order to try to design tailored inhibitors. The inhibition of such "cap

thieves" is considered a promising approach to novel antiviral compounds.

*Fernández-García Y. et al., PLoS Pathog 2016, 12:e1005635*

*Rosenthal M. et al., PLoS Pathog 2017, 13:e1006400*

Maria Rosenthal, Yaiza Fernández-García, Nadja Gogrefe, Dominik Vogel, Carola Busch, Stephan Günther, Sophia Reindl and external co-operation partners (see publication)

*Figure:* Atomic structure of the two essential parts of the "cap-stealing" enzyme of Arena and Hanta viruses (shown as cartoon model): On the left the part assumed to bind a cap of the host-cell RNA, and on the right the part cleaving off the cap from the RNA strand. An RNA molecule has been modelled into the structure (shown as sticks).

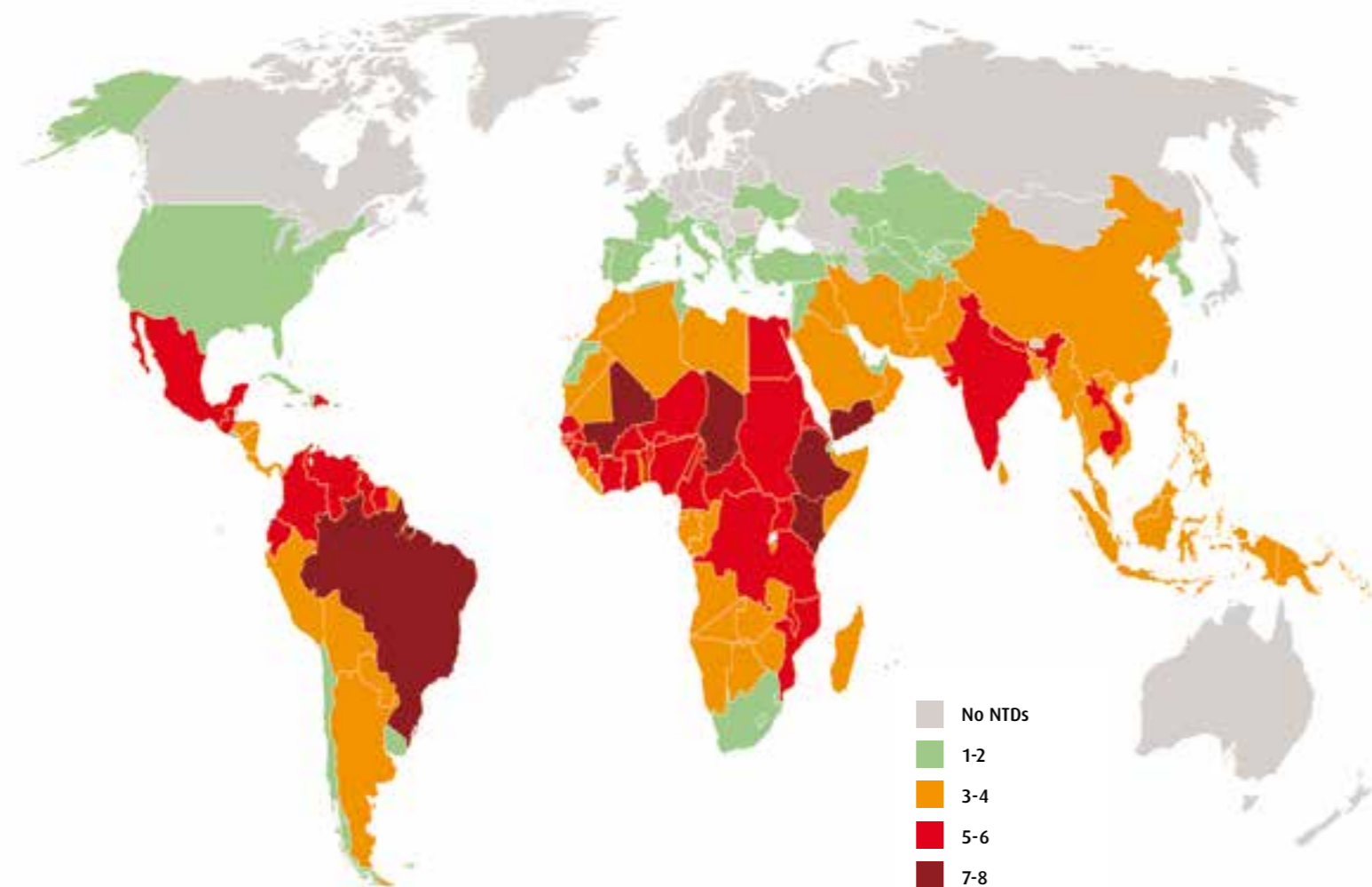
# NEGLECTED TROPICAL DISEASES

In the 1990s, the measure of "Disability-Adjusted Life Years (Lost)" (DALY) was developed, which attempts to quantitatively describe the global socio-economic burden of a disease. It estimates the years lost by death or impaired by disability, whereby the extent of disability is included in the calculation. Thus, DALYs describe the difference between reality and the ideal that all humans reach their average life expectancy in complete health.

With the introduction of DALYs it was documented that, according to this estimation, malaria (82.7 Mio. DALY)<sup>1</sup>, HIV/Aids (81.6 Mio DALY) and tuberculosis (49.4 Mio DALY) constitute the most important poverty-related diseases by far. Therefore, the large international funding agencies decided to concentrate on these "Big 3". The reaction of Médecins

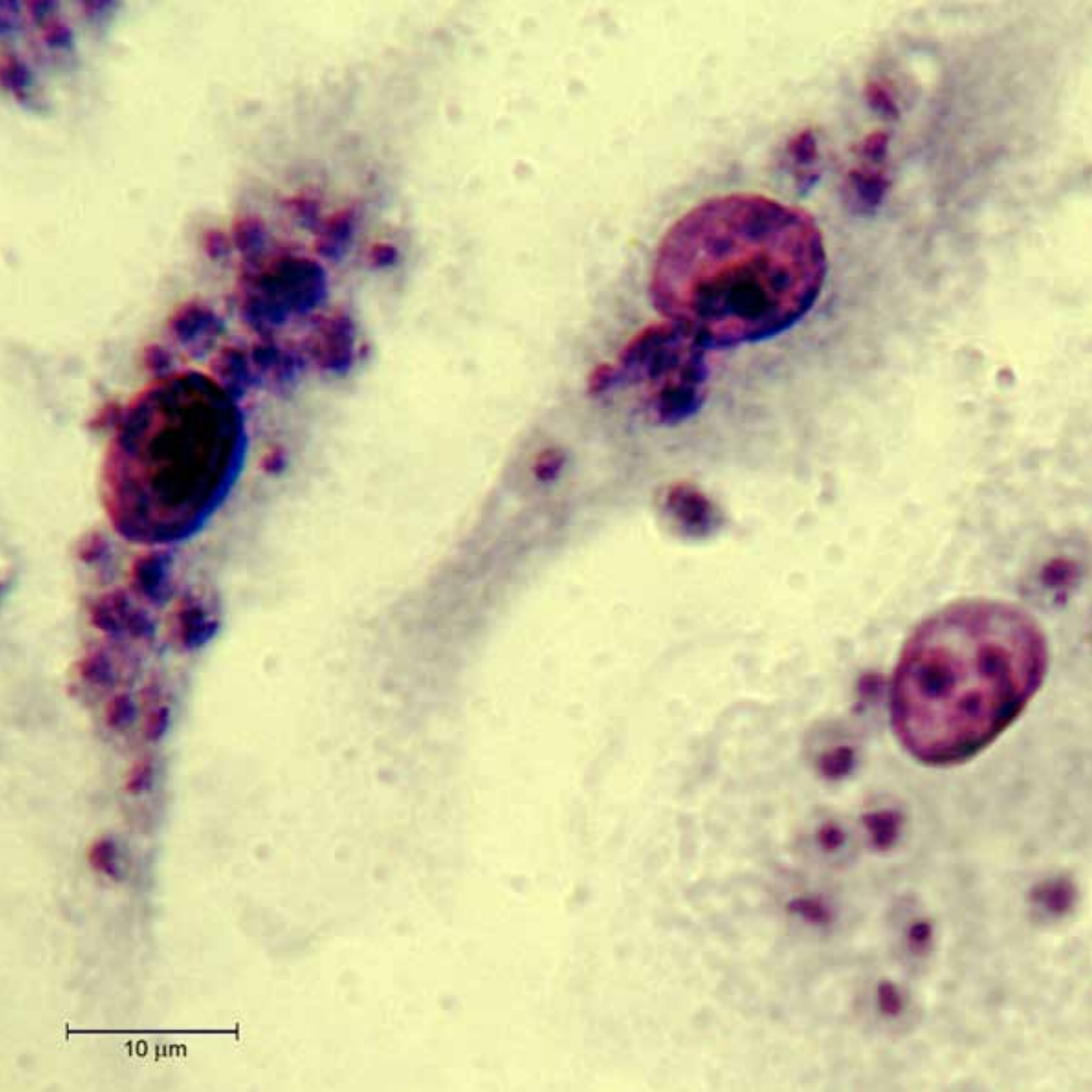
sans Frontières was to coin the term *Neglected Tropical Diseases* (NTDs) for all those diseases that had not been acknowledged but collectively also cause extensive human suffering and economic damage (21.0 Mio DALY)<sup>2</sup>.

*Figure: Global prevalence of "Neglected Tropical Diseases" (NTDs) (source: Study "Integrated implementation in combatting neglected tropical diseases – The potential of Germany", German Network Against Neglected Tropical Diseases, 2017)*



<sup>1</sup> Murray, C.J.L. et al., *Lancet* 2012, 380:2197–223

<sup>2</sup> NTDs are not defined consistently. The World Health Organisation (WHO) currently includes 20 diseases in this definition, i.e. Buruli ulcer, Chagas disease, Dengue fever and Chikungunya, dracunculosis (Medina worm), echinococcosis, endemic treponematoses, food-borne trematode infections, human African trypanosomiasis (sleeping sickness), leishmaniases, leprosy, lymphatic filariases, onchocercosiasis (river blindness), rabies, schistosomiasis, geohelminth infections (soil-transmitted worm infections), taeniasis and (neuro-) cysticercosis, trachoma, mycetoma, chromoblastomycosis and other deep mycoses, snakebite envenoming as well as scabies and other ectoparasites. Other organisations add diarrhoeal diseases, bacterial pneumonias and meningitis, chronic suppurative otitis media (CSOM), salmonellosis, certain forms of hepatitis, rheumatic fever, leptospirosis, Nodding syndrome (NS), podoconiosis, scabies, snake bites and strongyloidiasis to the definition of NTDs.



On two fronts

## ANALYSIS OF LEISHMANIA DRUG RESISTANCE AND THE SEARCH FOR NEW COMPOUNDS

With an estimated 12 Mio affected humans, leishmaniasis belongs to the most relevant NTDs. Some Leishmania species only affect the skin, others the skin-mucosal transitions causing mutilating disfigurements. Yet others infect inner organs and cause life-threatening generalized diseases. The old but still widespread treatment with antimonial drugs (arsenic-like toxins) is threatened by increasing resistance of the parasites. On the search for the underlying resistance causes and in pursuit of new drugs, we have contributed on both fronts. Thus, we have detected a small group of leishmania genes grouped around an already known drug-resistance gene. To combat resistance, we participate in a research network identifying and studying potentially effective new compounds. We found that certain plant products, so-called flavonoids, are active

against Leishmania infection in vitro and may be leads for drug development.

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*Tejera Nevado P. et al., Antimicrob Agents Chemother 2016, 60:5262-75*

*Borsari C. et al., J Med Chem 2016, 59:7598-616*

Paloma Tejera Nevado, Eugenia Bifeld,  
Katharina Höhn, Julia Eick, Joachim Clos and  
external cooperation partners (see publication)

*Figure:* Massive infection of immune cells (macrophages) with leishmaniae. Cells are seen as grey areas, the cells' nuclei as large violet circles, leishmaniae as small violet spots with a grey corona.





Parasite stuff against parasites

## AMOEBA COMPOUND FOR THE TREATMENT OF CUTANEOUS LEISHMANIASIS

The most widespread form of the leishmaniasis is cutaneous leishmaniasis (oriental sore), which initially causes a swelling, followed by a chronic skin ulcer. Leishmaniae allow themselves to be taken up by immune cells, so-called macrophages, but in many humans resist digestion and killing by the macrophages. A rationale approach to treatment is, therefore, to activate and enable macrophages to digest the parasites. We have purified a substance from the cell membrane of amoebae (*Entamoeba histolytica*), which can activate macrophages like no other known compound. Using both infected macrophages in the test tube and a mouse model for human cutaneous leishmaniasis, we found that the amoeba compound drastically reduced the numbers of leishmaniae. Certain synthetic fragments of the compound had the same effect. Future studies will show whether these fragments

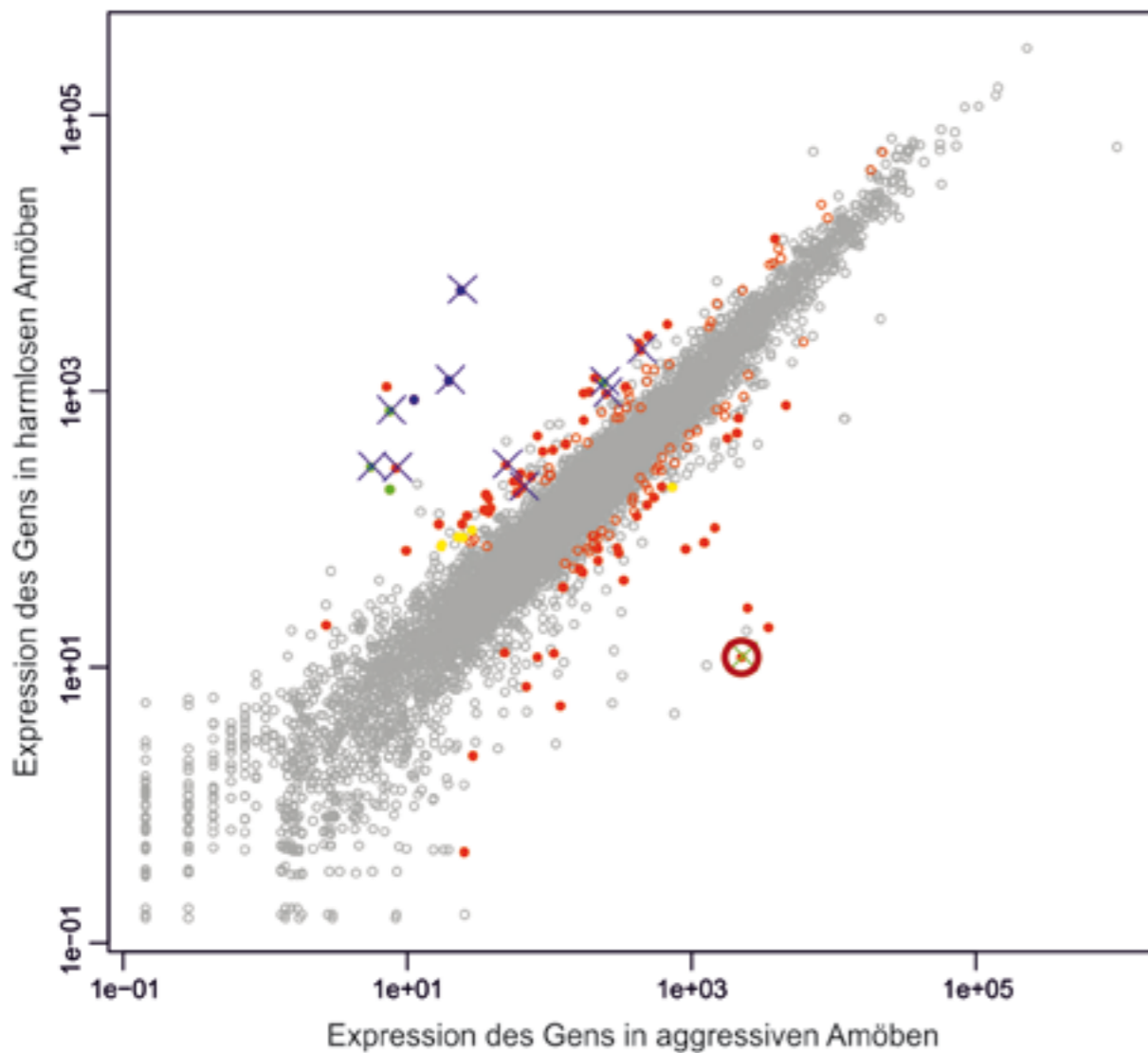
are also active against other leishmania species and other pathogens, which likewise inhabit macrophages, such as, for instance, tubercle bacilli.

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*Choy S.L., Bernin H. et al., Sci Rep 2017, 7:9472*

Siew Ling Choy, Hannah Bernin, Eugenia Bifeld, Sarah Corinna Lender, Melina Mühlenpfordt, Jill Noll, Julia Eick, Claudia Marggraff, Hanno Niss, Joachim Clos, Egbert Tannich, Hanna Lotter and external cooperation partners (see publication)

*Figure:* Characteristic dry skin ulcer of a patient with cutaneous leishmaniasis. In scratch samples from the rim, experts can identify the parasites inside macrophages by microscopy.



Rabble-rouser

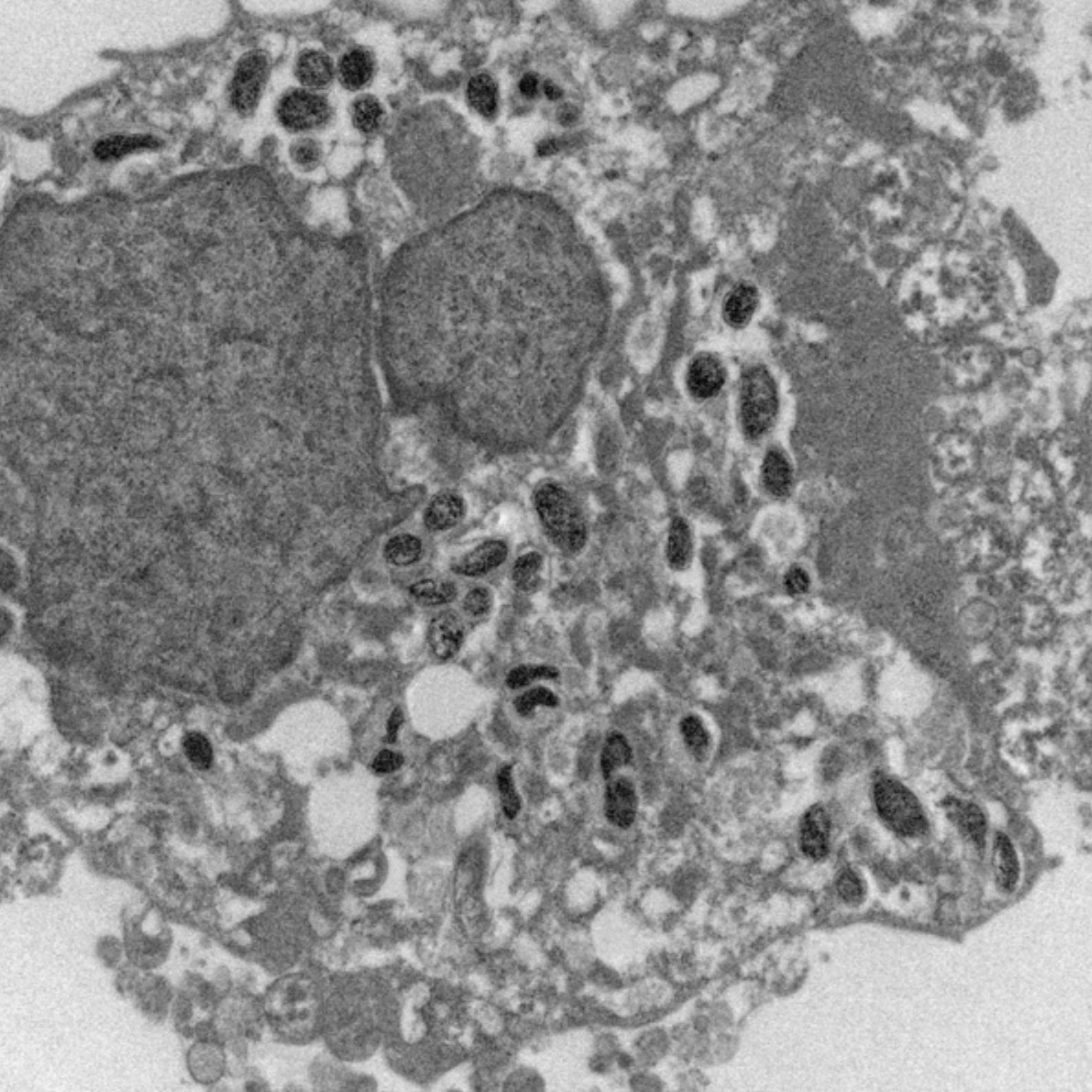
## PROTEIN WITH UNKNOWN FUNCTION MAKES AMOEBAE AGGRESSIVE

The parasite *Entamoeba histolytica* may survive in the human intestine for years without causing symptoms. For unknown reasons, the amoebae at some point start invading the intestinal wall and blood vessels causing bleeding ulcers and abscesses, respectively, if they end up in organs. To better understand this process, we use several animal models and compare an *E. histolytica* clone that causes large abscesses with a clone shown to be much less virulent. We found many genes differently activated in aggressive and harmless amoebae. One of them, much stronger expressed in aggressive ones, codes for a protein with an unknown function. Thus, this protein appears to contribute to the ability of amoebae to cause abscesses and may be a new target for drug development.

Meyer M. et al., *PLoS Pathog* 2016, 12:e1005853

Martin Meyer, Helena Fehling, Jenny Matthiesen, Stephan Lorenzen, Kathrin Schuldt, Hannah Bernin, Mareen Zaruba, Corinna Lender, Egbert Tannich, Hanna Lotter, Iris Bruchhaus and external cooperation partners (see publication)

Figure: Comparison of gene expression in aggressive and harmless strains of amoebae (*E. histolytica*). Grey open circles near the diagonal indicate genes similarly expressed in both strains, whereas circles in red and blue mark genes showing substantial differences in expression. The gene of interest is highlighted with a bold red circle.



With a little help from my friends

## IMMUNE DEFENCE AGAINST RICKETTSIAE

Rickettsiae are small bacteria that grow inside cells. There are several species, which are transmitted by fleas, lice, ticks or mites and cause different kinds of disease.

*Rickettsia typhi* causes so-called endemic typhus, leading to severe complications in some cases. It may occur worldwide. We use various mouse models to study mechanisms of the immune system that may overcome the infection. Although rickettsiae grow inside host cells, the cytotoxic activity of T cells (CD8+ lymphocytes), which usually kill infected cells, appear not to play a superior role. Interestingly, helper T cells (CD4+ lymphocytes) were found to be of pivotal importance: Apparently, *R. typhi* invades phagocytes of the immune system, neutrophils and macrophages, without being recognised by these cells. Only if the phagocytes are activated by helper T cells, they mobilise their weapons and are able to kill the invaders.

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Papp S. et al., *PLoS Negl Trop Dis* 2016,

10:e0004935

Moderzynski K. et al., *PLoS Negl Trop Dis* 2016,

10:e0005089

Moderzynski K. et al., *PLoS Negl Trop Dis* 2017,

11:e0005404

Kristin Moderzynski, Stefanie Papp, Liza Heine, Jessica Rauch, Svenja Kühn, Ulricke Richardt, Heidelinde Müller, Bernhard Fleischer and Anke Osterloh

*Figure:* Rickettsiae (dark grey areas) inside a host cell, here a fibroblast (visualisation by electron microscopy).



Coming closer

## THREATENING BACTERIAL DRUG RESISTANCE IN GHANA

Salmonellae are a main cause for bloodstream infections - infections with high fatality rates - in sub-Saharan Africa. Until recently, salmonellae could be treated well with antibiotics. However, like in Europe, the numbers of drug-resistant bacteria are on the rise in Africa. Together with our cooperation partners, we have found that certain salmonellae (mainly *Salmonella enterica* serovar Enteritidis), which cause bloodstream infections, have developed some resistance against a widely used antibiotic in Ghana (Ciprofloxacin). Should this development continue, hardly any effective drug against these salmonellae will soon be available there.

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*Eibach D. et al., Clin Infect Dis 2016, 62 Suppl 1:S32-6*

Daniel Eibach, Hassan Al-Emran, Denise Dekker, Ralf Krumkamp, Christa Ehmen, Anna Jaeger, Jürgen May and external cooperation partners (see publication)

*Figure:* Standard method for drug-resistance testing: Bacteria (a homogeneous isolate) grow to a continuous layer in Petri dishes containing small discs soaked with various antibiotics. If a drug is effective, a corona free of bacteria (a so-called inhibition zone) forms around the disc. It generally applies that the larger the inhibition zone, the better the activity of the drug. If no inhibition zone is formed at all, the bacteria are fully resistant (at 4 and 7 o'clock in the figure).



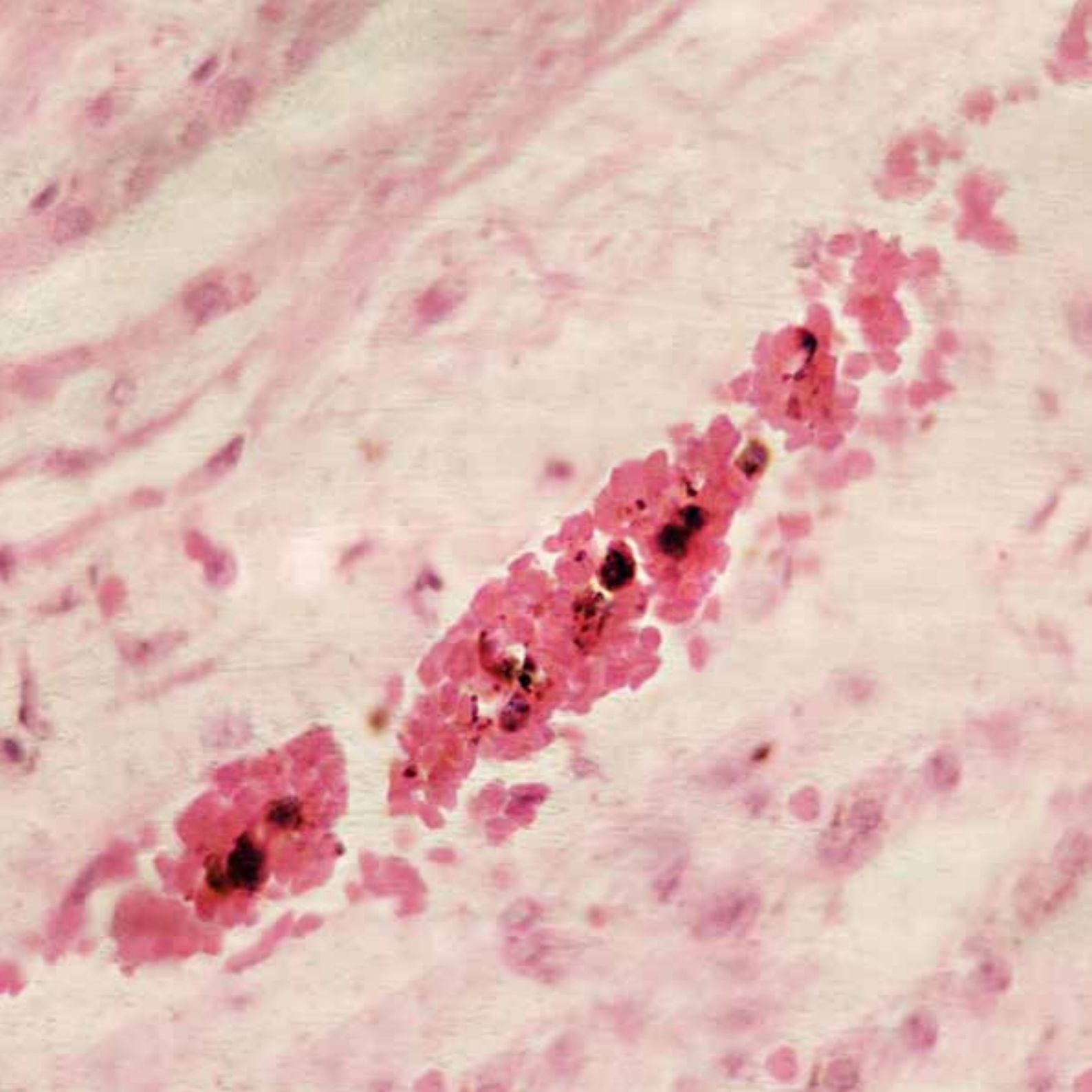
## THE HIDEOUT OF MALARIA PARASITES

Malaria parasites cause disease only in their blood stage, i.e., when they settle and proliferate in red blood cells. Then fatal complications may develop, albeit virtually exclusively in infections with *Plasmodium falciparum*. The main reason is that *P. falciparum* in a complicated process transports some of its own proteins onto the surface of the infected red blood cell and makes it stick to the wall of a small blood vessel. Thereby, the parasites impair the microcirculation and may give rise to fatal organ failure, in particular upon attachment in blood vessels of the brain. The advantage for the parasites is that, by hiding the periphery, they avoid the circulation and escape being trapped in the spleen, which culls red blood cells carrying

chunky loads such as haemoglobin precipitates or malaria parasites. Thus, *P. falciparum* is able to develop particularly fast and numerous by hiding in small blood vessels.

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*Figure:* Rubbing the breastbone to test a child with cerebral malaria for its reaction to pain stimulation. With a fatality rate of approximately 20%, cerebral malaria is the most dangerous form of the disease.



Dangerous bonds

## PROTEINS OF PLASMODIUM FALCIPARUM BINDING TO VESSEL WALLS

Many of the surface molecules of blood vessels used by *Plasmodium falciparum* to attach its red blood cell are present in the vessels of certain organs only. Therefore, it happens that only a single organ is affected at a given time of a *P. falciparum* infection. We have expressed some of these surface molecules of human blood vessels on hamster cells. By repeated cycles of allowing infected red blood cells in the test tube to attach to one of the surface molecules, we have enriched for *P. falciparum* strains expressing the respective binding partner. Thereby, we have characterized several *P. falciparum* molecules that specifically bind to a given surface molecule on human blood vessels. We hope that a cocktail of such binding molecules may in the future be used to develop vaccines stimulating the production of antibodies that inhibit the attachment of infected red blood cells in certain organs, thereby preventing or

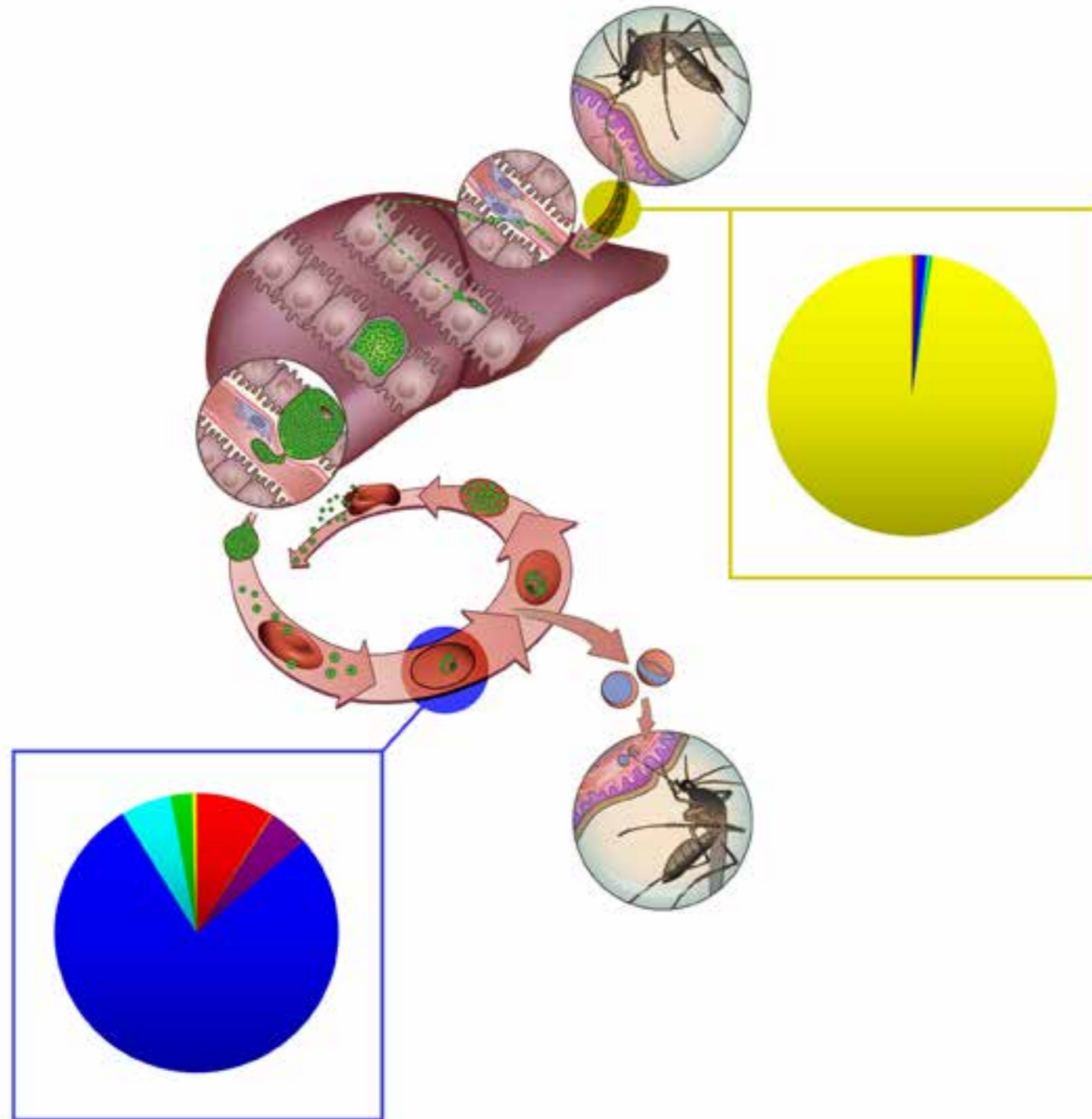
treating distinct organ failures in human malaria.

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*Metwally N.G. et al., Sci Rep 2017, 7:4069*

Nahla Metwally, Ann-Kathrin Tilly, Pedro Lubiana, Lisa Roth, Michael Dörpinghaus, Stephan Lorenzen, Kathrin Schuldt, Susanne Witt, Anna Bachmann, Egbert Tannich, Iris Bruchhaus and external cooperation partners (see publication).

*Figure:* Brain tissue preparation of a patient who died from cerebral malaria. Neural tissues appear white, red blood cells red, and brown is the colour of the product of haemoglobin after intake and digestion by malaria parasites, the so-called malaria pigment.



Go back to start

### AFTER THE MOSQUITO STAGE. PLASMODIUM FALCIPARUM RE-STARTS ITS SET OF VAR-GENES

As the proteins produced by *P. falciparum* to attach infected red blood cells to a vessel wall are located on the outer cell surface (p. 55), they are recognised by our immune cells, resulting in the production of antibodies, which may inhibit attachment. To circumvent the inhibition, each *P. falciparum* strain contains a family of about sixty genes – so-called var-genes -, each of which encodes a different surface molecule. During its blood stage, *P. falciparum* activates these 60 genes in an as yet unknown order to stepwise change its attachment molecules, thereby escaping antibody inhibition. The order and regulation of the stepwise change has remained obscure although being of great importance for both drug and vaccine development. Only by studying a number of volunteers, all infected by mosquito bites with the same *P. falciparum* isolate in controlled vaccination experiments, enabled us to reveal that, after transmission by a

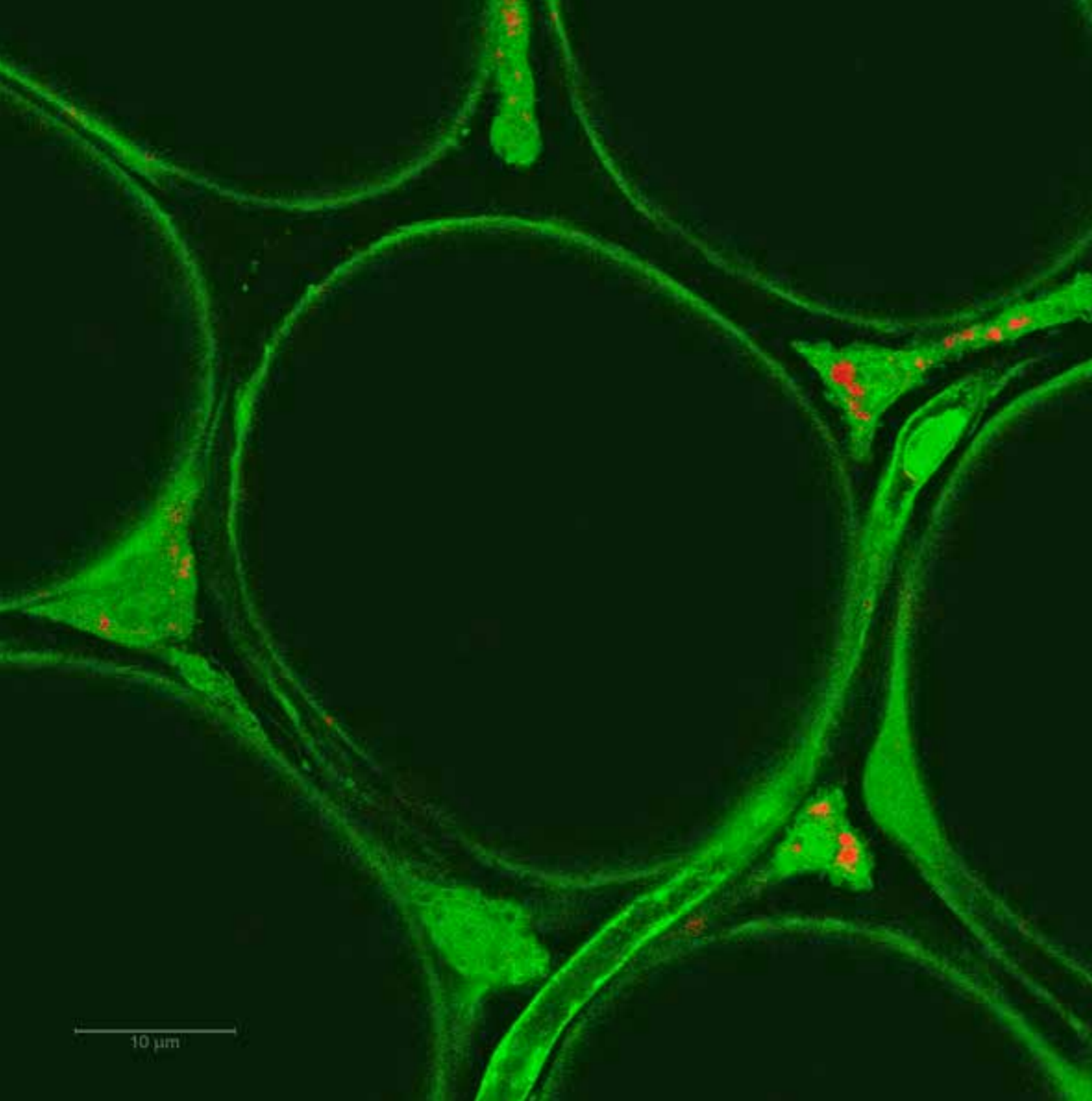
mosquito, *P. falciparum* in the onset of the blood stage always activates the same group of var genes simultaneously, apparently to test the suitability of several proteins for attachment to the vessel walls, in case the new host carries antibodies against some of them from a previous infection.

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*Bachmann A. et al., PLoS Pathog 2016, 12:e1005538*

Anna Bachmann, Ralf Krumkamp, Judith Scholz, Egbert Tannich and external cooperation partners (see publication)

*Figure: Malaria life cycle. Left, composition of the various var genes activated in *P. falciparum* before feeding a mosquito. Right, composition in human blood after the mosquito bite and the liver stage.*



Model wanted

## MOUSE MALARIA - YET A MODEL FOR FATAL HUMAN DISEASE?

The value of animal models for studying human infectious diseases is increasingly being questioned. Nonetheless, it remains a serious disadvantage if no appropriate animal model is available at all, and this applies particularly to the life-threatening complications of human malaria. The mouse malaria caused by *Plasmodium berghei* may result in some signs resembling cerebral malaria, the most fatal of human malaria complications, but its value as a model has been disputed because the affected brain vessels look different and *P. berghei* lacks var genes and, thereby, the characteristic attachment proteins used by *P. falciparum*. Now, we have found that *P. berghei* can indeed express several proteins *P. falciparum* uses to transport the attachment proteins to the surface of infected red blood cells and shown that this leads to the attachment to vessel walls. *P. berghei* also uses similar receptors but the

infected red blood cells preferably bind in fat tissues and the lungs rather than in the brain. Thus, mouse malaria may serve as a model for certain malaria complications after all.

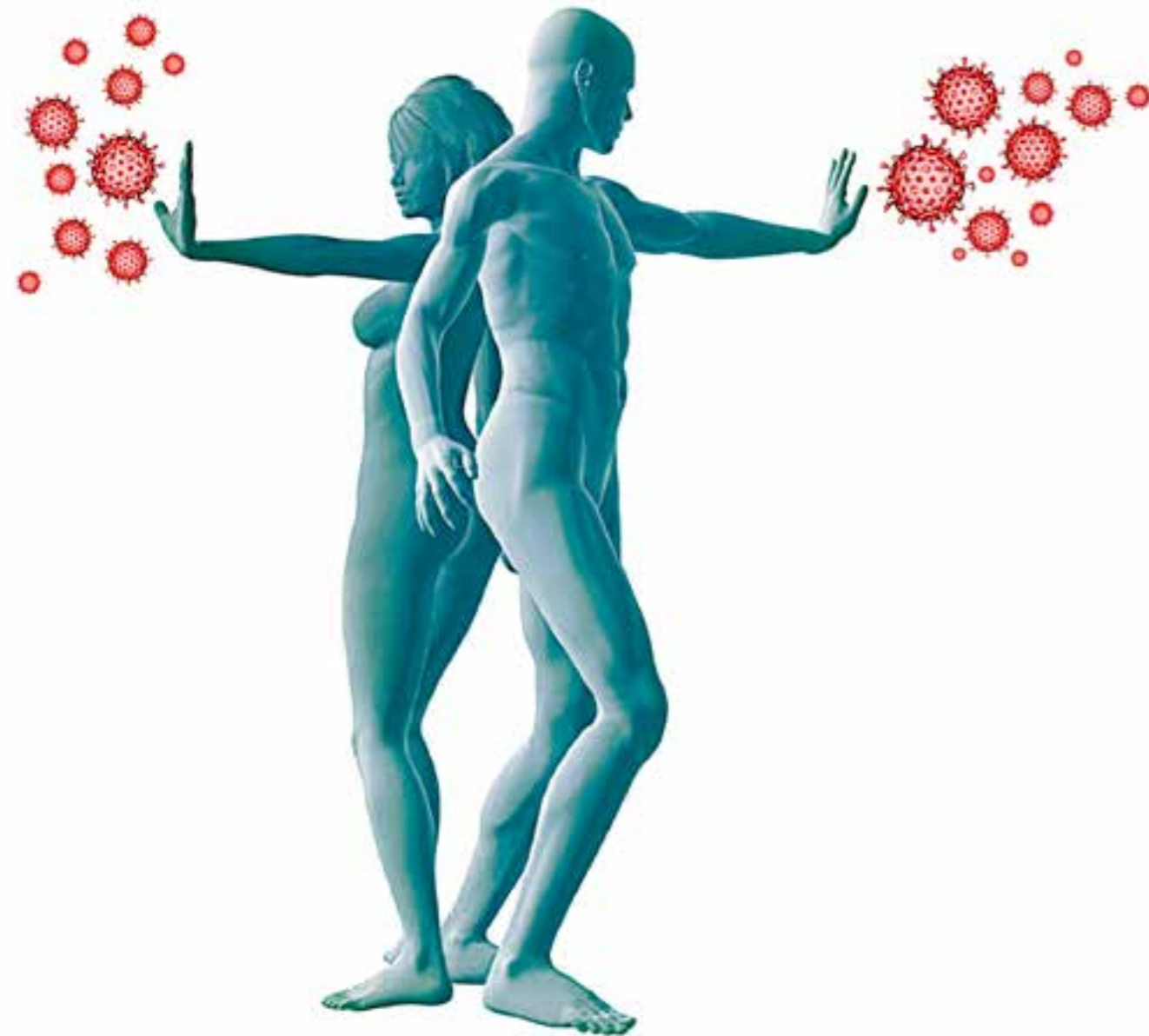
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De Niz M. et al., *Nat Commun* 2016, 26:11659

Ann-Katrin Ullrich, Arlett Heiber, Alexandra Blancke Soares, Monica Prado, Sven Flemming, Tobias Spielmann and external cooperation partners (see publication)

*Figure: Plasmodium berghei* in the blood vessels of fat tissue in an infected mouse. Characteristic ring structures of fat cells result from leaching of the large round fat inclusions by alcohol fixation for microscopy. Cell bodies are stained in green, malaria parasites in red.

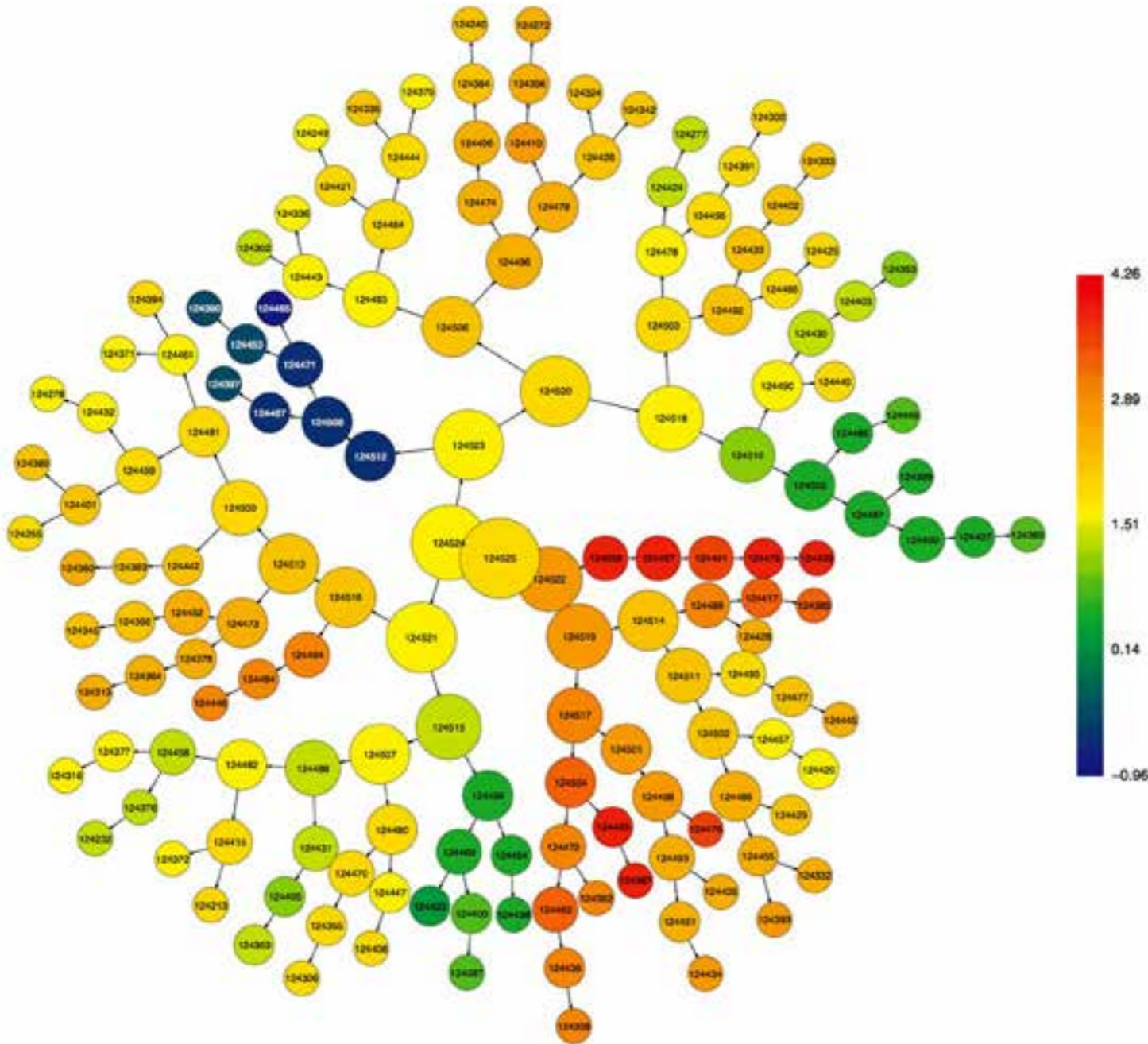




## IMMUNOLOGY

Ever increasing antimicrobial drug resistance currently causes enormous concern in global health care, in particular because new antibiotics are being developed less and less frequently. At the same time, we understand our immune system increasingly well and also, why certain humans are naturally protected against certain infectious diseases. Maybe, one should exploit such insights more vigorously for the development of new antimicrobial drugs, namely compounds, which manipulate the immune responses of susceptible humans such that they react like the immune system of those who are protected by nature. These kinds of drugs do exist already, mostly to treat autoimmune diseases. They are called immune modulators. And there are reasons

to assume that infectious agents would have a much harder time to become resistant against such compounds.



Balancing act

## IMMUNOSUPPRESSION IN MALARIA

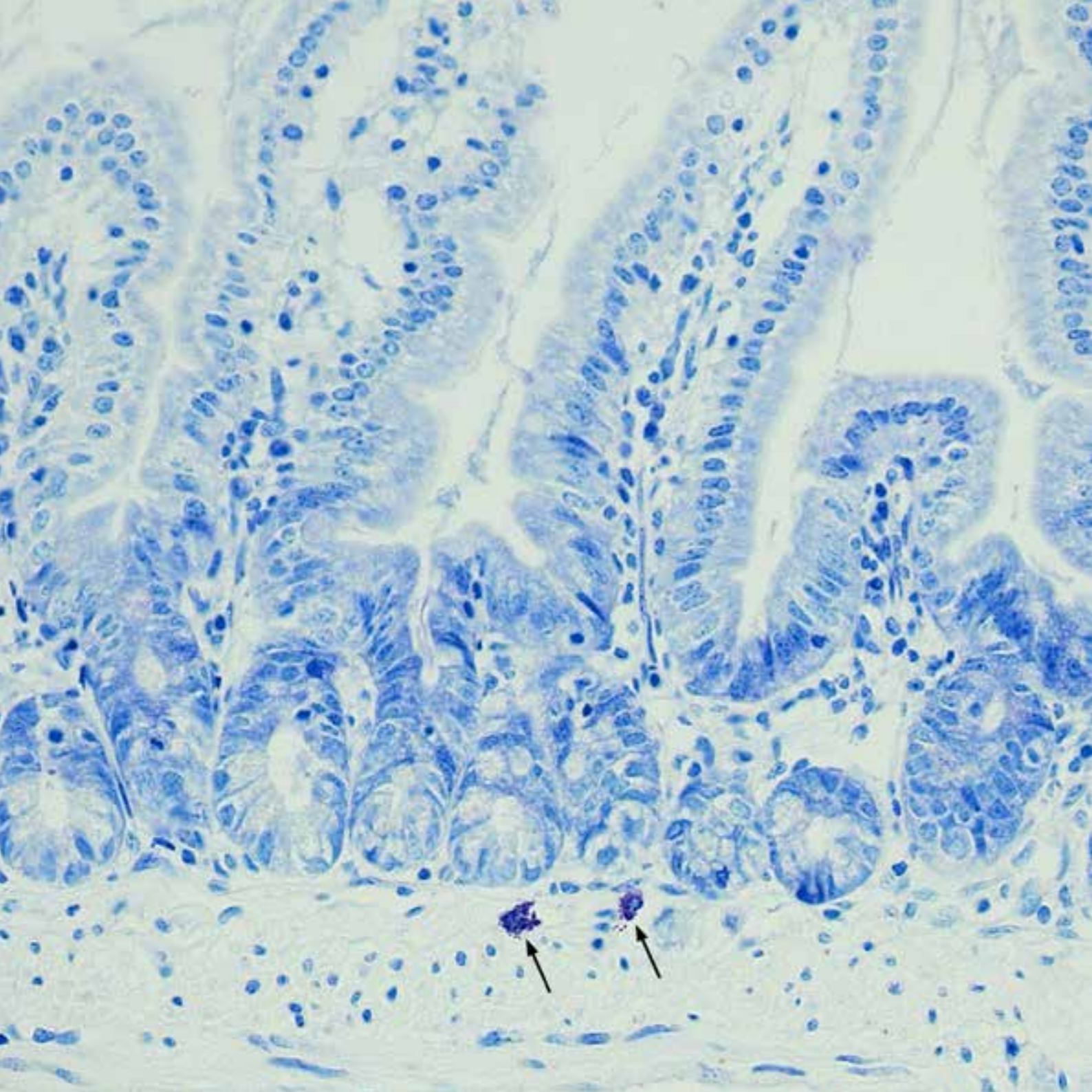
It is well known that our immune system can build up partial immunity against repeated malaria attacks. But there is also evidence indicating that the immune response may as well contribute to the development of life-threatening *Plasmodium falciparum* infections. After an initial activation by an infection, an immune response usually is controlled by central regulators (T lymphocytes), which start to express receptors for inhibitors (CTLA4, PD1) on their surface. In patients who were treated for acute malaria in Germany, we found substantially higher numbers of such receptors than in healthy persons. Incubation with red blood cells infected by *P. falciparum* resulted in a significant increase in the number of such T lymphocytes carrying receptors for inhibitors. These lymphocytes in turn inhibited other T lymphocytes reactive to *P. falciparum*. On one hand, such a transient inhibition of T lymphocytes appears to be unfavourable because it impairs the

immune response to the parasites, on the other hand it may be of advantage because it dampens immune-mediated inflammatory reactions, which contribute to the development of life-threatening complications – a delicate balance. Now, the aim is to find out whether these two effects can be separated from each other and may be modified individually.

Mackroth M.S. et al., *PLoS Pathog* 2016, 12:e1005909

Maria Mackroth, Annemieke Abel, Christiane Steeg, Thomas Jacobs and external cooperation partners (see publication)

Figure: A novel algorithm to arrange immune cells into a family tree based on several properties; here, comparing inhibitory receptors of T lymphocytes from children with uncomplicated and complicated malaria (scale from high [red] to low [blue] counts).



Bouncers

## MAST CELLS AS EFFECTORS, NOT REGULATORS OF THE DEFENCE AGAINST INTESTINAL WORMS

Nearly one third of the world's population is infected with parasitic worms. The worm *Strongyloides ratti* parasitizes in the intestines of rats. Laboratory mice are also susceptible and serve as a model for human infections. Like in humans, larvae of *S. ratti* invade through the skin and may migrate through connective tissues and the lung to the intestine where they develop into adult worms. We have previously shown that basophils and mast cells, highly specialised innate immune cells present in blood and tissues, respectively, essentially contribute to the control of *S. ratti*. By studying the infection of mice, in which these cells had been depleted generally or specifically in connective tissues, we now found that mast cells are indeed indispensable for the expulsion of adult worms from the intestine but play no superior role in the general regulation of the immune response against these worms.

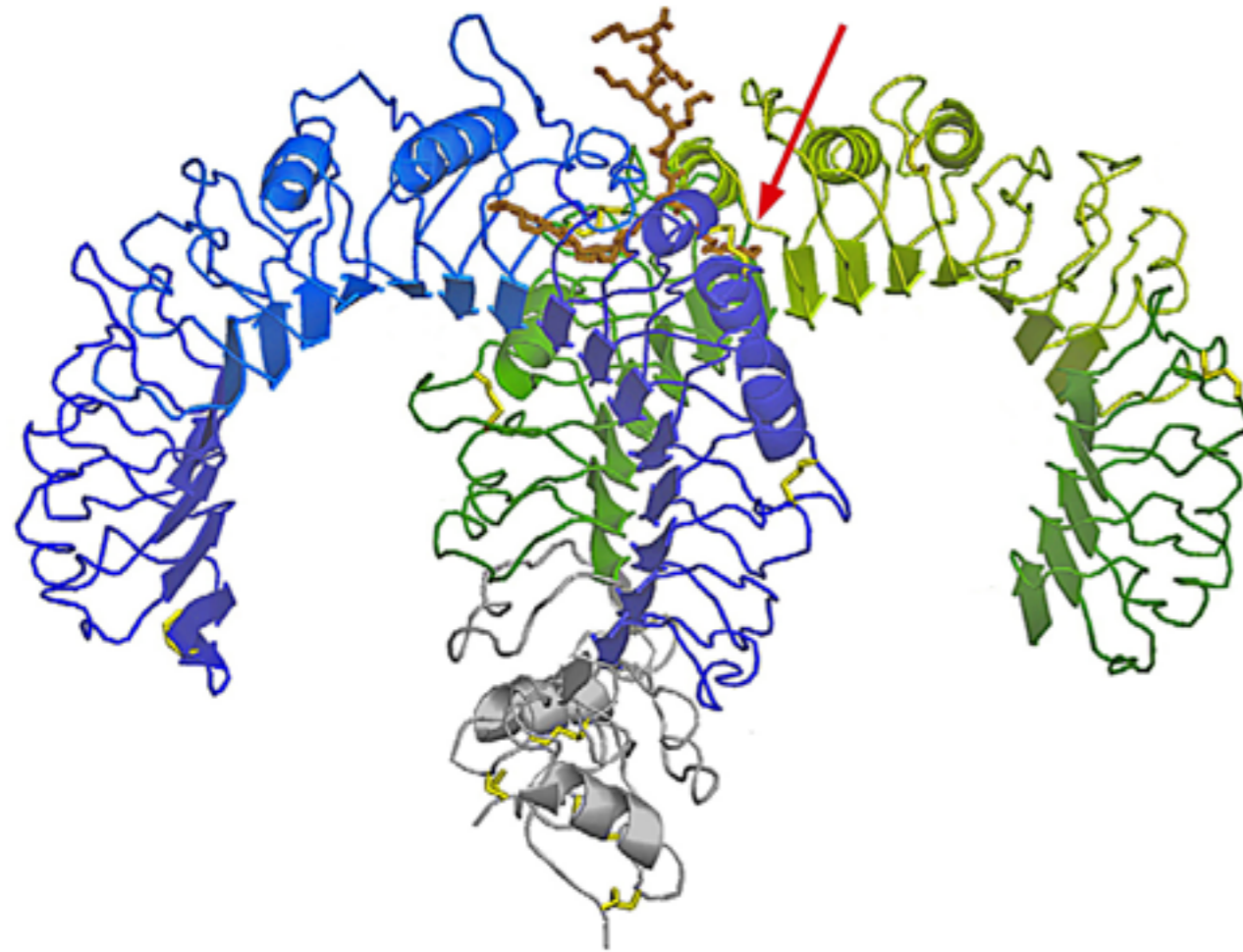
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Reitz M. et al., *Mucosal Immunol* 2017, 10:481-492

Martina Reitz, Marie-Luise Brunn, Minka Breloer and external cooperation partners (see publication)

*Figure:* Intestinal mucosa with two mast cells (arrows). The highly specialised immune cells are characterised by inclusion bodies (granules), which contain alkaline histamine stained in dark blue (Toluidine stain) while the mucosa appears in light blue. Long protrusions serving to increase the mucosal surface for better absorption of nutrients are characteristic for the small intestine.

## INBORN PROTECTION AGAINST TUBERCULOSIS



More than one third of the world's population is infected with the tubercle bacteria, *Mycobacterium tuberculosis*, but only a small proportion of them fall sick. Little is known about the protective factors. Twin studies have shown, however, that the genetic make-up plays a pivotal role. In a Ghanaian population, we have extensively studied the genes coding for proteins, which recognise infectious agents on the surface of immune cells. By comparing thousands of tuberculosis (TB) patients with non-affected persons, we found that a mutation changing the structure of the recognition molecule TLR1, provides an outstandingly strong protection of 80% against TB. Apparently, this variant of the receptor recognises TB bacteria exceedingly well and stimulates protective immune responses. It is, however, very exclusive. In its protective (homozygous) form, it occurs in no more than 0.6% of the Ghanaians studied and 0.1% of

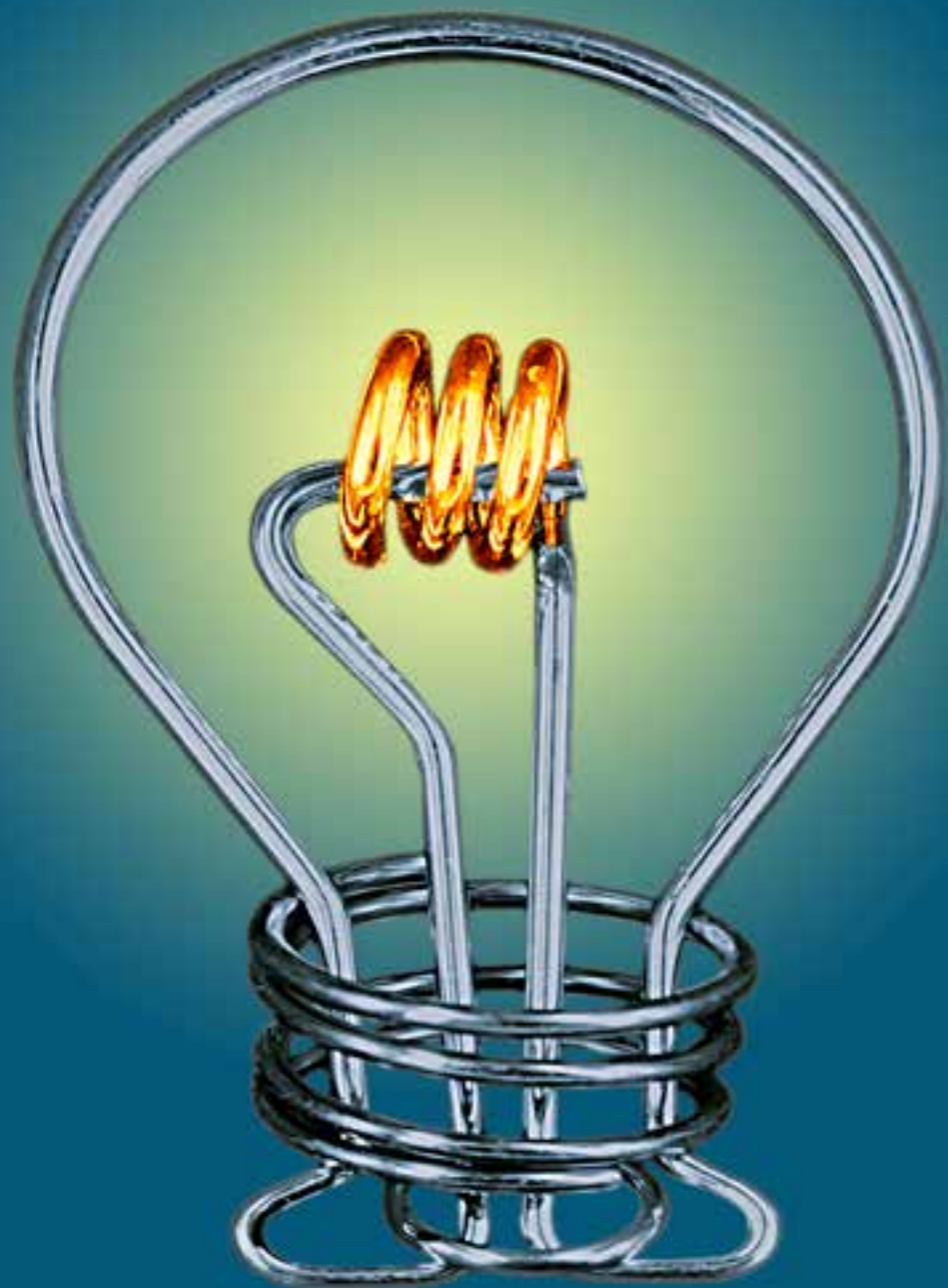
Europeans. Presumably it has either arisen only a few generations ago or is beset with serious disadvantages, otherwise evolution would have spread the mutation more widely.

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*Meyer C.G. et al., PLoS One 2016, 11:e0156046*

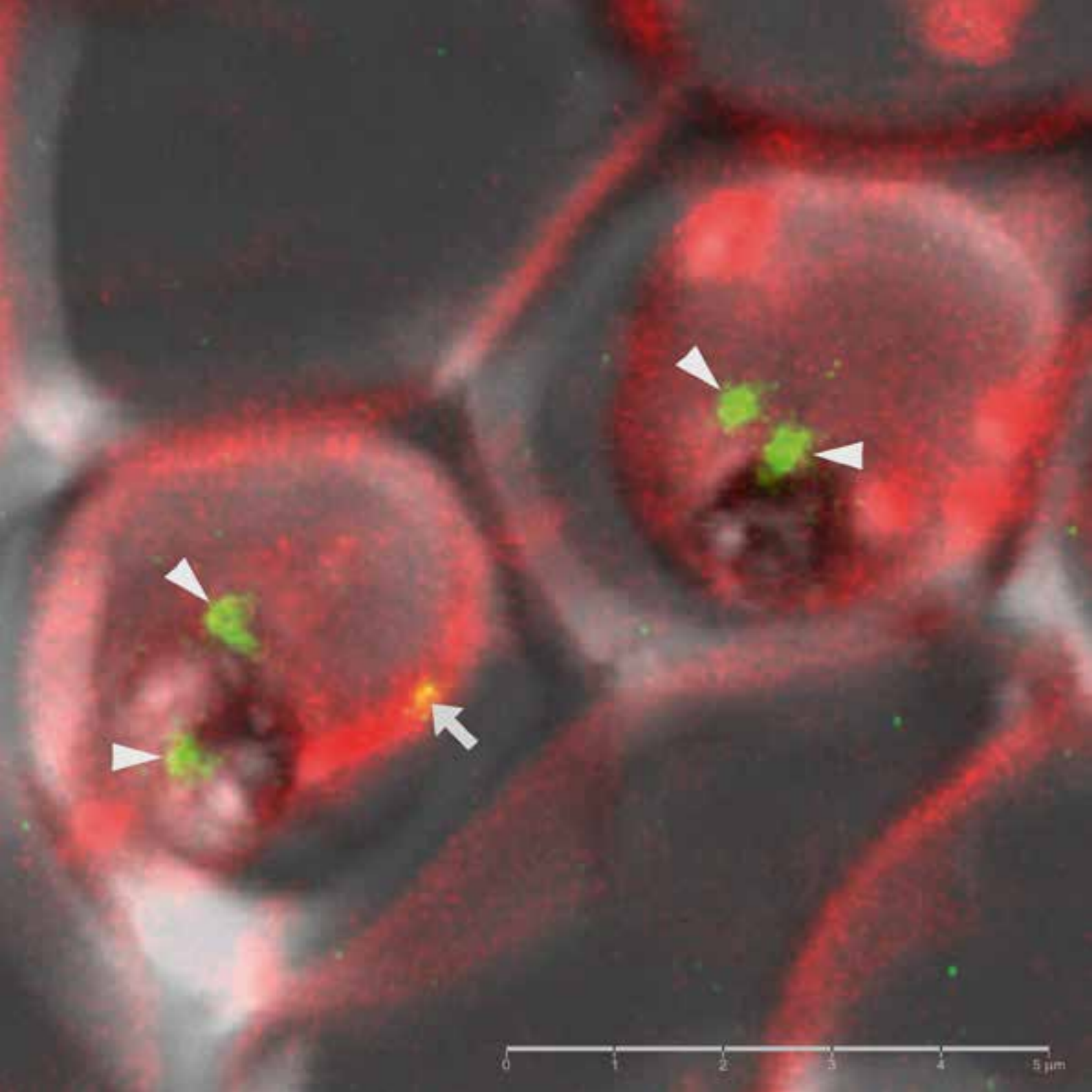
Christian Meyer, Christa Ehmen, Gerd Ruge, Rolf Horstmann, Thorsten Thye and external cooperation partners (see publication)

*Figure:* Atomic structure of TLR1 (*Toll-Like-Receptor 1*, cartoon model in green) in complex with one of the chains of TLR2 (cartoon model in blue). The arrow points to the site where the mutation associated with TB protection changes the structure of the molecule – it affects the binding pocket for the recognition of infectious agents (here orange, shown as sticks).



## METHODS

Although methods are fundamental to all forms of research, their descriptions used to be considered deadpan and unattractive for renowned scientific journals. Thus, seminal methodological breakthroughs commonly were hiding behind titles of publications describing the result of a first application. Nearly fifteen years ago, however, a prestigious publishing house took the risk of launching a purely methodological journal, which meanwhile belongs to the most highly cited and most influential journals in natural sciences. Not surprisingly, since pioneering methods usually are applied frequently, may open entire fields of research and, accordingly, are cited many times. An example is found on the following page: the method is put ahead, and a quite remarkable result is set behind.



Toybox

## GENETIC TOOLBOX TO MODIFY PROTEINS OF PLASMODIUM FALCIPARUM

Genetic modification of *Plasmodium falciparum* is still very tedious and time consuming as standard procedures to achieve integration of DNA into the parasites' genomes are very inefficient. We have developed a new method, which allows manipulating the genes of *P. falciparum* like building blocks, to analyse the function of the encoded proteins. For instance, we can easily filter out parasites, which have successfully integrated an artificial gene, shut off genes right away or on demand, park proteins in the nucleus as a kind of storeroom, etc. To demonstrate the advantages of the new method, we tested it successfully on a dozen genes. Among them, we analysed a particularly important gene encoding a protein (Kelch13) involved in resistance to the drug Artemisinin, the greatest upcoming challenge in malaria treatment worldwide.

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*Birnbaum J. et al., Nat Methods 2017, 14:450-456*

Jakob Birnbaum, Sven Flemming, Nick Reichard, Alexandra Blancke Soares, Paolo Mesén-Ramírez, Ernst Jonscher, Bärbel Bergmann and Tobias Spielmann

*Figure:* Genetically modified *Plasmodium falciparum* in red blood cells (red-grey rings). Green areas mark Kelch13, the yellow dot shows Kelch13 at the parasite membrane.



Sophisticated statistics

### ESSENTIAL CONTROL GROUP

Clinical studies occasionally yield conflicting results for the same objective. For example, there have been studies indicating that patients with malaria come down with life-threatening salmonella blood-stream infections both more frequently and less frequently than patients without concomitant malaria. Together with international colleagues, we have shown that such contradictions result from differences in study designs. The group used for comparison (control group) is critical. Comparing the frequency of malaria among patients who have salmonella blood-stream infections to the frequency of malaria among patients hospitalised with any other disease gives a distorted result. The appropriate control group was a group of patients with a similarly severe disease as the salmonella group, for instance with blood-stream infections by bacteria other than salmonellae, because, regardless of

malaria, they had the same probability of being treated as inpatients in the hospital. Applying this study design, we found that patients with malaria indeed have twice as frequently salmonella blood-stream infections than those without concomitant malaria. Using the unselected control group yielded exactly the opposite result.

*Krumkamp R. et al., Clin Infect Dis 2016, 62 Suppl 1:S83-9*

Ralf Krumkamp, Benno Kreuels, Benedikt Hogan, Anna Jaeger, Lisa Reigl, Jürgen May and external cooperation partners (see publication)

*Figure:* Formulas for the statistical analysis of complex study designs.



Source of error

### MALARIA IMPAIRS ZIKA TEST

Infections with the Zika virus often take such a mild course that the persons don't notice that they are infected. If, however, pregnant women are affected the virus can cause severe child malformations. In these cases, a reliable diagnosis is of utmost importance. A widespread method to detect an ongoing or past infection is based on the detection of serum antibodies directed to the virus. Together with our cooperation partners, we have found that the overall quite reliable test for Zika antibodies may be impaired by other infections such as malaria, occasionally causing false-positive results. Such mistakes would be disastrous if, in pregnant women, they would lead to unnecessary abortions.

*Schwarz N.G. et al., PloS One 2016, 12:e0176708*

Norbert Schwarz, Eva Mertens, Doris Winter, Oumou Maiga-Ascofare, Denise Dekker, Stefanie Jansen, Dennis Tappe, Jürgen May, Jonas Schmidt-Chanasit and external cooperation partners (see publication)

*Figure:* Microtiter plate, standard tool for the ELISA (Enzyme-Linked-Immunosorbent Assay) technique. It contains 96 small wells, in which the diagnostic reactions take place. Commonly, a part of an infectious agent, the antigen, is fixed to the bottom of the well. After adding a diluted serum sample and washing, bound antibodies are being visualised by mouse antibodies, which are directed to human antibodies and labelled with an enzyme catalysing a colour change.





## SNAPSHOT

Joerg Blessmann, MD, BNITM member presently stationed in Southeast Asia, was awarded the third prize in the photography competition "Fully loaded" of the "Globetrotter" company for this picture.



**KCCR**

**KUMASI CENTRE  
FOR  
COLLABORATIVE  
RESEARCH  
(KCCR)**

### **Brief on KCCR**

Having been established as a joint venture between Ghana and Germany for almost twenty years now, the Kumasi Centre for Collaborative Research (KCCR) serves as a platform for health research of overseas partners and their Ghanaian counterparts and continues to maintain its status as the research arm of the college of health sciences at the Kwame Nkrumah University of Science and Technology (KNUST). KCCR has been pivotal in the research agenda of the Ghanaian Ministry of Health, while in recent times facilitating investigations into some epidemic prone diseases such as meningitis and yellow fever, working closely with the Ghana Health Service. KCCR has recently commissioned a new block for offices and space for a biorepository.

### **Research Groups**

There are currently six groups led by senior research scientists including: Buruli Ulcer (Richard Phillips Group), Haematology (Ofori-Acquah Group), Medicine in the Tropics (Owusu-Dabo Group), Onchocerciasis, Lymphatic Filariases (Alex Debrah Group), Paediatric Fevers (May Group), Viruses and Zoonoses (Christian Drosten Group).

### **Projects**

There are at least 32 projects hosted by KCCR that cover mainly communicable diseases, non-communicable diseases, training, and capacity development.

### **Research Themes**

There are ongoing projects on filariasis to refine the antibiotic treatment targeting symbiotic bacteria in filarial worms to alleviate the often underestimated suffering from elephantiasis and tackle drug resistance in onchocerciasis. This also includes assessing genome-wide associations for lymphatic filariasis, developing rapid diagnosis of onchocerciasis using urinary biomarkers, and establishing a filarial clinical trial and research platform to address the patients' needs in relation to the three areas of access to diagnostics and medicines for the treatment of filariasis. This group was awarded three million Euros by the Federal Ministry of Education and Research (German-Africa) to further deepen the understanding of lymphatic filariasis transmission and control. Tuberculosis (TB) projects currently concentrate on typing mycobacterial strains for antibiotic resistance. This includes latent TB infection diagnosis and treatment, and designing point of

care diagnostics for TB case detection particularly among children. The Buruli ulcer project focuses on pathogenesis and management of *M. ulcerans* disease including development of both a rapid test for Buruli ulcer and point of care diagnostic tools, as well as identifying vaccine candidates.

One current malaria project assesses the effect of schistosomiasis infestation on *Plasmodium falciparum* transmission in co-endemic areas and, in a prospective study, will determine immunological responses. Additionally, the team is assessing the effects of indoor residual spraying on the prevalence of asymptomatic malaria and anaemia among school students and is working on capacity building towards genomics and bioinformatics across malaria endemic countries. The use of genetic data for malaria interventions and eradication programmes for graduates, doctoral, and postdoctoral fellows are being explored.

The Virology and Zoonosis group examines virus biology, host ecology, and human behavior as determinants for coronaviral zoonoses and also studies detection of chronic HCV infection and recovery among a cohort of HCV-positive blood donors in Ghana.

The African Research Network for Neglected Tropical Diseases (ARNTD) is a capacity building



academy hosted at KCCR. Since its implementation almost three years ago, it has focused on providing small grants that address the control of neglected tropical disease.

There are also a number of small studies that examine antimicrobial resistance in Ghana. Other bacterial studies investigate the specific microbiota of the nasopharyngeal niche, which are associated with pneumonia in HIV positive children. Typhoid fever studies focus on the burden of the disease and generate immunological data to drive vaccine development and inform evidence-based prevention and control policy (including vaccine policy) in sub-Saharan Africa. KCCR recently conducted a study on an outbreak related to meningitis carriers in Brong-Ahafo and Kumasi.

In April 2013, BNITM introduced a new research group at KCCR to address the epidemiology of non-communicable diseases (NCD) in the low resource setting. The group participated in the RODAM study (Research on Obesity & Diabetes among African Migrants) comparing Ghanaians resident in the EU and Ghana to unravel the causes of obesity and diabetes among African migrants and non-migrants. Insights will inform targeted intervention and prevention and provide a basis for improving diagnosis and treatment. Also

included is the ORDISS (Organ Damage in Sickle Cell Disease Study) study which aims to better understand the process of sickle cell organ damage and be able to suggest biomarkers for vaccine and drug development in particular in relation to pain management. Other research focuses include cervical cancer and hypertension.

### Training for PhDs and MPhil / MSc

The year under review, one PhD and six Masters students graduated while thirteen PhDs and ten Masters students are at various stages of their training.

### Funding sources

KCCR currently hosts and supports a number of projects funded by agencies including the Volkswagen Foundation, German Research Council, German Ministry of Education and Research, Global Fund, British Medical Research Council, Wellcome Trust through MRTG, BNI Hamburg, Gates Foundation, European Union, University of Pittsburgh USA, Loyola University USA, GIZ, WHO/TDR, EDCTP, and NTD-SC, etc.

### Social events

Ingrid Sobel married Peter Timm while Grace Agyekum married Emmanuel Essilfie.

*Ellis Owusu-Dabo, Scientific Director, KCCR*

*Figure: Opening of the new storehouse and other impressions from KCCR*

## Report of the Department of Tropical Medicine of the German Armed Forces

Within the last month, our microbiology team has focused on the evaluation of diagnostic tests in the field of tropical medicine. This includes the comparative analysis of nucleic acid extraction from fixed samples, carried out as a project in our department. Furthermore, two medical doctoral theses focused on the detection of Burkholderia



- bacteria which are particularly dangerous for patients with a weakened immune system. For the expansion of the diagnostic test portfolio for returnees from the tropics, PCR-based methods for the molecular detection of diarrhoea-associated *E. coli* were assessed. Additionally, diagnostic tests for malaria and typhoid fever were evaluated in close collaboration with scientists from the BNITM. This evaluation was funded by the Medical Service of the German Armed Force starting in September 2017. Retrospective surveys in infectious epidemiology showed the rare occurrence of long-term colonisation of the gut with multi-resistant bacteria in returnees from the tropics. *Giardia* and *Schistosoma* used to be most detected pathogens among migrants from endemic regions.

Our work during the Ebola epidemic was also significant during the past few years. After the deployment of volunteers in the first half of 2015, the participation of employees from the Department of Tropical Medicine in numerous information events was requested. The Department itself organized a symposium with the title "Learning from Ebola" at the BNITM, which offered a platform for discussion of outstanding issues and for the exchange of experiences. Representatives of

all big charities, the Medical Service of the German Armed Forces, doctors from the treatment center for highly infectious diseases in Hamburg, Marylyn Addo (Universitysklinikum Eppendorf) as leader of the vaccine development study, colleagues from the Department of Virology of the BNITM with their units from the *European Mobile Laboratory*, and the engineers of the rescue aircraft "Robert Koch" from the Robert Koch Institute, participated in that event.

In January 2016, the Department of Tropical Medicine organized two three-day courses in "Barrier Nursing" for employees of the *Komfo Anokye Teaching Hospital* in Kumasi/Ghana. The hospital works in collaboration with the BMITM in the framework of the ESTHER program, which is founded by the German Society for International Cooperation (GIZ). The subject of management of highly infectious diseases was presented by the Department of Tropical Medicine.

In September 2016, the Department held the "3rd Force Health Protection Congress" together with high-ranking NATO representatives in Hamburg. People from 24 nations joined the congress at the Helmut-Schmidt University.

In October 2016, the Department had the opportunity to speak of their good experiences with international, cross-cultural training courses for the management of highly infectious diseases at the "1er Congrès International Militaire" of the *Médecine Tropicale et de Pathologies Sub-Sahariennes* in Gabes, Tunisia.



Course "Barrier Nursing" at the Komfo Anokye Teaching Hospital in Ghana



"3rd Force Health Protection Congress" in Hamburg

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# Courses

On October 1st 1900, the Institute for Ship and Tropical Diseases opened under the direction of Bernhard Nocht whose idea of an institute, in which patients are treated, diseases researched and the resulting knowledge is communicated to doctors, manifested as such. The training in Tropical Medicine started in January 1901 and in the following 15 years, 836 medical doctors were trained in 43 courses. Training remains an important element of the institute and the range of courses expanded constantly. In the last 15 years, about 1,000 persons received their diploma in Tropical Medicine.



*Historical photograph of the course room*

Course for physicians – 03.04. to 24.06.2016 and 03.04. to 29.06.2017

## **DIPLOMA COURSE ON TROPICAL MEDICINE**

**The objective of the Diploma Course** is to prepare physicians for professional missions in tropical and subtropical countries. The physicians are learning skills to diagnose and treat tropical diseases in travellers as well as migrants and are enabled to provide pre-travel health advice.

**The central topic** of the Diploma Course is the presentation of tropical diseases. Teaching focuses on the pathogenesis, diagnosis, clinical presentation, treatment, epidemiology and prophylaxis of parasitic, bacterial, viral and non-communicable tropical and travel-related diseases. In addition, the biology, epidemiology and control of pathogens as well as their vectors and reservoirs are addressed. Further topics include the particular features of the various clinical disciplines in tropical environments, aspects of community health in low-income countries as well as methods of medical development cooperation and disaster relief. The course also covers migrant and refugee medicine and the basics of occupational medicine in the tropics.

**The curriculum** is divided into thirteen sections. The structure follows the pathogen taxonomy and is complemented by insights into the working fields of travel, migrant and occupational medicine as well as topics from the public health sector. The curriculum

includes ca. 350 hours of lectures as well as 30 hours practical, mainly microscopic tutorials. During the time of the course, the German Reference Library for literature on tropical medicine can be used for private studies. The Diploma Course on Tropical Medicine is accredited by the German Medical Association as part of the continuing education for the additional title „Tropical Medicine“ and by the American Society of Tropical Medicine and Hygiene (ASTMH). The course was credited with 586 (2016) / 366 (2017) training points by the Medical Association Hamburg.

■ **Scientific Direction:**  
Prof. Dr. Gerd Burchard



*Diploma Course 2017*

## DIPLOMA COURSE ON TROPICAL MEDICINE

### General Overviews

Emerging infectious diseases, climate and infectious diseases, global epidemics, clinical trials in the tropics, vaccinology, digital health in tropical medicine and others

### Introductions and Basics

Virology, bacteriology, mycology, protozoology, helminthology, entomology, immunology, principles of immunodiagnosics, introduction into microscopy, introduction into epidemiology

### Virology and viral diseases

Virological diagnostics, HIV and HTLV-1, flaviviral diseases, arenaviruses, filoviruses, bunyaviruses, poxviruses, rabies, MERS and more

### Bacteriology and bacterial diseases

Systemic bacterial infections, rickettsial diseases, relapsing fever, leptospirosis, brucellosis, typhus abdominalis and other salmonellosis, plaque, melioidosis, anthrax, cholera and others; antibiotic resistance in the tropics; mycobacterial diseases: tuberculosis, leprosis, Buruli ulcer and more

### Mycology and fungal diseases

Systemic mycoses, subcutaneous mycoses

### Protozoology and protozoal diseases

Malaria, leishmaniasis, trypanosomiasis, amoebiasis, diseases caused by pathogenic intestinal protozoa, toxoplasmosis

### Helminthology and helminth diseases

Immunology, molecular diagnostics, cestodes and cestode larvae, schistosomiasis, liver and intestinal flukes, lung fluke, nematodes and nematode larvae, especially filariae, pentastomida

### Ectoparasitoses, poisonous animals

Myiasis, tungiasis, scabies, poisonous animals, management of snake bites

### Medicine in the Tropics

Dermatology in the tropics, STDs in the tropics, ophthalmology in the tropics, anesthesia in the tropics, surgery in the tropics, radiology in the tropics, sonography in the tropics, neurology in the tropics, transcultural psychiatry, paediatrics in the tropics, dietary problems in the tropics, health of mother and child, gynaecology and obstetrics, encephalitis and meningitis in the tropics, pneumonia in the tropics, hepatitis and HCC in the tropics

### Non-communicable diseases

Hemoglobinopathies in the tropics, tropical oncology incl. Burkitt-Tumor, diabetes in the tropics, hypertension in the tropics, cardiology in the tropics, renal diseases in the tropics, FMF and Morbus Behçet, toxicology in the tropics

### Travel Medicine and Health Care for migrants and refugees

Risks in travel medicine, malaria prophylaxis, travel vaccination, travelers with pre-existing conditions, aviation medicine, altitude medicine, wilderness medicine, migration, dealing with disease in other cultures, medicine and Islam, screening examinations of asylum seekers, unattended underage refugees, intercultural communication

### Occupational Medicine

Occupational preventative examinations, occupational diseases and workplace-associated diseases, environmental medicine abroad, risk assessment of workplaces in the tropics, particular hazards for special professional groups, fitness for service in the tropics

### Public Health

Epidemiology of infections, general hygiene, hospital hygiene in the tropics, acute intervention in catastrophes, health and culture, health systems and financing, medical development cooperation and international organisations, vaccination programmes, reproductive health, sustainable development goals, district health systems, project management

## LECTURERS OF THE DIPLOMA COURSE ON TROPICAL MEDICINE

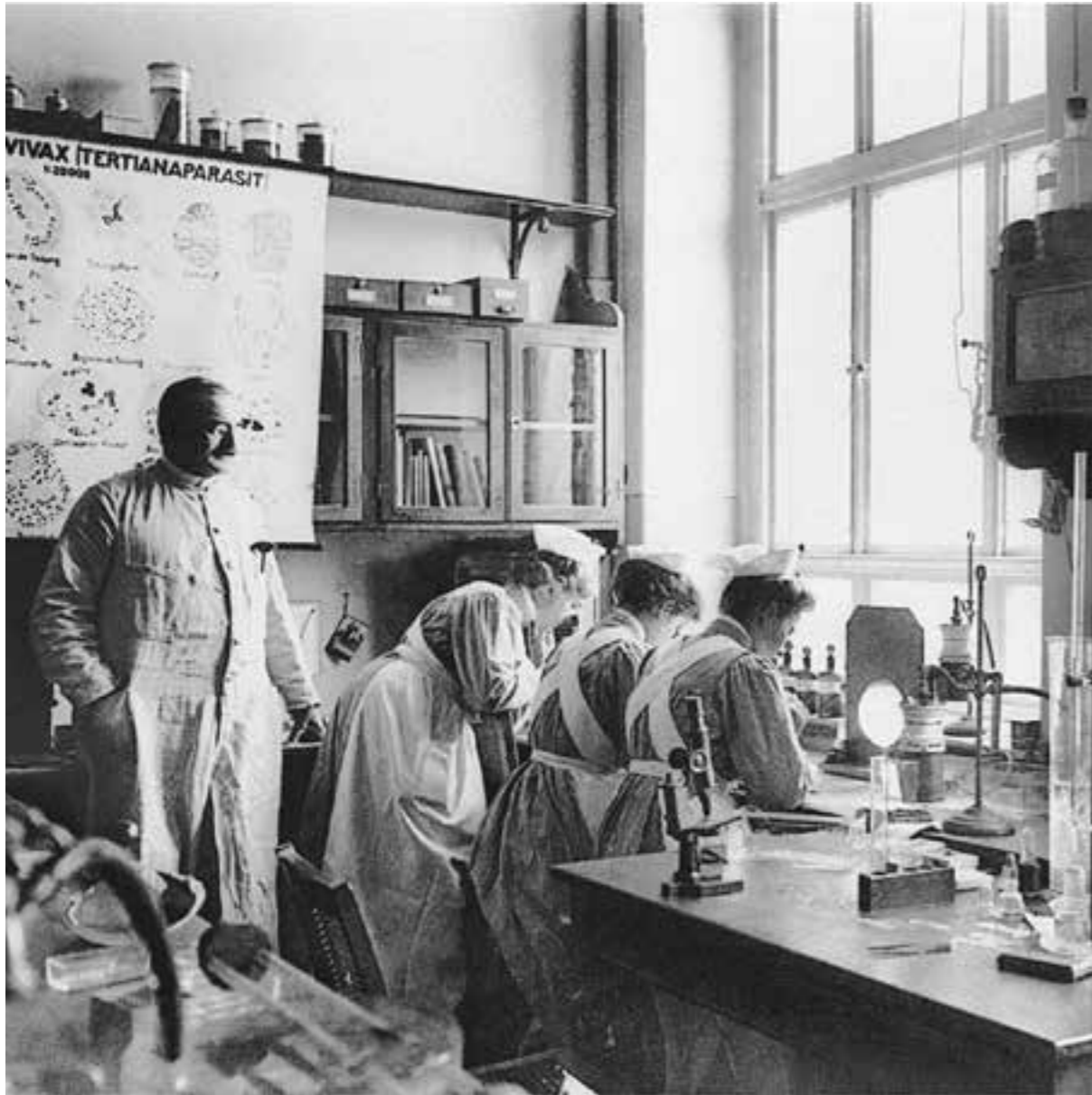
### INSTITUTE LECTURERS

**PD Dr. Norbert Brattig; PD Dr. Minka Breloer; Prof. Dr. Iris Bruchhaus; Prof. Dr. Gerd Burchard; PD Dr. Joachim Clos; Dr. Denise Dekker; Prof. Dr. Bernhard Fleischer; Prof. Dr. Rolf Garms; Prof. Dr. Stephan Günther; Prof. Dr. Rolf Horstmann; Martina-Christine Koschwitz; Dr. Ralf Krumkamp; Prof. Dr. Jürgen May; Dr. Eva Mertens; Dr. Bernd Noack; Prof. Dr. Jonas Schmidt-Chanasit; Prof. Dr. Herbert Schmitz; Prof. Dr. Esther Schnettler; PD Dr. Norbert Georg Schwarz; Prof. Dr. Herbert Schmitz; Prof. Dr. Egbert Tannich; PD Dr. Dennis Tappe; Dr. Christian Timmann**

### EXTERNAL LECTURERS

**Prof. Dr. Marylyn Addo** Universitätsklinikum Eppendorf, Hamburg; **Dr. John Amuasi** University of Minnesota, USA; **Dr. Mary Asiyovogel** Augenärztin, Lübeck; **Dr. Katrin Bangert** Universitätsklinikum Eppendorf, Hamburg; **Dr. Heiko Becher** Universitätsklinikum Eppendorf, Hamburg; **Dr. Jörg Blessmann** University of Health Science Vientiane Lao PDR, Laos; **Dr. Boecken** Auswärtiges Amt, Berlin; **Dr. Matthias Brockstedt** Kinder- und Jugendmedizin, Berlin; **Dr. Alois Dörlemann** Managing Director, Health Focus, Berlin; **Prof. Efraime Jr, PhD** Psychologe und Physiotherapeut, Mosambik; **Prof. Dr. Götz Ehrmann** Zahnarzt; **Prof. Dr. Jochen H. Ehrlich** Med. Hochschule Hannover, Hannover; **Dr. Torsten Feldt** Universitätsklinikum Eppendorf, Hamburg; **Dr. Thomas Fenner** Labor Dr. Fenner und Kollegen, Hamburg; **Dr. Marcellus Fischer** Bundeswehrkrankenhaus, Hamburg; **PD Dr. Herbert Fliege** Auswärtiges Amt, Berlin; **Dr. Antje Fuß** Missionsärztliches Institut, Würzburg; **Bernd Göken** Cap Anamur, Köln; **Dr. Matthias Grade** Christliches Krankenhaus Quakenbrück, Quakenbrück; **Prof. Dr. Uwe Groß** University Göttingen, Göttingen; **Dr. Claudia Herlt** Fachärztin für Allgemeinmedizin, Hamburg; **Dr. Sandra Hertling** Universitätsklinikum Eppendorf, Hamburg; **Prof. Dr. Achim Hoerauf** Universitätsklinikum Bonn, Bonn; **Prof. Dr. Klaus Hoffmann** Zentrum für Psychiatrie, Reichenau; **Dr. Fritz Holst** Philipps-University Marburg, Marburg; **Dr. Dr. Ph. Jens Holst** Hochschule Fulda, Fulda; **Dr. Olaf Horstick** Institute of Public Health (IPH), Heidelberg; **Dr. Frank Hüniger** Klinikum Dortmund, Dortmund; **Dr. Helmut Jäger** Heidekreis Klinikum GmbH, Walsrode; **Prof. Dr. Albrecht Jahn** Institute of Public Health (IPH), Heidelberg; **Dr. Johannes Jochum** Universitätsklinikum Eppendorf, Hamburg; **Dr. Sabine Jordan** Universitätsklinikum Eppendorf, Hamburg; **Dr. Rolf Käthner** Carl Zeiss Microscopy GmbH, Göt-

tingen; **Prof. Dr. Volker Klauß** Praxis Augenärzte Klauß, München; **PD Dr. Robin Kobbe** Universitätsklinikum Eppendorf, Hamburg; **Prof. Dr. Michael Krawinkel** Institut für Ernährungswissenschaft, Gießen; **Dr. Benno Kreuels** Universitätsklinikum Eppendorf, Hamburg; **Dr. Ute Lippert** Hanza Hanseatisches Zentrum für Arbeitsmedizin, Hamburg; **Prof. Dr. Thomas Löscher** Klinikum der LMU, München; **Prof. Dr. Dieter Mebs** Zentrum für Rechtsmedizin, Frankfurt/Main; **PD Dr. Peter Meißner** Klinik für Kinder- und Jugendmedizin, University Ulm; **Dr. Andreas Meyer** Arzt für Allgemeinmedizin, Hamburg; **Prof. Dr. Frank P. Mockenhaupt** Charité, Berlin; **Dr. Andreas Montag** Facharzt für Haut- und Geschlechtskrankheiten und Allergologie, Hamburg; **PD Dr. Henning Mothes** Universitätsklinikum Jena, Jena; **Dr. Andreas Müller** Klinikum Würzburg Mitte gGmbH, Würzburg; **Dr. Thomas Müller** Friedrich-Loeffler-Institut, Insel Riems; **Andreas Neutzling** Tauchmedizin, Meißen; **Prof. Dr. Andreas Nitsche** Robert-Koch-Institut, Berlin; **Dr. Ellis Owusu-Dabo** KCCR, Ghana; **Dr. Rupert Pöschl** Facharzt für Anästhesiologie, Baunatal; **PD Dr. Sven Poppert** Regio Klinikum Wedel, Wedel; **Prof. Dr. Utz Reichard** MVZ wagnerstibbe, Göttingen; **Dr. Dieter Reinel** Dermatologe, Hamburg; **Prof. Dr. Frank Riedel** Facharzt für Kinder- und Jugendmedizin, Hamburg; **Dr. Thierry Rolling** Universitätsklinikum Eppendorf, Hamburg; **Dr. Camilla Rothe** Klinikum der LMU, München; **Dr. Sabine Rüscher-Gerdes** Forschungszentrum Borstel, Borstel; **Dr. Helmut Salzer** Forschungszentrum Borstel, Borstel; **Dr. Clara Schlaich** Fachärztin für Innere Medizin und für Arbeitsmedizin, Hamburg; **Dr. Salvatore Schmidt** Sanitätsamt der Bundeswehr, München; **Dr. Stefan Schmiedel** Universitätsklinikum Eppendorf, Hamburg; **Dr. Peter K. Schmitz** University Bonn, Bonn; **Prof. Dr. Erich Schmutzhard** Universitätsklinik für Neurologie, Innsbruck; **Dr. Jörg Siedenburg** Aeromedical Center München der Deutschen Lufthansa AG, München; **Prof. Dr. August Stich** Missionsärztliche Klinik, Würzburg; **Dr. Tankred Stöbe** Ärzte ohne Grenzen, Berlin; **Dr. Hinrich Sudeck** Tropenmediziner, Hamburg; **Lars Timm** Region AMEOS West, Hildesheim; **Prof. Jan van Lunzen** ViiV Healthcare, UK; **Dr. Christof Vinnemeier** Universitätsklinikum Eppendorf, Hamburg; **Dr. Katrin Völker** Bundeswehrkrankenhaus Hamburg, Hamburg; **Dr. Christian Wagner-Ahlf** BUKO Pharma-Kampagne, Kiel; **PD Dr. Martin W. Weber** WHO Regional Office for Europe, Dänemark; **Waltraut Wernhart** Missionsärztliches Institut, Würzburg, Frankfurt; **Dr. Alexander Wex** Auswärtiges Amt, Berlin; **Dr. Dominic Wichmann** Universitätsklinikum Hamburg-Eppendorf, Hamburg; **Gudrun Zimmermann** Zentrum für Interkulturelles Management & Diversity, Bremen



Historical photograph

Course for Medical Support Staff – 01.02. to 19.02.2016 and 30.01 to 17.02.2017

## Medicine in the Tropics

The course provides basic knowledge in tropical medicine and concentrates on the topics of public health and health care management in the tropics.

### TARGET GROUPS:

Medical staff (nurses, technical assistants, midwives, health economists, etc.) preparing for professional assignments in tropical and subtropical countries. In addition, medical support staff who would like to acquire or expand their knowledge of tropical medicine.



Participants of the Course for Medical Support Staff 2017

### Course Contents

- Tropical infectious diseases: Malaria, leprosy, tuberculosis, schistosomiasis and other helminth diseases, viral infections
- Insects as disease vectors
- Malnutrition
- Update on global epidemics, basics of epidemiology
- General medical aspects: obstetrics, family planning, paediatrics, venereal diseases, dermatology, HIV/AIDS, travel medicine etc.
- Clinical examinations and laboratory techniques, microscopy
- Socio/cultural comparison of health systems
- Intercultural competence
- Hygiene, drinking water
- Nursing practice in the tropics
- Presentation of organisations for international cooperation
- Information systems, literature and internet search
- Teamwork

■ **Scientific Direction:**  
Prof. Dr. Gerd Burchard



## LATEST INFORMATION ON TROPICAL MEDICINE

The course provides information current on the developments and recommendations in medical consultation of travellers such as vaccinations and malaria prophylaxis as well as more specialized topics currently discussed in travel medicine. As such, the

course in 2017 also covered the import of resistant pathogens through travellers (and migrants). The course includes the DTG-Refreshercourse on Travel Medicine.

■ **Scientific Direction:**  
Prof. Dr. Gerd Burchard

Course for Physicians / 28./29.11.2016 and 14.-15.01.2017

## COURSE REFUGEE HEALTH

Given the fact that the number of refugees and asylum seekers is rising in Germany, the medical care of these individuals has to be adequately organised. The physicians involved have to address specialized medical questions, which otherwise do not play a significant role in Germany. They have to take a different disease spectrum, depending on the country of origin, and a different cultural background, which has an impact on sickness, into account. BNITM therefore decided to offer a course on refugee health. The course is intended for physicians who work for example as general

practitioners or as physicians in public health departments and are involved in the medical care of these patients.

The topics of this course follow the guidelines of the German Society for Tropical Medicine and Hygiene (DTG), which designed a curriculum for a certificate "Refugee Health". The course includes the modules "migration", "cultural influence / communication / psychological problems", "diseases" as well as "screening / prevention"

■ **Scientific Direction:**  
Prof. Dr. Gerd Burchard

## REFRESHERCOURSES TROPICAL MEDICINE

The course is intended for physicians interested in tropical medicine, in particular former participants of the "Diploma Course on Tropical Medicine" at the Bernhard Nocht Institute for Tropical Medicine. It addresses recent advances in tropical medicine, including new results from

basic research and new recommendations based on clinical studies and current epidemiological data. Microscopic training is also offered.

■ **Scientific Direction:**  
Prof. Dr. Gerd Burchard

Course for Physicians – 20./21.05. and 11./12.11.2017

## BASIC SEMINAR TRAVEL MEDICINE

Together with the Section Infectiology and Tropical Medicine, I. Medical Clinic, University Hospital Hamburg-Eppendorf, the 32-hours-course Travel Medicine was organized according to the curriculum of the German Society for Tropical Medicine and Hygiene (DTG). This basic seminar conveys basic knowledge about health risks in connection with a journey, specifically to tropical countries, and about measures

for prevention. It also covers indicative aspects of diseases in returnees and aviation medicine. The course is certified through the Medical Association Hamburg and the Academy for Infection Medicine of the German Society for Infectiology.

■ **Scientific Direction:**  
Prof. Dr. Gerd Burchard

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# Facts and Figures

## STAFF

256, including 106 scientists (31.12.2017)

## FUNDING

	2016	2017
	Mio. EUR	Mio. EUR
<b>Public core funding</b>	<b>15,478,200</b>	<b>15,284,200</b>
<b>Third-party funding</b>	<b>8,060,670</b>	<b>6,695,585</b>
<i>Amount passed through to collaborating partners</i>	<i>926,460</i>	<i>1,101,288</i>
<i>Amount retained by BNITM</i>	<i>7,134,210</i>	<i>5,680,297</i>
<b>Additional in-house resources</b>	<b>2,201,975</b>	<b>1,547,567</b>

### Third-party funding has been received from the following organisations:

Alexander von Humboldt Foundation, Federal Foreign Office, Becton Dickinson GmbH, Bio-X-Charge, Federal Office of Agriculture and Food (BLE), German Academic Exchange Service (DAAD), Deutsche Lepra- und Tuberkulosehilfe (DAHW), German Research Foundation (DFG), German Aerospace Center e.V. (DLR), Federal Ministry of Education and Research (BMBF), Euroimmun AG, European Commission, European Federation of Immunological Societies (EFIS), Europese Federatie van Immunologische Verenigingen, GeoSentinel, German Corporation for International Cooperation GmbH (GIZ), German Center for Infection Research e.V. (DZIF), Instand e.V., IUIS Education Committee, Jürgen Manchot Foundation, Kirmser Foundation, Hospital of the Ludwig Maximilians University of Munich, Leibniz Association, Robert Koch Institute, Rockefeller University, Foundation Diagnostik Hilft, Federal Environment Agency (UBA), Vereinigung der Freunde des Tropeninstituts Hamburg e.V. (VdF), Volkswagen Foundation, Wiley-Blackwell



On 31.08.2106 the BNITM has been certified with audit berufundfamilie.

Performance Indicators	2016	2017
<b>Publications</b>	<b>155</b>	<b>110</b>
in peer-reviewed journals	152	105
<i>average impact factor</i>	<i>6,12</i>	<i>7,05</i>
in others	3	5
<b>Qualifications</b>		
Diploma / Masters theses	12	14
Dissertations	26	8
<b>Teaching and Training</b> <sup>1</sup>		
University (SWS <sup>®</sup> )	130	550
Education and training events (days)	130	135
<b>Technology transfer (ongoing)</b>		
Patents and licenses	19	27
Invention	4	2
<b>Laboratory diagnostics</b> <sup>2</sup>		
Number of cases	37.421	32.747
Number of tests	104.000	95.750
<b>Library</b> <sup>3</sup>		
Inventory	41.000	41.000
Journals	66	66
<b>International cooperations</b>		
Jointly funded third-party projects	30	35
<b>KCCR</b> <sup>4</sup>		
Total projects at KCCR	26	26
externally managed projects	14	18

\* Lessons per semester week

<sup>1</sup> **Teaching and Training**  
Knowledge transfer comprises university teaching.

<sup>2</sup> **Laboratory Diagnostics of the Diagnostics Services GmbH**  
*Number of cases:*  
Number recorded submission of samples.  
*Number of tests:*  
Number of performed tests

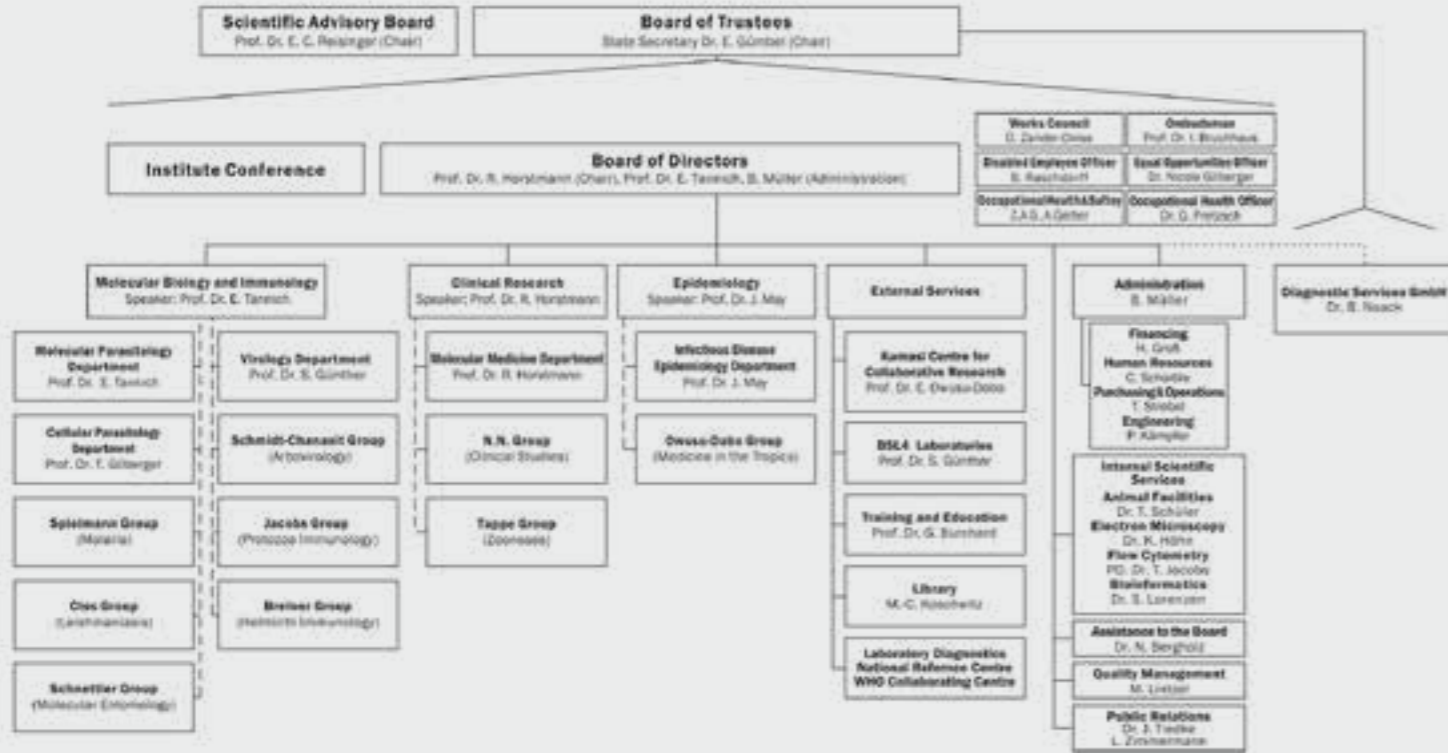
<sup>3</sup> **Reference Library for Tropical Medicine**  
The library participates in a nationwide loan process. Inventory and usage are recorded.

<sup>4</sup> **KCCR**  
Kumasi Centre for Collaborative Research, a joint venture of the Ministry of Health, Republic of Ghana, Kwame Nkrumah University, Kumasi, Ghana, and BNITM

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# Staff

# BERNHARD NOCHT INSTITUTE FOR TROPICAL MEDICINE



Date: 2017

## A) SCIENTIFIC STAFF

(\* = end of employment during the reporting period)

### ■ Molecular Parasitology Department

#### Scientific Staff

Prof. Dr. Egbert Tannich; Prof. Dr. Iris Bruchhaus; Dr. Anna Bachmann; Dr. Hannah Bernin\* (BMBF/DZIF); PD Dr. Hannelore Lotter; Dr. Jenny Matthiesen\*; Dr. Anna Heitmann (BMEL); Dr. Jill Noll (DFG)\*; Dr. Julie Sellau (BWFG, DFG)

#### Doctoral and Graduate Students

Michael Dörpinghaus (Jürgen Manchot Stiftung); Finn Fürstenwerth\*; Constantin König; Dirk Lercher\*; Pedro Lubiana\* (DFG, UHH); Thorben Matthies\*; Nahla Metwally\* (DAAD); Martin Meyer\* (DFG); Sonja Obersteller\*; Torben Rehn (Jürgen Manchot Stiftung); Jill Noll\* (DFG); Helena Fehling\*; Stephan Hoenow (BWFG); Mayke Leggewie\* (Leibniz Graduate School, BMBF/DZIF); Corinna Lender; Judith Scholz\* (Instand e. V.); Jan Stephan Wichers (DFG); Siew Ling Choy (Leibniz-Graduiertenschule); Hanno Niss (BMBF/DZIF)

#### Technical Staff

Christina Herrde; Claudia Marggraff (DFG); Susann Ofori; Heidrun von Thien

#### Visiting Scientists

Amen Rahma\*

### ■ Associated Scientists in the Molecular Parasitology Department

#### Scientific Staff

Prof. Dr. Rolf D. Garms; Dr. Thomas Kruppa; Dr. Susanne Witt (Re-entry)

#### Technical Staff

Silke van Hoorn; Frank Geisinger

#### Student Trainees

Melina Fonfara; Vincent Wolf\*

#### Visiting Scientists

Vargas Wilmar; Alexander Correa\*

### ■ Department Cellular Parasitology

#### Scientific Staff

Prof Dr. Tim Gilberger; Dr. Paul Burda (UHH); Dr. Steffen Erkelenz\*; Dr. Janis Rambow\*

#### Doctoral and Graduate Students

Arne Alder (Jürgen Manchot Stiftung); Dorothee Heincke (UHH)\*; Louisa Wilcke (UHH); Christoph Keil\*; Francis Nkrumah; Sarah Scharf; Louisa Wilcke; Benthe Winkelmann\*; Michael Geiger

#### Technical Staff

Sarah Lemcke (UHH)

#### Student Trainees

Lisa Fuhrmann\*; Jacqueline Kolanski\*; Hanna Matthiesen\*; Yvonne Randi; Annika Schmidtke

#### Visiting Scientists

Tawanda Zininga\*

### ■ Spielmann Group (Malaria)

#### Scientific Staff

Dr. Tobias Spielmann; Dr. Jakob Birnbaum; Dr. Alexandra Blancke Soares\*; Dr. Paolo Mesen-Ramirez (DFG)

#### Doctoral and Graduate Students

Jakob Birnbaum\*; Ernst Jonscher (DFG); Melissa Khosh-Naucke (DFG); Sabine Schmidt (BMBF/DZIF); Ann-Katrin Ullrich\* (DFG); Ricarda Sabitzki; Sarah Smith (DAAD); Johanna Becker\*; Lea Sanchez Milde\* (DAAD); Isabel Naranjo Prado; Svenja Schwald\*; Jan Stäcker; Alexandra Blancke Soares\* (DFG)

#### Technical Staff

Bärbel Bergmann; Ulrike Fröhlke

#### Student Trainees

Thuy Tuyen Tran (DFG/Uni Bonn); Sarah Scharf\*; Anja Schmidt\*

#### Visiting Scientists

Christine Lehmann\*

## ■ Clos Group (Leishmaniasis)

### Scientific Staff

PD Dr. Joachim Clos; Dr. Eugenia Bifeld (EU);  
Dr. Anje Hombach-Barrigah (DFG); Dr. Katharina Bartsch (DFG);  
Vanessa Aduai Sicheri (Humboldt Research Foundation)

### Doctoral and Graduate Students

Katharina Bartsch\* (DFG); Julia Eick\* (EU); Paloma Tejera Nevado\* (EU);  
Henner Zirpel (DFG); Constanze Kröber; Judith Laurentius

### Technical Staff

Marlis Badusche; Andrea MacDonald; Dorothea Zander-Dinse;  
Sandra Arriens\* (DFG); Christine Brinker

### Student Trainees

Christine Brinker\*; Miriam Martens\*; Henriette Rehn\*

### Visiting Scientists

Anna Heitmann\*

## ■ Hagedorn Group

### Scientific Staff

Dr. Monica Hagedorn\*; Dr. Lilli Gerstenmaier\* (DFG);  
Dr. Ann-Kathrin Tilly\*\*

### Doctoral and Graduate Student

Ombretta Colasanti\*; Yannick Brenz\* (DFG); Lilli Gerstenmaier\* (DFG)

## ■ Schnettler Group (Molecular Entomology)

### Scientific Staff

Prof. Dr. Esther Schnettler (BMBF/DZIF);  
Dr. Mayke Leggewie (BMBF/DZIF)

### Doctoral and Graduate Students

Eric Agboli (DAAD)

### Technical Staff

Marlis Badusche; Michelle Helms (BMEL)

## ■ Virology Department

### Scientific Staff

Prof. Dr. Stephan Günther; Dr. Sophia Reindl; Dr. Michael Schreiber;  
Prof. Dr. emer. Herbert Schmitz; Dr. Petra Emmerich-Paloh;  
Dr. Elisabeth Fichet-Calvet (BMG, DFG); Dr. Martin Gabriel (EU, BMG);  
Dr. Meike Pahlmann (DFG); Dr. Romy Kerber; Dr. Maria Rosenthal;  
Dr. Lisa Oestereich (BMBF/DZIF); Dr. Toni Rieger (EU);  
Dr. Martin Rudolf (EU); Dr. Sophie Duraffour (BMG);  
Ronald von Possel (Euroimmun); Dr. Yaiza Fernández García (BMBF);  
Dr. Deborah Ehichioya (Humboldt Research Foundation)

### Doctoral and Graduate Students

Heidi Auerswald\* (EU); Tobias Holm (DFG); Paula Ruibal Montoro\* (EU);  
Dominik Vogel (DFG); David Wozniak (DFG);  
András Bencsik; Veronika Brinschwitz\*; Xenia Jentgens\*; Anna Kiss;  
Anja Lüdtke\*; Linda Niemetz\*; Maximilian Schulz\*;  
Anke Thielebein (AA, BMG); Silke Olschewski (Jürgen Manchot Stiftung)

### Technical Staff

Beate Becker-Ziaja\*; Sabrina Bockholt (BMBF/DZIF);  
Elisa Pallasch (BMBF/DZIF); Stephanie Wurr; Nadja Gogrefe (EU, DFG);  
Carola Busch; Marzenna Domagalski\* (RKI); Kerstin Krausz;  
Corinna Thomé-Bolduan; Neele Neddersen (BMG, EU, BMBF/DZIF);  
Alexander Schlaphof; Mathias Hartmann\* (Translationsfond);  
Michaela Bockelmann (AA); Julia Hinzmann (BMBF/DZIF);  
Maboubah Mahjoubi\* (AA); Agnieszka Malota (AA); Jonas Müller (EU);  
Angela Parczany\* (AA); Sabine Kleuckling

### Student Trainees

André Fienemann\*; Fenja Harder\* (EU); Maibritt Kretschmer (EU);  
Julian Leefmann\* (EU); Franziska Meusel\* (EU)

### Visiting Scientists

Adesina Adetunji; Umaru Bangura\*; Gédéon Bongo\*;  
Dr. Beatriz Escudero Pérez\*; Ákos Gellért\*; Sergio Gómez Medina\*;  
Yemisi Ighodalo\*; Bafoday Jatta\*; Liana Kafetzopoulou; Dr. Claudia Kohl\*;  
Michel Koropogui\*; Fara Raymond Koundouno\*; Angelika Lander\*;  
Mark Anthony Luz\*; Meheretu Yona Madebo\* (DFG); Joachim Marien\*;  
Jürgen Müller-Guhl; Dr. Cesar Muñoz-Fontela\*; Dr. Emily Nelson\*;  
Catherine Olal\*; Dr. Bernadett Pályi\*; Julia Port\*; Monika Rottstegge\*;  
Dr. Paula Ruibal Montoro\*; Anges Yadouleton\* (DFG)

### Visiting Scientists (EMLab)

Dr. Anna Maisa\*; Dr. Susann Handrick\* (EU); Dr. Verena Klümpers\* (EU);  
Julia Hinzmann\*; Dr. Thomas Strecker\*; Dr. Sandra Beermann\*;  
Dr. Cristina Domingo Carrasco\*; Nicole Hetzelt\*; Dr. Andreas Kurth\*;  
Dr. Philipp Raab\*; Dr. Constanze Yue\*; Eva Kuisma\*; Koffi Mathurin  
Koumoin\*; Dr. Janine Michel\*; Dr. Antonio Mazzarelli\*;  
Dr. Rebecca Surtees\*

## ■ Schmidt-Chanasit Group (Arbovirology)

### Scientific Staff

Prof. Dr. Jonas Schmidt-Chanasit; Dr. Daniel Cadar;  
Dr. Stephanie Jansen (BMBF/DZIF); Dr. Hanna Jöst (BMBF/DZIF);  
Dr. Renke Lühken (BMEL); Dr. Jessica Börstler\* (AA)

### Doctoral and Graduate Students

Johannes Friedrich\* (BMBF/DZIF); Linda Jaworski (BMEL);  
Sandra Oerther; Stefan Pfister\*; Jessica Börstler\*; Nariman Shahhosseini\*  
(Leibniz Graduate School); Alexandru Tomazatos

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Lisa Kustermann (BMBF); Leonie Meya\*; Anucha Ponyiam; Branka Zibrat;  
Clemens Schlink\*

### Student Trainees

Marthe Claußen\*; Julian Leefmann\*

### Visiting Scientists

Xenia Augsten\*; Lilian Avilla\*; Tania Ayllori Santiago\*; Xuan Su Hoang\*;  
Madeleine Königer\*; Van An Nguyen\*

## ■ Immunology Department

### Scientific Staff

Prof. Dr. Bernhard Fleischer\*; Dr. Matthias Hauptmann\*;  
Dr. Christian Keller\*; Dr. Anke Osterloh\* (VW-Stiftung, RKI);  
Dr. Jessica Rauch\*

### Doctoral and Graduate Students

Liza Heine\*; Sabrina Osterhof\*; Michael Petermann\*; Jakob Schwemmler\*;  
Nadine Stetter\*; Stefanie Papp\*; Kristin Moderzynski\* (VW-Stiftung)

### Technical Staff

Svenja Kühl

### Student Trainees

Hella Schwanke\*

## ■ Jacobs Group (Protozoan-Immunology)

### Scientific Staff

PD Dr. Thomas Jacobs; Prof. Dr. Bernhard Fleischer (VW-Stiftung);  
Dr. Annemieke Abel (DFG); Dr. Mathias Riehn; Dr. Julie Sellau\*;  
Dr. Rafael de Freitas e Silva (Humboldt Research Foundation);  
Dr. Lidia Bosurgi (UKE); Dr. Maria Mackroth (UKE, BMBF/DZIF)

### Doctoral and Graduate Students

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Scheu\*; Auriane Carcone\*; Sarah Elbaz\*; Stephane Gankou; Rosa Isela  
Grote-Gálvez (Konrad-Adenauer-Stiftung); Stephan Hoenow\*;  
Michelle Vanessa Kamga Kapchoup; Bastian Kruse\*; Imke Liebold (UKE);  
Hannes Michelsen\*; Yanina Arana Policarpo (DAAD); Rhamin Shakiba\*;  
Mona Tabel\*; Vincent Wolf

### Technical Staff

Lea Kaminski (BMBF/DZIF); Ulricke Richardt; Christiane Steeg;  
Birgit Hüsing

### Student Trainees

Antonia Wierk\*; Vera Brackrock; Atchana Ganesalingam\*; Franziska Karl\*;  
Leonie Ott\*; Ella Weinert\*

## ■ Breloer Group (Helminth-Immunology)

### Scientific Staff

PD Dr. Minka Breloer; Dr. Wiebke Hartmann (DFG);  
Dr. Nils Kruse (DFG)\*; Dr. Martina Reitz

### Doctoral and Graduate Students

Annette Beatrix Schlosser\*; Nikolas Rüdiger (Leibniz-Graduiertenschule);  
Nadine Stetter (BWFG)

### Technical Staff

Marie-Luise Brunn

### Student Trainees

Andrea Iteka\*; Kim Steffens\*

## ■ Molecular Medicine Department

### Scientific Staff

Prof. Dr. Rolf Horstmann\*; Dr. Kathrin Schuldt\*; Dr. Thorsten Thye;  
Dr. Christian Timmann; Prof. Dr. Gerd Burchard;  
Dr. Christina Deschermeier (EXIST); Dr. Yang Liu (EXIST);  
Dr. Angela Mika; Dr. Stephan Lorenzen; Dr. Ulrike Thalmaier\* (EU)

### Doctoral and Graduate Students

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Christa Ehmen; Birgit Förster; Britta Liedigk; Anna-Maria Mallmann\* (EXIST); Birgit Muntau; Gerd Ruge (AA); Jürgen Sievertsen;  
Valentina König (EXIST)

## ■ Associated Scientists in the Molecular Medicine Department

### Scientific Staff

PD Dr. Klaus Erttmann\*; PD Dr. Norbert W. Brattig; Prof. Dr. Paul Racz;  
Dr. Klara Tenner-Racz; Dr. Simone Kann\*

### Technical Staff

Silke van Hoor

### Visiting Scientists

Nancy Ngwafu\*, Elizabeth Sentongo\*, MSc Sara Barati\*,  
Shahid Chamram

## ■ N.N. Group (Clinical Research)

### Scientific Staff

Dr. Jakob Cramer\*; Dr. Kirsten Eberhardt; Dr. Stefanie Schoppen\*

### Technical Staff

Abdul-Malik Chimsi Haruna\* (GIZ)

### Student Trainees

Michael Dörpinghaus (GeoS)

## ■ Tappe Group (Zoonoses)

### Scientific Staff

Prof. Dr. Dennis Tappe; Dr. Jessica Rauch

### Technical Staff

Ute Mehlhoop; Petra Allartz; Petra Eggert; Yvonne Gross\*

## ■ Infectious Disease Epidemiology Department

### Scientific Staff

Prof. Dr. Jürgen May; Dr. Oumou Maiga-Ascofaré (BMBF/DZIF);  
Dr. Denise Dekker (BMBF/DZIF); Dr. Daniel Eibach;  
Dr. Nicole Sunaina Gilberger (BMBF/DZIF); Dr. Benedikt Hogan\* (BMBF/DZIF);  
Ralf Krumpkamp (BMBF/DZIF); Dr. Eva Mertens (BMBF/DZIF, AA);  
PD Dr. Norbert Schwarz (AA, BMG, Humboldt Research Foundation);  
Cassandra Aldrich\* (BMBF/DZIF); Dr. Jörg Blessmann;  
Barbara Bürkin (AA, BMG); Maike Lamshöft (BMBF/DZIF);  
Lisa Reigl (BMBF/DZIF, BMZ); Dr. Eva Lorenz;  
Dr. Dewi Ismajani Puradiredja (AA, BMG); Ricardo Strauss (BMG, AA);  
Dr. Florian Gehre (BMZ); Dr. Benno Kreuels (UKE);  
Dr. Peter Sothmann (UKE); Dr. Thierry Rolling (UKE);  
Dr. Christof Vinnemeier (UKE)

### Doctoral and Graduate Students

Luise Sophie Ammer\*; Matilda Ayim-Akonor (DAAD); Konstantin Franke\*;  
Wiebke Herr; Shari Elena Kapischke\*; Sebastian Krannich\*;  
Vinzent Levermann\*; Sophia Melhem (BMBF/DZIF); Enusa Ramani\*;  
Christina Rohmann\* (BMBF/DZIF); Kira Schütze; Maria Johanna Tapken;  
Marlow Zimmermann (BMBF/DZIF); Hassan Al-Emran\* (BMBF/DZIF)

### Technical Staff/Project- and Data Management

Nassim Behjat-Mohammadi (BMBF/DZIF, AA, Humboldt Research Foundation);  
Johanna Brinkel (BMBF); Anna Jaeger (BMBF/DZIF);  
Wibke Loag; Doris Winter (BMBF/DZIF)

### Student Trainees

Luisa Korte; Myrtha Eggert; Sara Steinfurth\*; Luisa Korte

### Visiting Scientists

Kennedy-Gyau Boahen\*; Prof. Dr. Julius Fobil

## ■ Owusu-Dabo Group (Medicine in the Tropics)

### Scientific Staff

Dr. Ellis Owusu-Dabo; Dr. Michael Nagel\*; Dr. Sampson Pandam Salifu;  
Augustina A. Sylverken (KCCCR); Dr. Denis D. Yar

### Doctoral and Graduate Students

Aliyu Mohammed; Samuel N. Darko; Nana Y. Awua-Boateng;  
Denis D. Yar; Caleb O. W. Sarfo; John Amuasi; Alexander Kwarteng

### Technical Staff

Isaac Aguna; Kwadwo Asante

## ■ Electron Microscopy

### Scientific Staff

Dr. Katharina Höhn

## ■ Central Diagnostic Unit / National Reference Centre

### Scientific Staff

Prof. Dr. Bernhard Fleischer\*; Prof. Dr. Stephan Günther;  
Prof. Dr. Rolf Horstmann\*; Prof. Dr. Egbert Tannich;  
Dr. Petra Emmerich-Paloh; Dr. Martin Gabriel; Dr. Bernd Noack;  
Prof. Dr. Jonas Schmidt-Chanasit; Dr. Philip Eisermann;  
Prof. Dr. Dennis Tappe

### Technical Staff

Fatma Firat (RKI); Alexandra Veit (RKI); Insa Bonow; Anja Schörle;  
Inga Bandholz; Doreen Bockmeyer; Yalini Chandraseelan; Nina Klein\*;  
Jürgen Müller-Guhl\*; Dorte Noack\*; Suzana Pinto de Jesus;  
Britta Rieckmann; Stefanie Ruben

## ■ Clinical Laboratory

### Scientific Staff

Prof. Dr. Egbert Tannich

### Technical Staff

Birgit Raschdorff; Doris von Schassen; Christine Wegner; Iris Zielke

## ■ Kumasi Centre for Collaborative Research in Tropical Medicine (KCCR), Ghana

### Scientific Staff

Prof. Dr. Ellis Owusu-Dabu; Kerstin Shand (Head of Laboratories)\*

### Doctoral and Graduate Students

Dr. Otchere Addai-Mensah; Anthony Afum-Adjei Awuah; Priscilla Anti;  
Mitchell Agbo; Daniel Antwi-Berko; Augustina Angelina Annan; Ebenezer  
Badu; Sandra Baffour Awuah; Linda Batsa; Albert Dompok; Alexander  
Kwarteng; Rita Nartey; Evans Ewald Nkrumah; Jubin Osei Mensah; Kenneth  
Bentum Otobil; Emelia Oteng-Seifah; Michael Owusu; Lawrence Annison,  
Michael Frimpong, Kennedy Boan Gyau

### Technical Staff

Kerstin Shand (Head of Laboratories)\*; Dr. Pandam Salifu (Deputy Head  
of Lab from 09/2012), Dr. Michael Nagel (Head of Lab from 10/2013);  
Esimebia Adjovi Amegashie; Richard Larbi

## ■ Animal Facilities

### Scientific Staff

Dr. Thomas Schüler

### Technical Staff

Arshad Ali; Meral Araz; Constantin Pretnar; Aline Adam; Doris Kuri;  
Meryem Küçük; Beate Richter; Yvonne Richter

## B) SUPPORT STAFF

(\* = end of employment during the reporting period)

### ■ Administration

#### Business Management

Birgit Müller, Business Managing Director

#### Finance

Herbert Groß (Leiter); Ata Atayi; Susanne Crohn; Simone Güllk; Dörte Kröhnert; Christiane Melzer\*; Ruth Petersen\*; Regina Senet; Anja Strebel; Maik Wortmann

#### Personnel

Carsten Schaible (Leiter); Katja Bünger; Linda Dvorak; Melanie Fuchs (Azubi); Anja Göttsche; Jennifer Hallmann; Ulrich Kretschmer; Jeannette Meurer

#### Purchasing and Operations

Thomas Strebel (Leiter); Werner Bormann; David Campbell; Stefan Elfert; Stephan Gadow; Riza Güven; Alexander Henkel; Katrin Himstedt; Rainer van Hoorn; Irmela van Kempen; Önder Küçük; Stefanie Meftah; Frauke Rau; Susanne Scherlitz; Marc Schiffner\*; Karin Schröder\*; Marie-Annique Stadie; Sylvie Szagarus\*; Jens-Peter Voß; Simone Witt

#### Technical Service

Paul-Gerhardt Kämpfer (Leiter); Thorben Adam; Claus Ahrens\*; Rainer Fromm; Andreas Lange\*; Frank Lipiota; René Loose; Patrick Mach; Marc Schiffner; Joachim Zietzschmann

#### Cleaning Staff

Grace Asare-Bediako; Sandy Chaimanatzis-Mohr; Bianka Dehus; Serpil Demir; Monika Dreessen; Cevahir Güven; Petra Hartmann; Naima Helbig; Güler Kanak; Birgit Mohr-Flügge; Claudia Scharloh; Nadine Schiffner; Annette Schwarzbach; Corinna Stallbaum; Kudret Sügök\*; Meral Tezcan; Serpil Tosun; Gülbahar Ulucan; Türkan Ulucan; Kadriye Yesilkaya; Sylvia Zanner

### ■ Scientific Services and Secretarial Staff

#### Library

Martina-Christine Koschwitz; Irene Michael

#### Photography

Klaus Jürries

#### Scientific Services and Public Relations

Dr. Natalie Bergholz (Assistance to the Board); Dr. Eleonora Schönherr; Dr. Jessica Tiedke and Laura Zimmermann, scientific representatives/public relations; Anneke Novak-Funk (DZIF); Martina-Christine Koschwitz; Jeannette Meurer

#### Occupational Services

Agnes Gerber, external specialist (Centre for Occupational Safety, Health and Environmental Protection); Dr. Toni Rieger

#### Quality Management

Maren Lintzel

#### Secretarial Staff

Britta Rehn, Board, Section Clinical Research  
Wiebke Böhm, Section Molecular Biology and Immunology  
Daniela Krüger\*, Department Infectious Disease Epidemiology  
Ulrike Kolander, Department Infectious Disease Epidemiology, Association of Friends of the Tropical Institute Hamburg e.V. (VdF), German Society of Tropical Medicine and International Health (DTG),  
Elke Werner, Courses, German Society of Tropical Medicine and International Health)

### ■ Staff Committee

#### Work council until 30.03.2017

Dorothea Zander-Dinse (Chairwoman); Beate Becker-Ziaja; Sabine Kleuckling; Andreas Lange; Mathis Petersen\*; Constantin Pretnar; Dr. Maria Rosenthal; Dr. Norbert Schwarz

#### Work council since 31.03.2017

Dorothea Zander-Dinse (Vorsitz); Dr. Stephanie Jansen; Sabine Kleuckling; Constantin Pretnar; Dr. Maria Rosenthal; Marc Schiffner; Dr. Norbert Schwarz

## C) OTHER PERSONNEL KCCR, GHANA

(\* = end of employment during the reporting period)

#### Management

Prof. Ellis Owusu-Dabo (Scientific Director) until 30.10.2017;  
Prof. Richard Odame Phillips (Scientific Director since 01.11.2017);  
Mrs. Ingrid Sobel (Head of Administration)

#### Administration

Sebastian Kankam (Senior Accountant); Francis Dorman (Senior Accountant); Henrietta Addai (Prin. Admin. Secretary); Jeffrey Agyeman (Systems Operator); Foster Boateng (Logistician); Elvis Oduro Adomako (Accountant Assistant); Emmanuel Kwaku Essilfie (Logistician Assistant); Grace Agyemang Agyekum (Office Assistant); Prisca Morkporkor Fiadoze (Receptionist/ Office Assistant)

#### Transport

Senyo Dompey (car mechanic/driver); Joseph Teye (car mechanic/driver); Robert Acheampong (driver); Paul Marfo Bekyir (driver); Philip Frimpong (driver)

#### Security

Dominic Adongo (Head); Andrews Baka; Francis Ayerakwa; Yaw Dankwa; Fidalis Ayomah, Simon Ayomah (until 30.11.2017)

#### Field/ Cleaning

Helina F. K. Amaning (caretaker); Eric Baba Amotchaab (gardener); Immaculate Kudimaya (cleaner); Christopher Tan (gardener); Comfort Yamson (senior cleaner); Rita Gyekye (cleaner); Mariam Issifu (cleaner)



---

# Appendix







V. von Kalkreuth, F. Konings, P. Aaby, Y. Adu-Sarkodie, M. Ali, A. Aseffa, S. Baker, R. F. Breiman, M. Bjerregaard-Andersen, J. D. Clemens, J. A. Crump, L. M. Cruz Espinoza, J. F. Deerin, N. Gasmelseed, A. G. Sow, J. Im, K. H. Keddy, L. Cosmas, **J. May, C. G. Meyer**, E. D. Mintz, J. M. Montgomery, B. Olack, G. D. Pak, U. Panzner, S. E. Park, R. Rakotozandrindrainy, H. Schutt-Gerowitt, A. B. Soura, M. R. Warren, T. F. Wierzb, and F. Marks, 'The Typhoid Fever Surveillance in Africa Program (Tsap): Clinical, Diagnostic, and Epidemiological Methodologies', *Clin Infect Dis*, 62 Suppl 1 (2016), S9-S16.

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## Book Chapters and Mongraphs

**N.W. Brattig**, Utzinger J, Bergquist R, Chimbari M, Zinsstag J; Ecohealth: An African Perspective, in *Acta Tropica - Special Issues*; 2017, Vol. 175

**G. D. Burchard**, 'Berufsbedingter Auslandsaufenthalt - Infektionsprophylaxe', in *Handbuch der Betriebsärztlichen Praxis*, ed. by F. Hofmann. Ecomed, 2017, pp. 1-30.

**G. D. Burchard**, 'Infektionsschutz in der Reisemedizin', in *Handbuch der Infektionskrankheiten. Epidemiologie, Diagnostik, Therapie, Prophylaxe, Gesetzliche Grundlagen*, ed. by F. Homann. Ecomed, 2017, pp. 1-25.

**G. D. Burchard** and M. Grobusch, 'Central Africa', in *Infectious Diseases, a Geographical Guide*, ed. by E. Petersen. Wiley Blackwell, 2017, pp. 78-92.

**S. Duraffour**, O. Ferraris, and C. Peyrefitte, 'Cowpox and Monkeypox', in *Traité Emc De Maladies InfectieusesElsevier Masson SAS*, 2016.

D. Erpenbeck, T. Bergen, T. Wittenberg, **E. Tannich**, C. Wegner, C. Münzemayer, and M. Benz, 'Basic Statistics of Sift Features for Texture Analysis', in *Bildverarbeitung für die Medizin 2016* (Berlin, Heidelberg: Springer, 2016), pp. 98-103.

V. Heussler, **T. Spielmann**, F. Frischknecht, and **T. Gilberger**, 'Plasmodium', in *Molecular Parasitology: Protozoan Parasites and Their Molecules*, ed. by J. Walochnik and M. Duchene. Springer, 2016, pp. 241-84.

## Other Publications

**G. D. Burchard** 'Wichtige Importierte Erkrankung: Mit Malaria muss sich jeder Arzt auskennen', *Pädiatrie hautnah*, 28 (2016), 31-33.

S. Krappe, M. Benz, A. Gryanik, **E. Tannich**, C. Wegner, M. Stamminger, T. Wittenberg, and C. Münzemayer, 'Automated Plasmodia Recognition in Microscopic Images for Diagnosis of Malaria Using Convolutional Neural Networks', *SPIE Medical Imaging. International Society for Optics and Photonics* (2017), 1014008-008.

H. Prange and **G. Burchard**, 'Akute Demyelinisierende Enzephalomyelitis (Adem) Nach Schutzimpfungen?', *Arzneimittelverordnung in der Praxis*, 4 (2017), 89-92.

**J. Schmidt-Chanasit** and B. Schumacher, 'Reisewarnung Wegen Zika-Viren', *MMW Fortschr Med*, 158 (2016), 8.

**J. Tiedke** und **J. Schmidt-Chanasit**, 'Dengue-Fieber', *Blutbild*, 31 (2017), 1-4.

**J. Tiedke** und **J. Schmidt-Chanasit**, 'Zika - ein weiteres Virus auf Weltreise', *Diagnostik im Dialog*, 50 (2016), 9-12.

**J. Tiedke** und **J. Schmidt-Chanasit**, 'Zika-Virus Eine Zoonose auf dem Vormarsch', *labor&more*, 7 (2016), 26-30

## Master Theses 2016/ 2017

Arne Alder, 'Funktionelle Charakterisierung invasionsbeteiligter Proteine in *Plasmodium falciparum* (Welch, 1897)' (2016)

Johanna Becker, 'Identification of new parasitophorous vacuole proteins in the human malaria parasite *Plasmodium falciparum*' (2016)

Veronika Brinschwitz, 'Expression and purification of the SFTS-virus L-protein and its segments' (2017)

Auriane Carcone, 'Induction of PD-11 on DEC205+ dendritic cells during Malaria does not lead to impaired CD8+ T cells stimulatory capacity' (2017)

Ombrett Colasanti, 'A role for escort and autophagy during mycobacterial cell-to-cell transmission' (2016)

Sarah Elbaz, 'Analyse der Hepatomazelllinie Hepa 1-6 CR1 hinsichtlich Stimulationsfähigkeit und Zellproliferation' (2016)

Finn Fürstenwerth, 'Interaction of human brain endothelial cells (HBEc-5i) and Plasmodium falciparum under heat stress conditions' (2017)

Marie Groneberg, 'E. histolytica abhängige Immunmodulation von Monozyten und Makrophagen' (2017)

Liza Heine, 'Empfänglichkeit von verschiedenen Makrophagen-Populationen für die Infektion mit Rickettsia typhi' (2016)

Stefan Hoenoer, 'Untersuchungen zur Funktion von IL-22 in der experimentellen Malaria' (2016)

Lea Kaminski, 'Untersuchung der suppressiven Eigenschaften von PD-1+CD4+ T-Lymphozyten des Menschen' (2017)

Bastian Kruse, 'Untersuchungen zur Funktion von CD160 im Verlauf der experimentellen Malaria' (2017)

Dirk Lercher, 'Die Lokalisation putativer Pathogenitätsfaktoren in Entamoeba histolytica (Schaudinn, 1903)' (2017)

Imke Liebold, 'Untersuchung zur Induktion von regulatorischen T-Zellen durch Plasmodien-Antigene auf infizierten Erythrozyten' (2016)

Thorben Matthies, 'Strukturelle und biochemische Charakterisierung der Alkoholdehydrogenase EHL\_088020 aus Entamoeba histolytica (SCHAUDINN, 1903)' (2017)

Melina Mühlenpfordt, 'Evaluation of protective, immunological and cytotoxic properties of synthetic immune-stimulatory molecules for the treatment of intracellular Leishmania major infection' (2016)

Sonja Obersteller, 'Establishment of CHO cell lines expressing human endothelial receptors for the analysis of the cytoadhesion of Plasmodium infected erythrocytes' (2017)

Elena Riel, 'Mutagenic Analyses of the Miltefosine Transporter in *Leishmania donovani* (Ross, 1903)' (2017)

Annette Beatrix Schloßer, 'Die Rolle der C-Typ-Lektin-Rezeptoren während der Immunantwort gegen parasitäre Nematoden' (2107)

Sabine Schmidt, 'Identification of essential parasite-specific genes in the human malaria parasite Plasmodium falciparum' (2017)

Marius Schmitt, 'Localization of *Plasmodium vivax* (Grassi and Feletti, 1890) VIR proteins by means of *Plasmodium falciparum* (Welch, 1897) transgenic cell lines' (2016)

Maximilian Schulz, 'Characterisation of Recombinant Arenaviruses' (2017)

Jan Stäcker, 'Characterisation of a new Maurer's clefts phenotype in the human malaria parasite *Plasmodium falciparum* (Welch, 1897)' (2017)

Sarah Steinfurth, 'Studien zur Identifizierung der Plasmodium falciparum erythrocyte membrane protein 1 (PfEMP1) Bindungsdomänen für die Endothelrezeptoren CD9 und P-Selektin' (2016)

Nadine Stetter, 'Impact of HvEM expression (Herpesvirus Entry Mediator; CD270) on the functionality of T cells in experimental Malaria' (2016)

Mona Tabel, 'PD-11 als suppressiver Faktor für Malaria spezifische CD8+ T-Zellen' (2017)

Benthe Winkelmann, 'Funktionelle Charakterisierung von Basalkomplex-Proteinen im Malariaiparasiten *Plasmodium falciparum* (Welch, 1897)' (2016)

Marlow Zimmermann, 'The effects of synchronized mass administration of anti-malarial drugs - A mathematical model' (2016)

## Dissertations 2016/2017

Anнемieke Abel, 'Untersuchung koinhistorischer Moleküle in der humanen Malaria' (2016)

Hassan Al-Emran, 'Molecular Epidemiology of Invasive Salmonella enterica in sub-Saharan Africa' (2016)

Ludger Allering, 'Detection of Usutu virus infection in a healthy blood donor from south-west Germany, 2012' (2017)

Emmanuel M. Anandarajah, 'Characterization of excretory/secretory proteins from intestinal nematodes affecting the mucosal immune system' (2016)

Heidi Auerswald, 'Analyse der humoralen, neutralisierenden Immunantwort nach natürlichen Infektionen mit Dengueviren' (2016)

Katharina Bartsch, 'Genetische und biochemische Analyse der Hsp90-ATPase-Aktivität (Aha1) aus *Leishmania donovani* (Ross, 1903)' (2017)

Jakob Birnbaum, 'A novel genetic system for the functional analysis of essential proteins of the human malaria parasite *Plasmodium falciparum*' (2017)

Alexandra Blanche Soares, 'Identification of trafficking determinants in novel PNEPs of the human malaria parasite *Plasmodium falciparum*' (2016)

Jessica Börstler, 'Arboviruses in Germany: geographical distribution and the interaction between mosquitoes and vertebrates' (2016)

Yannik Brenz, '*Dictyostelium discoideum* als Francisella-Infektionsmodell unter der Verwendung von *F. noatunensis* susp. *Noatunensis*' (2016)

Dana Dilgen, 'Characterization of candidate immunomodulatory excretory/secretory proteins of gut-dwelling nematodes' (2016)

Dimiри Engel, 'Reconstruction of the evolutionary history and dispersal of Usutu virus, a neglected emerging arbovirus in Europe and Africa' (2017)

Helena Fehling, 'Analyse der Unterschiede pathogener und apathogener Entamoeba histolytica (SCHAUDINN, 1903) Klone in der Parasit-Wirt Interaktion' (2016)

Clemens Frank, 'Spatial heterogeneity of malaria in Ghana - a cross-sectional study on the association between urbanicity and the acquisition of immunity' (2016)

Lilli Gerstenmaier, 'Untersuchungen der molekularen Mechanismen des Austritts von intrazellulären Bakterien am Beispiel des Mycobakterium Marinum - *Dictyostelium discoideum* Modellsystem' (2016)

Leonie Hecht, 'Biogenesis of the parasitophorous vacuole membrane (PVM) and regulation of its major component, the early transcribed membrane proteins (ETRAPMs) of *Plasmodium falciparum* (Welch, 1897) blood stages' (2016)

Philipp Klein, 'Artemether-Lumefantrin und Artesunat plus Amodiaquin zur Behandlung kindlicher Malaria tropica in Ghana: eine Effizienzstudie' (2016)

Ralf Krumkamp, 'Management of childhood infections in rural Ghana - Filling information gaps' (2016)

Mayke Leggewie, 'Susceptibility of culex species native to Germany for West Nile virus and the role of Wolbachia in virus-vector interaction' (2016)

Stefanie Lilla, 'Einfluss der negativen T-Zell-Kostimulation auf die CD8+ T-Zell-vermittelte Immunantwort in der experimentellen Infektion mit *Orientia tsutsugamushi*' (2016)

Pedro Lubiana, 'Charakterisierung der Interaktion zwischen Plasmodium infizierten Erythrozyten und humanen Endothelrezeptoren' (2017)

Anja Stefanie Lüdtke, 'Die Rolle der Dendritischen Zellen während der Ebola Virus Immunantwort und Pathogenese' (2016)

Paolo Mésen Ramirez, 'Characterization of the protein export steps at the parasite-host cell interface of the human malaria parasite *Plasmodium falciparum* (Welch, 1897)' (2016)

Nahla Metwally, 'Analyses of the transcriptome profiles of *Plasmodium falciparum* infected erythrocytes selected for binding to the human endothelial receptors (ICAM-1, P-selectin, E-selectin, CD9 and CD151)' (2016)

Martin Meyer, 'Identifikation neuer Pathogenitätsfaktoren durch Überexpression differentiell exprimierter Gene in pathogenen und nicht-pathogenen *Entamoeba histolytica* (SCHAUDINN, 1903) Klonen' (2016)

Kristin Moderzynski, 'Characterization of T-cell-mediated immune response to *Rickettsia typhi* infection in mice' (2016)

Stefanie Papp, 'Charakterisierung angeborener Immunmechanismen und immunpathologischer Defekte in der Rickettsia typhi-Infektion (Wolbach und Todd, 1920) in der Maus (Mus musculus, Linnaeus, 1758)

Martina Reitz, 'Funktion und Regulation von Mastzellen bei der Immunantwort der Maus (Mus musculus; Linnaeus, 1758) auf den Darmparasiten *Strongyloides ratti* (Sandground, 1925)' (2016)

Paula Rubal, 'Relationship between HLA and T cell responses to Ebola virus' (2017)

Nariman Shahhosseini, 'Mosquito surveillance in Iran and Germany reveals new insights into arbovirus ecology and evolution' (2017)

Peter Sothmann, 'Urbanicity and Paediatric Bacteraemia in Ghana - A Case-Control Study within a Rural-Urban Transition Zone' (2016)

Christina Strauß, 'Genetic fine mapping and functional analysis of a chromosomal region associated with resistance against severe malaria in humans' (2017)

Paloma Tejera Nevada, 'A Cluster of Antimopy Resistance Genes on Chromosome 34 of *Leishmania infantum* and their Properties' (2016)

Inga Toborg, 'Auswirkung einer Infektion mit *Strongyloides ratti* auf eine durch Indomethacin induzierte Darmrentzündung bei Ratten' (2016)

Ann-Katrin Ullrich, 'Characterisation of trafficking signals shared by different types of exported proteins in the human malaria parasite *Plasmodium falciparum*' (2016)

## LECTURES AND SEMINARS OF BNITM STAFF AT THE UNIVERSITY OF HAMBURG

Faculty of Medicine	WS	SS
Elective course: Tropical and travel medicine; 12 weeks* <i>Egbert Tannich, Marylyn Addo</i>	x	x
Introduction into tropical medicine / Basic knowledge on tropical medicine; seminar, 1 SWS <i>Rolf Horstmann, Christian Timmann, Jürgen May</i>	x	
Human genetics of infections and other common diseases; seminar, 2 SWS <i>Rolf Horstmann, Thorsten Thye, Christian Timmann</i>		x
Epidemiology and control of tropical diseases; 2 SWS <i>Jürgen May, Norbert Schwarz, Ralf Krumkamp, Daniel Eibach, Benedikt Hogan</i>	x	x
Epidemiology of global infections; Seminar, 1 SWS <i>Jürgen May, Norbert Schwarz, Ralf Krumkamp, Daniel Eibach, Denise Dekker</i>	x	
Introduction into parasitology; 2 SWS <i>Egbert Tannich, Anna Bachmann, Iris Bruchhaus, Joachim Clos, Tobias Spielmann</i>	x	x
Current results of basic research in parasitology; 2 SWS <i>Egbert Tannich und MitarbeiterInnen</i>		x
Current problems in parasitology; 1 SWS <i>Egbert Tannich, Iris Bruchhaus</i>	x	
Immunological practices and literature; 2 SWS <i>Thomas Jacobs</i>	x	
Current problems in immunology; 2 SWS <i>Thomas Jacobs</i>	x	x
Systematic classification and physiology of pathogen and drug-substance producing organisms; 1 SWS <i>Norbert Brattig, Peter Heisig</i>	x	x

Faculty of Biology and Chemistry	WS	SS
Molecular parasitology; lecture; 2 SWS <i>Iris Bruchhaus</i>	x	
Molecular parasitology; practical course, 6 SWS <i>Iris Bruchhaus</i>	x	
Special virology; lecture, 2 SWS <i>Stephan Günther</i>		x
Basics in cellular and molecular immunology; lecture, 2 SWS <i>Minka Breloer</i>		x
New results in immunology; 3 hour block <i>Minka Breloer</i>	x	
Immunological working techniques, practical course, 6 hour block <i>Minka Breloer</i>	x	
Immunological practices and literature; block, 6 SWS, 4 week <i>Minka Breloer, Thomas Jacobs, Bernhard Fleischer and colleagues</i>		
Cellular biology; lecture, 2SWS <i>Tim Gilberger</i>	x	
Cellular biology; seminar, 2SWS <i>Tim Gilberger</i>		x
Infectious disease biology; seminar, 2 SWS <i>Tim Gilberger</i>		x
Organisational structures in animal kingdom; practical course, 6 SWS <i>Minka Breloer and colleagues from the University of Hamburg</i>		x

### \*Elective course Tropical and Travel Medicine

for medical students at the University of Hamburg

#### Tutors

Prof. Dr. Marylyn Addo  
(clinical tropical medicine)

Prof. Dr. Egbert Tannich  
(theoretical tropical medicine)

### Elective course Tropical and Travel Medicine

This course provides students who show a special interest in tropical and travel medicine the opportunity to focus their course work. Therefore, this option has been offered for several years in cooperation with the University Medical Center to a maximum of six selected medical students. The subject of tropical and travel medicine is particularly suited for an interdisciplinary lesson because:

- it is not related to one organ; tropical diseases generally affect many organ systems
- tropical medicine is a typical cross-disciplinary subject, which includes not only internal medicine training but also theoretical, diagnostic, surgical, and microbiological aspects
- it addresses not only aspects of curative medicine but also public health

## SEMINARS

### Dr. Gianni Lo Lacono

Public Health England, Didcot, Oxon, UK  
„Natura non facit saltus .... and mathematicians shouldn't either.  
Two coherent mathematical models for Lassa fever and Rift Valley  
Fever“  
(October 25, 2016)

### Dr. Gisa Gerolds

Twincore, Hannover, Germany  
„Pathogen Entry and Innate Immunity in the Liver: Interplay of  
Hepatitis C Virus, Arenaviruses and Plasmodium“  
(November 7, 2016)

### Dr. Jens Bernhard Bosse

Heinrich-Pette-Institut, Leibniz-Institut für Experimentelle Virologie,  
Hamburg, Germany  
„Viral DynOmics: Towards realtime imaging of viral transport processes  
in whole cells“  
(November 22, 2016)

### Dr. Josh Beck

Washington University School of Medicine, St. Louis, USA  
„Interrogating PTEX function in P. falciparum effector export“  
(November 30, 2016)

### Prof. Stephanie Blandin

Institute for Molecular and Cellular Biology,  
University of Strasbourg, France  
„Targeting mosquito/parasite redox equilibrium to control malaria  
transmission“  
(January 12, 2017)

### Dr. Moritz Treecik

Crick Institute, London, UK  
„Remote control: How intracellular parasites control proteins beyond  
their own boundaries“  
(February 14, 2017)

### Dr. Daniel Velez

National Autonomous University of Mexico, Mexico City, Mexico  
„TbBRF1: an usual transcription factor for an unusual parasite“  
(March 17, 2017)

### Dr. Natalie Spillman

University of Melbourne, Melbourne, Australia  
„Understanding artemisinin action in Plasmodium falciparum“  
(May 24, 2017)

### Prof. Dr. Jörg Overmann

Leibniz-Institut DSMZ, Braunschweig, Germany  
„Microbiological Research Under the Nagoya Protocol: Facts and  
Fiction“  
(June 21, 2017)

### Prof. Dr. John Parkinson

University of Toronto and Sick Kids Hospital, Toronto, Canada  
“Computational Systems Biology of the Apicomplexa“  
(June 28, 2017)

### Dr. Beate Henrichfreise

University of Bonn, Institute for  
Pharmaceutical Microbiology, Bonn, Germany  
“Chlamydial pathogens: mechanisms of persistent infections and  
epidemiology in Africa vs. Europe“  
(July 11, 2017)

### Dr. Sabine Dittrich

FIND, Genf, Schweiz  
“Non-malarial febrile illness (NMFI) in Asia –  
as story of beast and man“  
(September 5, 2017)

### Dr. Linda Brunotte

Westfälische Wilhelms-Universität Münster, Institut für Virologie,  
Münster, Germany  
“Dual-use Research of Concern (DURC) und Bildung  
einer Kommission für Ethik sicherheits-relevanter Forschung (KEF)“  
(September 19, 2017)

### Prof. Dr. Stefan Bonn

Zentrum für Molekulare Neurobiologie (ZMNH),  
Institut für Medizinische Systembiologie, Hamburg, Germany  
“Finding and understanding (infective) diseases using systems biology“  
(November 14, 2017)

## STAFF ACTIVITIES

### Dr. Anna Bachmann

Molecular Parasitology Department

#### Teaching

University of Hamburg, Department for Biology

### Dr. Jörg Blessmann

Epidemiology Section

#### Prizes

Preis für exzellente Posterpräsentation, International Society of  
Toxicology at World Congress, Haikou, Hainan, China (10/2017)

#### Teaching

BNITM, Refresher Course

### PD Dr. Norbert Brattig

Clinical Research Section

#### Offices and Posts

Editor, Acta Tropica (since 2007)  
Editorial Board, The Open Tropical Medicine Journal (since 2007)  
Editorial Board, Asian Pacific Journal of Tropical Medicine (since 2007)  
Editorial Board, Medicina Universitaria (since 2011)  
Reviewer, Acta Tropica, Trop. Med. Int. Health

#### Organizer and Chairman

Organizer Editor Meeting Elsevier, Swiss TPH, Basel, Schweiz (02/2016)  
Organizer Editor Meeting Elsevier, Swiss TPH, Basel, Schweiz (09/2017)  
Organizer Scientific Meeting Development of a Strongyloides Rapid  
Diagnostic Test, Swiss TPH, Basel, Schweiz (02/2016, 09/2017)

#### Teaching

BNITM, Diploma Course on Tropical Medicine  
BNITM, Refresher Course  
BNITM, Course Medizin in the Tropics  
University of Hamburg, Department of Chemistry / Pharmacy

### PD Dr. Minka Breloer

Molecular Biology and Immunology Section

#### Invited Speaker

University of Edinburgh, UK (12/2016)  
Paul-Ehrlich-Institut, Göttingen (05/2017)  
Herbsttagung der Deutschen Gesellschaft für Immunologie (DGfI),  
Hamburg (09/2017)  
Tierärztliche Hochschule Hannover (11/2017)

#### Teaching

University of Hamburg, Department for Biology  
BNITM, Diploma Course on Tropical Medicine

### Prof. Dr. Iris Bruchhaus

Molecular Parasitology Department

#### Offices and Posts

BNITM, Kuratorium (since 2008)  
BNITM, Ombudsman (since 2003)  
BNITM, Strahlenschutzbeauftragte (since 2000)

#### Invited Speaker

Hygiene-Institut Wien (01/2016)  
Newcastle University, Newcastle upon Tyne, England (09/2017)

#### Organizer and Chairman

Chairman, 27th Annual Meeting of the German Society for Parasitology,  
Göttingen (03/2016)  
Anaerobic protists: Integrating parasitology with mucosal microbiota  
and immunology, Newcastle University, Newcastle upon Tyne, England  
(08/09/2017)

#### Teaching

University of Hamburg, Department of Biology / Chemistry  
BNITM, Diploma Course on Tropical Medicine  
LCI Graduate School

### Prof. Dr. Gerd Burchard

Clinical Research Section

#### Offices and Posts

Außerordentliches Mitglied, Arzneimittelkommission der Deutschen  
Ärzteschaft (since 1994)  
Mitglied, Wissenschaftlicher Beirat, Deutsche Akademie für Flug- und  
Reisemedizin (1997 - 2017)  
Vorsitzender, Deutsche Gesellschaft für Tropenmedizin und  
internationale Gesundheit (DTG) (2014 - 2016)  
Leiter des Ausschusses “Leitlinienentwicklung”, Deutsche Gesellschaft  
für Tropenmedizin und international Gesundheit (DTG) (2005-2016)  
Mitglied des Ausschusses “Reisemedizin”, Deutsche Gesellschaft für  
Tropenmedizin und international Gesundheit (DTG) (since 2005)  
Editorial Board, Journal of Travel Medicine (2006-2016)  
Mitglied der Expertengruppe Off-Label Innere Medizin, Bundesinstitut  
für Arzneimittel und Medizinprodukte (BfArM) (2010-2017)  
Mitglied, Ethikkommission der Ärztekammer Hamburg (since 2013)  
Mitglied, Ausschuss für medizinische Ausstattung in der Seeschifffahrt,  
Hamburg (since 2014)  
Mitglied, Ständige Impfkommision am Robert-Koch-Institut (STIKO)  
(since 2017)

#### Invited Speaker

Aktuelles zu Impfungen in der ärztlichen Praxis. Fortbildung ÄrzteNetz  
Hamburg, Agaplesion Diakonieklinikum Hamburg. 3. Februar 2016,  
Hamburg  
Flüchtlingsmedizin – müssen wir mit neuen Erregern rechnen?  
Internistisches Kolloquium. Krankenhaus Reinbek St. Adolf-Stift. 10.  
Februar 2016  
Impfungen bei Patienten mit Antizytokin-Therapie. Tag der  
Reisegesundheit, Bernhard-Nocht-Institut für Tropenmedizin. 27.  
Februar 2016, Hamburg  
Update Malaria und Reiseimpfungen und FSME. III. Symposium für  
Impf- und Reisemedizin in Hamburg, Bernhard-Nocht-Institut für  
Tropenmedizin, 16. April 2016, Hamburg  
Ethische Grundlagen. Prüfartzkurs nach AMG. Clinical Trial Center North  
in Kooperation mit der Universitären Bildungsakademie. 29. April 2016,  
Hamburg  
Die Leber in den Ferien. Lebertage Hamburg, ifi-Institut für  
Interdisziplinäre Medizin. 27. Mai 2016, Hamburg  
Malaria prophylaxe. Basis Seminar Reisemedizinische  
Gesundheitsberatung, University Medical Center Eppendorf. 28. Mai  
2016, Hamburg  
Malaria – Behandlung, Diagnostik, Prophylaxe. Auffrischkurs  
Reisemedizin für Ärztinnen und Ärzte, Niedersächsisches  
Landesgesundheitsamt, 4. Juni 2016, Hannover

Reisevorbereitungen. Kurs der Akademie für Infektionsmedizin  
„Infektiologie Kompakt“. 13. Kongress für Infektionskrankheiten und  
Tropenmedizin, 18. Juni 2016, Würzburg  
Intestinale Parasitenerkrankungen. Infektiologie-Kursus der Akademie  
für Infektionsmedizin e.V. Deutsches Gesellschaft für Infektiologie. 2.  
Juli 2016, Hamburg  
Ethische Grundlagen. Prüfartzkurs nach MPG. Clinical Trial Center North,  
University Medical Center Eppendorf, 30. August 2016, Hamburg  
Risiko Malaria und Update Malaria Prophylaxeempfehlungen.  
Reisemedizin für niedergelassene Ärzte. Jahrestagung der Deutschen  
Gesellschaft für Tropenmedizin und Internationale Gesundheit e.V. 8.  
Oktober 2016, Bonn

Fallbeispiele: Reiserückkehrer, Gesundheitsberatung vor der Reise.  
Basis-Seminar Reisemedizinische Gesundheitsberatung, University  
Medical Center Eppendorf, 12. November 2016, Hamburg  
Malaria prophylaxe 2017; Reisemedizinische Impfungen – was gibt es  
Neues; Aktuelle Daten zu importierten Erkrankungen. 9. Deutsches  
Infektiologie-Update. Ifi-Institut für Interdisziplinäre Medizin. 4.  
Dezember 2016, Hamburg  
Tropenerkrankungen: womit muss ich 2017 in Deutschland rechnen?  
106. Kasseler Gastroenterologen-Gespräch. Klinikum Kassel. 11. Januar  
2017, Kassel  
Screening-Empfehlungen bei Flüchtlingen. Course Medicine for  
Refugees, Bernhard-Nocht-Institut für Tropenmedizin. 14. bis 15. Januar  
2017, Hamburg  
Update Malariaphylaxe. Tag der Reisegesundheits. Bernhard-Nocht-  
Institut für Tropenmedizin. 18. Februar 2017, Hamburg  
Tropenerkrankungen: womit muss ich 2017 in Deutschland rechnen?  
Update Medizin. Fortbildung Labor Dr. Heidrich & Kollegen. 25. Februar  
2017, Hamburg  
Virale hämorrhagische Fieber - eine Gefahr für Beschäftigte im  
Gesundheitsdienst? Seminar „Infektionskrankheiten“ Jahrestagung der  
Deutschen Gesellschaft für Arbeitsmedizin und Umwelmedizin, 15. – 17.  
3. 2017, Hamburg

Fieber bei Tropenrückkehrern und Migranten – Differenzialdiagnosen  
und Management. 3. Dortmunder Tag der Krankenhaushygiene. Institut  
für Krankenhaushygiene und klinische Mikrobiologie, 26. April 2017,  
Dortmund  
Reisen ins Ausland und ihre Mitbringsel. Lebertage Hamburg, ifi-Institut  
für Interdisziplinäre Medizin. 12. Mai 2017, Hamburg  
Diarrhoe bei Reiserückkehrern – Was ist wirklich relevant? 7.  
Kammersymposium der Ärztekammer Nordrhein. 10. Juni 2017,  
Düsseldorf

Seltene importierte pulmonale Infektionen. Akademie für  
Infektionsmedizin e.V. Infektiologie Kursus, 30. Juni. 2017, Hamburg  
Ethische Grundlagen. Prüfartzkurs nach AMG. Clinical Trial Center North,  
University Medical Center Eppendorf, 12. September 2017, Hamburg  
Reisemedizin. Akademie für Infektionsmedizin e.V. Vortrag im Rahmen  
der gemeinsamen Jahrestagung der DGI und DZfI. 30. September 2017,  
Hamburg  
Ethische Grundlagen. Grundlagenkurs nach AMG. Clinical Trial Center  
North, University Medical Center Eppendorf, 21. November 2017,  
Hamburg  
Differenzialdiagnose zerbale Raumforderung durch Helminthen.  
Auffrischkurs Tropenmedizin. Bernhard-Nocht-Institut für Tropenmedizin,  
25. November 2017, Hamburg  
Update Parasitologie – neue Entwicklungen 2017 mit Relevanz für die  
Patientenversorgung. 10. Deutsches Infektiologie-Update. Ifi-Institut für  
Interdisziplinäre Medizin. 2. Dezember 2017, Hamburg  
Malariaphylaxe 2017; Reisemedizinische Impfungen – was gibt  
es Neues; Aktuelle Daten zu importierten Erkrankungen. Refresher  
Course Reisemedizin, 10. Deutsches Infektiologie-Update. Ifi-Institut für  
Interdisziplinäre Medizin. 3. Dezember 2017, Hamburg

#### Teaching

BNITM, Diploma Course on Tropical Medicine  
BNITM, Course Medizin in the Tropics

Bundeswehrkrankenhaus Hamburg, Fachbereich Tropenmedizin,  
Lehrgang Einsatzvorbereitung Infektions-, Tropen- und Präventivmedizin  
(2016 und 2017)

Medical Parasitology. Summer School for Young Parasitologists.  
Bernhard-Nocht-Institut für Tropenmedizin. 9. August 2016, Hamburg  
Bacterial diseases. Core Course Tropical Medicine and Public Health,  
Institute of Tropical Medicine and International Health, Berlin (2016  
+ 2017)

Migrant health: what is the role of the tropical medicine specialist?  
Diploma Course Tropical Medicine and Hygiene. Center for International  
Health, University München. 18. Oktober 2017, München

### PD Dr. Joachim Clos

Molecular Parasitology Department  
Head, Research Group Clos (Leishmaniasis)

#### Invited Speaker

Institut für Zoologie der University Würzburg (06/2017)

#### Teaching

University of Hamburg, Department of Biology / Chemistry

### Dr. Denise Dekker

Infection Epidemiology Department

#### Invited Speaker

Workshop, DZfI Autummschool 2016, Lübeck (09/2016)

#### Teaching

NIMR, Tansania  
ESTHER, KATH, Kumasi  
BNITM, Diploma Course on Tropical Medicine

### Dr. Sophie Duraffour

Virology Department

#### Invited Speaker

WHO Informal Consultation on options to improve regulatory  
preparedness to address public health emergencies, WHO, Geneva,  
Schweiz (05/2017)  
WHO International Meetings “Ebola virus persistence studies and  
implications on public health recommendations”, WHO, Monrovia,  
Liberia (06/2017)  
Irrua Specialist Teaching Hospital in collaboration with Nigeria Centre for  
Disease Control, Nigeria (05/2017)

### Dr. Daniel Eibach

Infection Epidemiology Department

#### Offices and Posts

Mitglied des Kompetenzteams “Antibiotikaforschung, -entwicklung und  
-versorgung”; Pharmadialog der Bundesregierung

#### Invited Speaker

Landesärztekammer Thüringen, Erfurt (06/2016)  
Junior Scientist Zoonoses Meeting, Göttingen (06/2016)

#### Teaching

University Medical Center Eppendorf  
GIBACHT  
Iranian-German Summer School on field Epidemiology  
NIMR, Tansania





**PD Dr. Norbert Schwarz**

Infection Epidemiology Department

**Offices and Posts**

Mitglied, Personalrat BNITM (since 2012)

**Invited Speaker**

Deutschland-Konferenz der UAEM (11/2016)

**Teaching**

BNITM, Diploma Course on Tropical Medicine  
 BNITM, Kurs medizinisches Fachpersonal, BNITM  
 University Medical Center Eppendorf  
 University of Applied Sciences Hamburg  
 HAW, Hamburg  
 GIBACHT introduction Course  
 German Partnership Programme for Excellence in Biological and Health  
 Security, Auswärtiges Amt  
 Iranian-German Summer School on field Epidemiology

**Dr. Tobias Spielmann**

Molecular Parasitology Department  
 Head, Research Group Spielmann (Malaria)

**Offices and Posts**

Editor, PLoS ONE (since 2011)  
 Editor, Molecular and Biochemical Parasitology (since 2013)  
 Faculty of 1000 (2016 - 2017)  
 Deputy Director, CSSB, Hamburg

**Invited Speaker**

Symposium in Honor of Klaus Lingelbach, University of Marburg (11/2016)  
 University of Heidelberg (11/2016)  
 Emerging Science Convention, DESY, Hamburg (11/2016)  
 University of Genf, Geneva, Schweiz (05/2017)  
 University of Saarbrücken (06/2017)  
 Swiss TPH, Basel, Schweiz (09/2017)  
 Invited Seminar, Glasgow, Scotland (10/2017)  
 Robert-Koch-Institut, Wernigerode (12/2017)

**Organizer and Chairman**

Chairman, SPP 1580 Conference, Glashütten (04/2017)

**Teaching**

University of Hamburg

**Prof. Dr. Egbert Tannich**

Molecular Biology and immunology Section  
 Head, Molecular Parasitology Department

**Offices and Posts**

Editorial Board Member, Molecular and Biochemical Parasitology (since 1994)  
 Editorial Board Member, Parasitology International (since 1998)  
 Beirat, Qualitätssicherungskommission der DGHM: Bereich Ringversuche "Parasitologie" (since 2003)  
 Beirat, Deutsche Gesellschaft für Tropenmedizin und Internationale Gesundheit (since 2005)  
 Fachberater, Institut für Standardisierung und Dokumentation im Medizinischen Laboratorium (since 2005)  
 Ringversuchsleiter, Institut für Standardisierung und Dokumentation im Medizinischen Laboratorium (since 2005)  
 Fachberater, Bundesärztekammer (since 2009)  
 Fachberater, BG Chemie, Heidelberg (since 2011)  
 Vorsitzender, Deutsche Gesellschaft für Parasitologie (since 2013)  
 Fachberater, KfW Entwicklungsbank (since 2014)  
 Mitglied, Nationale Expertenkommission „Stechmücken als Überträger von Krankheitserregern“ (since 2016)

**Invited Speaker**

Cost-Meeting, Robert-Koch-Institut, Berlin (06/2016)  
 Landesumweltamt Hessen, Wiesbaden (06/2016)  
 NEI-Treffen, Helmholtz-Zentrum für Infektionsforschung, Braunschweig (09/2016)  
 Bundeswehrkrankenhaus, Hamburg (11/2016)  
 Medizinische Hochschule Hannover (02/2017)  
 Bundeswehrkrankenhaus Hamburg (02/2017, 07/2017, 09/2017)  
 INSTAND, Düsseldorf (03/2017)  
 Umweltbundesamt, Berlin (03/2017)  
 National Symposium on Zoonoses Research, Zoonoseplattform, Berlin (10/2017)  
 DVTA, Dresden (11/2017)  
 BNITM, Refresher Course (11/2017)

**Organizer and Chairman**

Scientific Committee, Chairman, 27. Jahrestagung der DGP, Göttingen (03/2016)  
 Scientific Committee, Chairman, 25. Jahrestagung der DTG, Bonn (10/2016)  
 Scientific Committee, Chairman, 6th European Congress of Virology, Hamburg (10/2016)

**Teaching**

University of Hamburg, Faculty of Medicine  
 BNITM, Diploma Course on Tropical Medicine

**Prof. Dr. Dennis Tappe**

Clinical Research Section  
 Head, Research Group Tappe (Zoonoses)

**Offices and Posts**

Stellv. Leitung, Arbeitsgemeinschaft Helminthen, Paul-Ehrlich-Gesellschaft (PEG), Frankfurt/Main (since 2014)

**Invited Speaker**

14. Symposium Impf- und Reisemedizin, Frankfurt am Main (03/2016)  
 26th ECCMID, Amsterdam, Niederlande (04/2016)  
 15th Medical Biodefense Conference, München (04/2016)  
 16. Kongress für Infektiologie und Tropenmedizin (KIT 2016), Würzburg (06/2016)  
 Paul-Ehrlich-Institut, Langen (09/2016)  
 Geneva Symposium on Emerging Viral Diseases, Geneva, Schweiz (11/2016)  
 XXII. Symposium Reise- und Impfmedizin – Internationale Gesundheit , Auswärtiges Amt, Berlin (04/2017)  
 REMMDI Regensburg (04/2017)  
 Bundesinstitut für Risikobewertung, Berlin (09/2017)  
 Riemser Diagnostik-Tage, Friedrich-Loeffler-Institut, Insel Riems (11/2017)

**Teaching**

BNITM, Diploma Course on Tropical Medicine  
 BNITM, Course Medizin in the Tropics  
 BNITM, Refresher Course  
 BNITM, Tag der Reisegesundheit  
 University of Würzburg, Faculty of Medicine

**Dr. Thorsten Thye**

Clinical Research Section  
**Offices and Posts**  
 Assoc. Editor, Tropical Medicine and International Health

**Teaching**

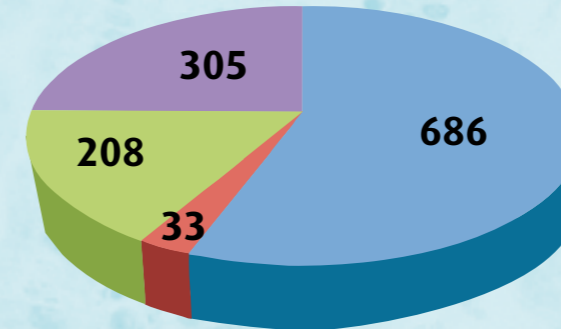
University of Hamburg, Faculty of Medicine  
 BNITM, Bioinformatic Service

**Dr. Christian Timmann**

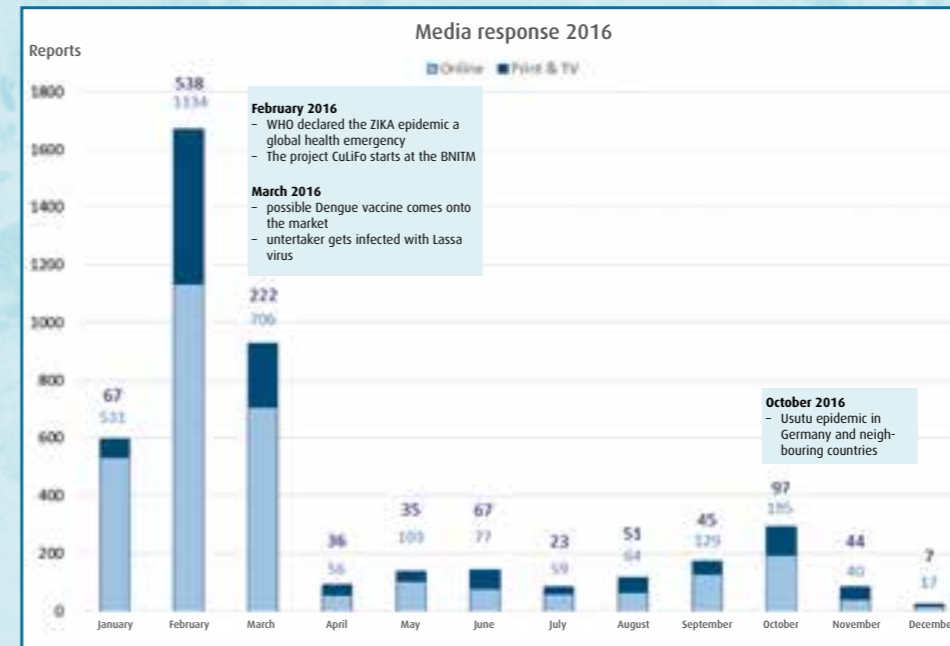
Clinical Research Section  
**Teaching**  
 University of Hamburg, Medizin  
 BNITM, Diploma Course on Tropical Medicine  
 BNITM, Refresher Course  
 BNITM, Course Medicine for Refugees  
 BNITM, Course Medizin in the Tropics

# Media response 2016

Overall >1.200 Print Reports, Radio, TV  
 >3.000 Reports online



- Newspapers and magazines
- Journals
- News Agencies
- Radio, TV



## BNITM in the Media



Member of Parliament Stephan Albani



LCI Symposium "Vaccines"



Dr. Schöps and Prof. Horstmann



Birgit Müller



State Secretary Dr. Flachsbarth opens mosquito research cooperation



Prof. Kleiner and Prof. Horstmann

# CHRONICLE 2016

## January

Early in 2016, Zika infections spread all across Latin America. Hosting the WHO Collaborating Centre for Arboviruses, up to 100 samples from the region are tested at BNITM daily. Zika viruses had first been noted in Brazil in March 2015 when they were diagnosed at BNITM.

## January 25

Stephan Albani, MdB, who in the Federal Parliament is known as an expert in poverty-related diseases, familiarises himself with the work done in the Institute.

## January 27 – 29

Approximately 120 international infectious disease researchers gather at the LCI Symposium "Vaccines". A public panel discussion on "Measles, Flu, Ebola – Sense and Nonsense around Vaccinations" takes place in the atrium of Hamburg's State and University Library on the eve of the meeting.

## February 6

Surgeon Major General Dr. Stephan Schöps, Acting Commander of the Army's Health Services, visits the Institute to supervise the activities of the Army's Tropical Medicine Section. Together with Physician General Dr. Joachim Hoitz, he completes a programme of several days of presentations.

## February 1 – 19

In the annual three-week course "Medicine in the Tropics", 24 medical support staff are trained in tropical medicine, public health, and health management.

## February 15

Birgit Müller moves from the administration of the Medical Faculty of Hamburg University and becomes the new business manager of the Institute. She replaces Udo Gawenda, who returns to the Hamburg Ministry of Finance after a 10 year leave in the Institute.

## February 22

Dr. Maria Flachsbarth, State Secretary of the Federal Ministry of Food and Agriculture, ceremoniously opens the new cooperation projects "CuliMo" and "CuliFo", which address the seasonal, climate-dependent occurrence and the genetic variation of domestic mosquitoes, and in particular, their ability to transmit infectious agents.

## February 25

Prof. Dr. Matthias Kleiner, President of the Leibniz Association, pays the Institute his inaugural visit. Prof. Horstmann presents to him BNITM's infrastructures and major research activities.

## April 1

Esther Schnettler, PhD, moves from Glasgow to be appointed W2 Professor for Medical Entomology by the Natural Sciences Faculty of Hamburg University. Supported by the German Center for Infection Research, she is equipped by BNITM with a research group to study immune reactions and the vector competence of insects.

## April 1 – June 24

In the annual three month "Diploma Course in Tropical Medicine" 37 physicians and biologists from Germany and Austria are prepared for health care in resource-poor settings.

## June 28

On Girls' & Boys' Day 47 pupils get an impression of the research performed at the Institute. Visiting the laboratories, they are taken care of by 17 scientists.

## June and July

For a feature "Mosquito Research at the Hamburg Tropical Institute", teams of North German public TV accompany Prof. Jonas Schmidt-Chanasit and his group studying the role of mosquitoes in transmitting viral infections in Germany.

## June 9

At the annual sports meeting, teams of Institute's staff, members of the army, and participants of the Diploma Course compete in lawn volleyball. During the breaks, they have a barbecue.

## June 24

Lisa Oestereich, PhD, (Virology dept.) and Maja Nielsen, MD, (May group) receive the annual Doctoral Awards endowed with € 1,000 from the "Association of Friends of the Hamburg Institute for Tropical Diseases". Lisa developed a mouse model for Lassa fever and Maja studied life-threatening bacterial blood infections of African infants.

## August 27 – September 15

Jointly with Tehran University of Medical Sciences, the Hamburg University of Applied Sciences and the University Medical Center Hamburg-Eppendorf, BNITM organises a course on the epidemiology and infection protection for international physicians and scientists in Tehran. The course is held again in 2017.

Course "Medicine in the Tropics"



Prof. Esther Schnettler



Diploma Course in Tropical Medicine



Girls' & Boys' Day



TV feature





Lisa Oestereich, PhD



Maja Nielsen, MD



Summer School for Infection Epidemiology in Tehran



Visit by Hamburg's Mayor Olaf Scholz



Visit by Hamburg's Mayor Olaf Scholz



Leibniz Evaluation



NATO/ German Armed Forces Training

■ **October 1**

The Institute sections of "Parasitology" and "Immunology and Virology" are merged into "Molecular Biology and Immunology". "Epidemiology" is established as a section on its own and with "Clinical Research" completes the Institute's tripartite structure of pathogen-oriented, patient-oriented, and population-based research.

■ **October 10**

Hamburg's First Mayor Olaf Scholz visits the Institute, inspects the BSL-4 laboratory and insectary, and discusses in-depth with the Board the options of strengthening infection research in Hamburg.

■ **October 10 - 14**

Under the auspices of the NATO Center of Excellence for Military Medicine (MilMedCoE), the faculty of Tropical Medicine of the German Armed Forces organized an international course for

the "Management of Infectious Diseases during Missions". Twenty medical officers from 8 nations participated. Course covered awareness of tropical infectious diseases, their importance for military deployments in regions with poor medical management, and an introduction to the basics of preventive medicine and infection protection.

■ **October 19**

During the opening of the 6th European Congress of Virology (ECV), participants visit institutes in Hamburg, which focus on virology including the BNITM and the Heinrich Pette Institute.

■ **November 9 - 10**

As a member of the Leibniz Association, BNITM is reviewed every seven years. During two days, a review board of 20 members looks at every angle of the Institute.

■ **November 20 - 25**

Prof. Horstmann is invited to accompany a delegation of Hamburg's Economics Ministry, led by State Secretary Dr. Rolf Bösinger, on a trip to Sao Paulo and Rio de Janeiro. The economists become interested in the Institute's diagnostic tests.

■ **December 1**

With a symposium "T cell activation: From antigens to pathogens", the Institute celebrates the farewell of Prof. Bernhard Fleischer, who retires after 24 years at BNITM - 12 years as the Director. About 150 immunologists participate, among them numerous colleagues, friends, and former research associates.

# CHRONICLE 2017

■ **January 1**

Dennis Tappe, MD, is promoted to group leader after an international call. Under the heading of "zoonoses", his group will focus on the detection of infectious agents in tissues and the investigation of infectious disease outbreaks as part of the National Reference Centre for Tropical Infections.

■ **January 19 - 20**

Under the title "Evolution and Infection", 150 scientists participate in this year's LCI symposium, which is annually organised jointly with Research Center Borstel and Heinrich Pette Institute, taking place in BNITM's historic lecture hall.

■ **January 30 - February 17**

In a three weeks course "Medicine in the Tropics", 35 medical support staff are being prepared to work in resource-poor settings.

■ **February 23**

In the international "Biology Olympics", which is arranged by the Leibniz Institute for Science and Mathematics Education, 45 pupils are informed about the Institute to award their successful participation. They are accompanied by 15 teachers.

■ **February 28**

As the city of Nagasaki plans the construction of a biosafety-level-4 laboratory, a 24-member delegation from Japan is informed about the set-up and operation of our laboratory.

■ **March**

Prof. Jürgen May, MD, after an international call is appointed full professor for "Epidemiology of Tropical Diseases" by the Medical Faculty of Hamburg University and nominated head of the department for "Infection Epidemiology" by our Board of Trustees.



Visitors of the ECV



Farewell to Prof. Fleischer



Organigramm of the BNITM



Accompany the Economics Ministry to Brazil



Research Group "Zoonoses" led by Dr. Tappe



Prof. Jürgen May, MD



LCI Symposium "Evolution and Infection"

Course "Medicine in the Tropics"

Successful participants of the Biology Olympics

German-Japanese Science Camp

Humboldt Fellows at BNITM

March for Science

■ April 03 – June 30

In the annual 3 month "Diploma Course in Tropical Medicine", 38 physicians from Germany, Austria, and Switzerland are trained in all aspects of health care in resource-poor settings.

■ April

Research fellows of the Alexander-von-Humboldt Foundation at BNITM: Dr. Vanessa Adai from Peru will join the Clos lab to study the biology of Leishmania using the CRISPR-Cas9 method, and Dr. Rafael de Freitas e Silva from Brazil will analyse the immune response to Leishmania in the Jacobs lab.

■ April 22

In support of sound evidence and against Fake News, roughly 2,000 people participate in the "March for Science" in Hamburg, about 37,000 in Germany, and hundreds of thousands worldwide. The LCI institutes BNITM, FZB, and HPI are official supporters

and are represented by about 50 staff members and several posters.

■ April 27

On the annual Girls' & Boys' Day, 34 pupils aged 10 to 14 years are familiarised with the Institute. They are taken care of by 18 scientists from epidemiology, immunology, parasitology, virology, and cellular biology.

■ May 19

The international participants of the "Follow-Up Conference on German-African Cooperation Projects in Infectiology" of the German Research Council (DFG) visit the Institute.

■ May 30

In the course of the "Leibniz in Parliament" campaign, Dr. Dennis Tappe and Prof. Jürgen May meet Members of Parliament in Berlin.

■ June 08

As part of the three year education of Hamburg emergency paramedics, Dr. Dennis Tappe and Prof. Jonas Schmidt-Chanasit teach about the risks and detection of infection transmission.

■ June 05 – 28

BNITM and the Hamburg University for Applied Sciences organise a summer school "Education- and Research-Oriented Training in Health Sciences" (EARTHS). Twenty-five mostly African participants are trained in medical research didactics, ethical requirements, and intercultural teaching methods, among others

■ June 15 – 17

The PhD students of the Institute for the first time have organised a retreat. In Hörnum on the isle of Sylt, seven postdocs, fifteen PhD students, and one master student discuss their experiences in the Institute and strengthen their

exchange and cohesion through team-building activities over two days.

■ June 21

In Berlin, the Institute's equal opportunities officer, Dr. Nicole Gilberger, is ceremoniously awarded the certificate for the audit "berufundfamilie" (job and family), to acknowledge the efforts of the Institute to strengthen a personnel policy conscious of family and phase-of-life circumstances.

■ June 29

The Centre for Structural Systems Biology (CSSB) is opened at the German Electron Synchrotron (DESY) in Hamburg-Bahrenfeld with an official ceremony. At CSSB, BNITM will be represented by its Department of Cellular Parasitology, led by Prof. Tim Gilberger.

■ June 30

Dr. Lilli Gerstenmeier (Hagedorn group) and Dr. Paolo Mesén-Ramírez (Spiel-

mann group) receive the annual Doctoral Awards and € 1,000 prize from the "Association of Friends of the Hamburg Institute for Tropical Diseases" (VdF). Lilli studied the exit of mycobacteria from host cells and Paolo protein export of the malaria parasite *Plasmodium falciparum*.

■ July 1

The Institute's Refresher Course in Tropical Medicine is attended by 110 alumni of the Diploma Course in Tropical Medicine.

■ July 7 – 8

"G20: STOP Neglected Tropical Diseases" is the message shown on a banner placed at the BNITM building on the occasion of the G20 Summit. As its facade is widely visible at the harbour front, the Institute serves as a mouthpiece also for various non-governmental organisations.

■ July 12

The Senate of the Leibniz Association in its final statement on the Institute's evaluation in 2016 recommends the continuation of the joint funding of the Institute by the federal and state governments for additional seven years. The 15 departments and research groups are overall rated "very good", and the interplay between laboratory, clinical, and field research is once again appreciated.

■ August 7 – 11

The "10th Summer School for Young Parasitologists" of the German Society for Parasitology offers 16 master and PhD students from Germany, England, France, and Switzerland training, particularly practical exercises in cell culture techniques, immunobiology, and imaging.



Girls' & Boys' Day 2017

Visit of a German-African DFG Conference

EMLab in Uganda

Diploma Course in Tropical Medicine 2017

Summer School on Medical Research Didactics

1st PhD retreat

Certificate "berufundfamilie"

CSSB opening



Summer party, annual meeting and PhD award ceremony



Dr. Lilli Gerstenmeier



Dr. Paolo Mesén-Ramírez



HSH Nordbank Run 2017



Banner for the G20 Summit



Summer School for Young Parasitologists



German Infectious Disease Conference



UN Ambassador Dr. Heusgen with 18 African colleagues



Senator Frank Horch and the Hamburg Consular Corps

■ August 11

Within the framework of the 3rd German-Japanese Science Camp, 26 students and Japanese visitors from the Leibniz Institute for Science and Mathematics Education participate in a training for epidemics of tropical pathogens and invasion strategies of the malaria parasite *Plasmodium falciparum* at the BNITM.

■ August 25

A cholera outbreak 125 years ago in 1892, which caused approximately 9,000 fatalities in Hamburg, was the reason to appoint Bernhard Nocht the first harbour physician and to found, under his directorship, in 1900 an “Institute for Tropical and Nautical Diseases”, today named Bernhard Nocht Institute for Tropical Medicine.

■ September 28 – 29

At the biennial joint meeting of the German Center for Infection Research and the German Society for Infectiology, 488 participants discuss new findings in infection research in a conference hotel across the street and using the Institute’s seminar rooms.

■ October 12

Economics Senator Frank Horch invites the Hamburg Consular Corps to the Institute on the occasion of his annual reception.

■ October 12

As part of a visit to Germany, the German UN Ambassador Dr. Christoph Heusgen invites colleagues from 18 sub-Saharan African nations to the Institute to present Germany’s contribution to research on poverty-associated diseases, campaigning for Germany’s application to obtain a non-permanent seat in the UN Security Council.

■ November 1

Prof. Marylyn Addo, MD, PhD, moves her group from the University Medical Center to BNITM premises. She conducts vaccine trials and clinically based immunological studies on emerging viral infections.

■ November 1

César Muñoz-Fontela, PhD, moves from the Heinrich Pette Institute to BNITM and is appointed group leader. He studies the immune response to haemorrhagic fever viruses.

■ November 4

During the 7th “Night of Science”, 1,537 guests visit the Institute, attending scientific presentations, trying microscopes and pipettes, African food, a percussion group and a wheel of fortune until midnight. A total of 58 research institutions participate in Hamburg, welcoming more than 32,000 visitors.

■ November 6

Twenty-four high-ranking international officers of general/admiral course get insights into the Department of Tropical Medicine of the German Armed Forces at the BNITM.

■ November 17

The German Ambassador to Ghana as well as high representatives of the Ghanaian government and the Ashanti King, the Vice-Chancellor of Kumasi University, and BNITM Board members attend the celebrations of the 20th anniversary of the Kumasi Centre for Collaborative Research (KCCR).

■ November

Requested by WHO, a European Mobile Laboratory (EMLab) is sent to Uganda for diagnostics in an outbreak of Marburg virus.

■ November 20

With a scientific symposium, the Institute celebrates the work of Prof. Werner Slenczka (Marburg University) and Dr. Günther Müller (BNITM alumnus), who identified the Marburg virus in 1967, 50 years ago and nine years before the detection of the closely related Ebola virus.

■ December 13

With a celebration hour, the Institute says goodbye to Prof. Rolf Horstmann, who worked at BNITM – with short interruptions – for 40 years, the last 10 years as Chairman of the Board. Companions and friends comment on his work and attitude, complemented by a string quartet by befriended musicians.

■ December 18

Christos Stylianides, EU Commissioner for Humanitarian Aid and Crisis Management, familiarises himself with the operation of a European Mobile Laboratory (EMLab), which is demonstrated by BNITM’s virology staff. He is accompanied by Hamburg’s Science Senator Katharina Fegebank as well as numerous media representatives.

Night of Science



Admiral Course



Panel discussion



20 Years of KCCR



Discovery of Marburg virus 50 years ago



Farewell to Prof. Horstmann



EU Commissioner visits EMLab



# Imprint

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# BNITM

Bernhard Nocht Institute for Tropical Medicine



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