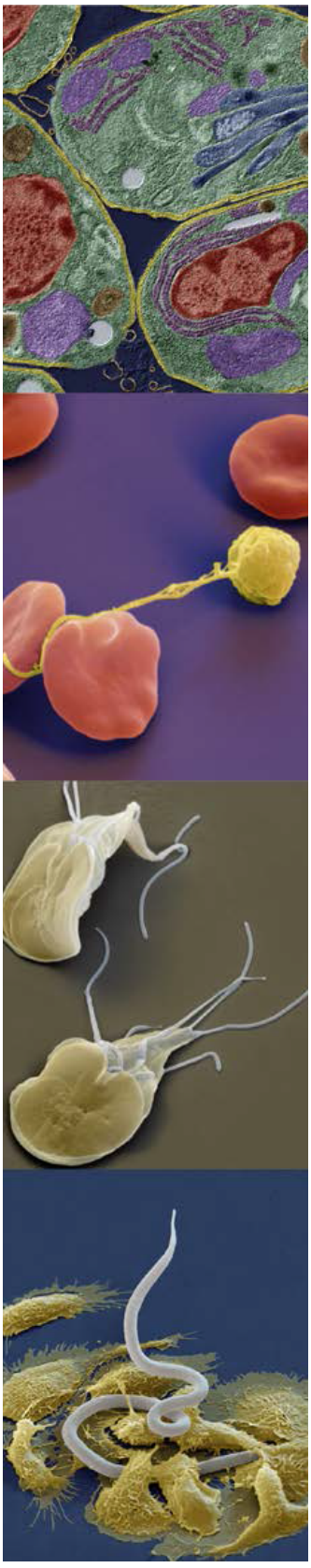
GRK 2046 Newsletter November 2019



Summary, Update and News

Please enjoy the 8th edition of our biannual GRK2046 newsletter. On October 1, we started our 2nd and final funding period. This gave our doctoral students a financial boost and more social security for most students now hold E13 positions with contracts to their corresponding institution.

We have now many 1st generation students who had or will soon have their defense. Please find a list below! Congratulations and all the best! As usual, we report from recent travel with conferences/workshops and seminars/lectures. Find a brief report on our Serengeti field trip, latest publications and upcoming seminars. Enjoy!

– Marko Janke

New Students

Sophia Pinecki Socias

I am Sophia Pinecki and I am from Spain. I completed there my B.Sc. in Biochemistry in the Universitiy of the Balearic Island in 2013. Following my path, I moved to Barcelona to obtain a M.Sc. in International Health, with focus on parasitic biology in 2014. I started my PhD in September 2017 under the supervision of Prof. Dr. Nijhof and Prof. Dr. Clausen at the Institute of Parasitology and Tropical veterinary medicine at the Freie Universität Berlin, in order to work on tick and tick-borne diseases. My project is about the development of new methods to study the biology and vector competence of *Ixodes ricinus*. I am a happy GRK2046 associate since Mai 2019.

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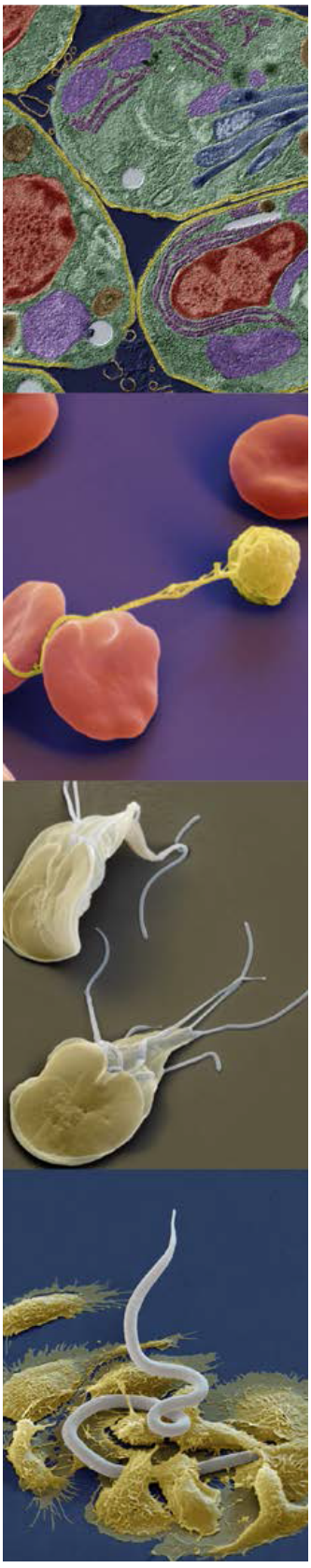

Nina Militzer

Hey to everyone, my name is Nina Militzer and I graduated from my veterinary studies at Freie Universität Berlin in April 2017. In the same year I started my PhD project under the supervision of Prof. Ard Nijhof at the institute of Parasitology and Tropical Veterinary Medicine. The focus of my studies is the development of novel methods to further investigate the vector biology of the hard tick *Ixodes ricinus*. Thereby, I mainly concentrate on the artificial tick feeding systems (ATFS). The ATFS offer a method to study tick-pathogen interactions, f.e. for infection and transmission studies on human and veterinary relevant *Borrelia burgdorferi* s.l. and *Anaplasma phagocytophilum*. Since May 2019 I am now a GRK2046 associate.

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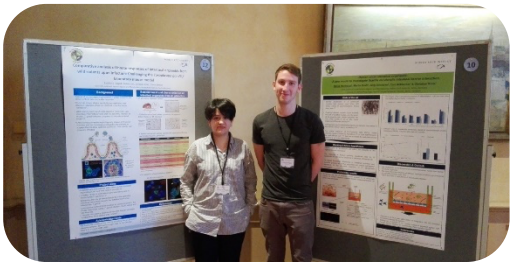
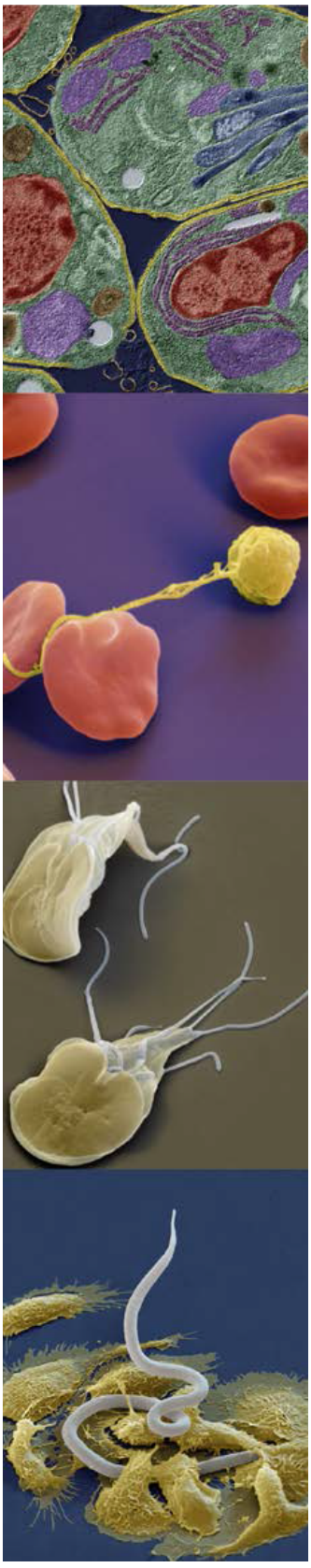
Travel & Conferences

3D Tissue Infection Symposium

5-7 April 2019
Würzburg, Germany



The 3D Tissue Infection Symposium was a small conference organized by the GRK2157 as part of their PhD track with about 60 participants. The focus of the conference was the use of complex three-dimensional models, such as organoids, to do research on host-pathogen interaction. The speakers included renowned scientists from the field, as well as the students from



the graduate school who presented their own research. The conference was stimulating for us because it was very easy to engage in networking, compare results and get input from other groups with similar models. Especially in the poster sessions it was very easy to have informal straightforward conversations with a mixed group of junior and senior scientists. By presenting our research on posters, we got very interesting input to develop our models further, from scientists of a very broad range of specializations. As it also was our first conference, we enjoyed the friendly atmosphere there.

– Estefania Delgado Betancourt and David Holthaus

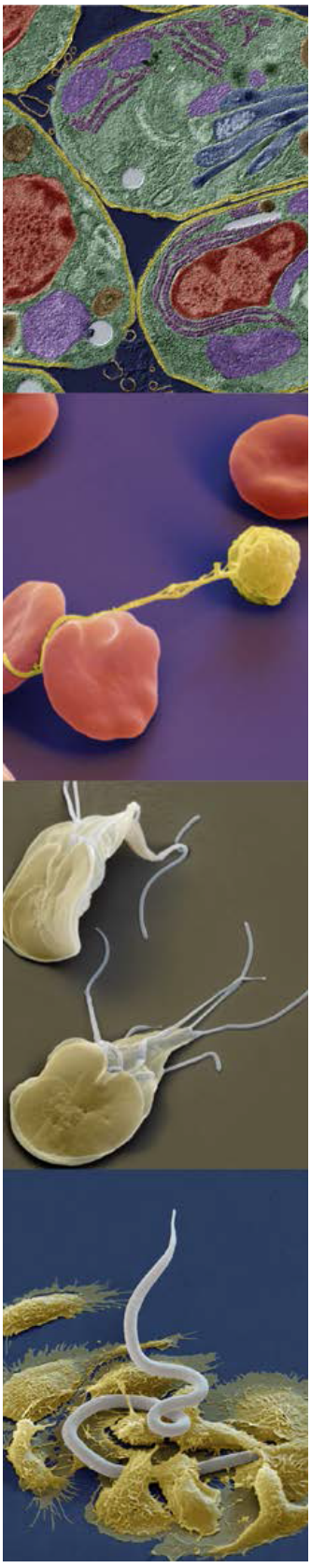
DVG Fachtagung Parasitologie und Parasitäre Krankheiten

17-19 June 2019
Leipzig, Germany

The DVG (Deutsche Veterinärmedizinische Gesellschaft) conference takes place every year with about 200 participants. The focus of this year's DVG was "Parasitic diseases - a challenge for science and practice" and took place in Leipzig (Saxony, Germany). The talks and posters covered a wide range of topics including clinical parasitic diseases, epidemiology, molecular mechanisms of parasite-host interaction, anthelmintic resistance and alternative experimental models. Alexander Gerhard presented the genomic and transcriptomic characterization of the P-glycoprotein family in *Parascaris sp.* and Irina presented her side project about a case of a canine *Dracunculus sp*. infection in Spain.

The social evening, sponsored by a large company, took place in a restaurant with a roof terrace. With a good view over the roofs of Leipzig, it was possible to discuss current topics and projects with scientists from industry and research. Again, this year it was a familiar and friendly atmosphere in which interesting aspects of veterinary parasitology could be discussed.

– Natalie Jacobs and Irina Diekmann



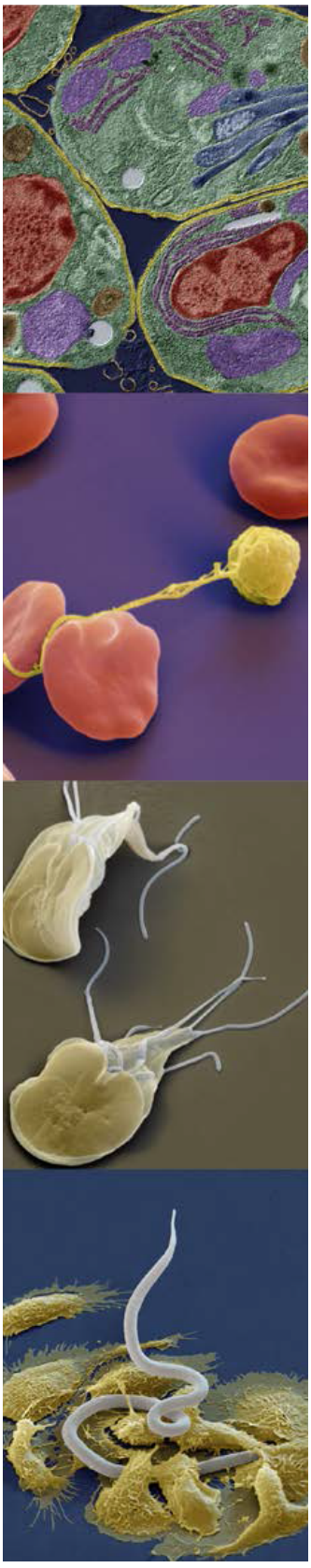
15th TOXO conference and Environmental Toxoplasmosis workshop

19-22 June 2019
Quindio, Colombia

The international conference on *Toxoplasma gondii* is held biannually. Hosting country for the 15th edition in 2019 was Colombia. The occasion was divided into two parts, a workshop on "*T. gondii* in the Environment" followed by the main conference, TOXO XV.
The scope of the workshop was to enable the participants to learn about toxoplasmosis in a region where over 60% of the population is affected with many cases suffering from occular toxoplasmosis. In addition to numerous informative talks by well-known experts in the field on *T. gondii* in the environment, we were given the opportunity to observe the ecosystem, where the oocyst shedding felids live, on a field trip into the national park Reserva Natural Bremen in Quindio and observed how the community's water sources get contaminated with oocysts, which are then spread throughout the whole region, exposing animals and human to risk of infection. One main outcome of the workshop is the establishment of a network of researchers focusing on *T. gondii* in the environment, from which our projects are already benefitting, both with regards to helpful knowledge and materials.

The conference was densely packed with oral and poster presentations for three days. Our Colombian colleagues however organised an extraordinary event in every regard. The food was authentic Colombian and the much-needed conference coffee was extremely good (Quindio is situated in the "Coffee Cultural Landscape" which is a UNESCO World Heritage Site after all). During the conference we were provided opportunities to gain much more and deeper insights into the recent advances in *T. gondii* research areas as well as extending and strengthening our network in talks with colleagues from all over the world. We were also able to present our own work, Ben with an oral presentation and Estefanía with a poster presentation, which earned both of us lots of constructive feedback and Estefanía in particular a poster prize.

– Estefanía Delgado Betancourt and Benedikt Fabian



7th International *Giardia* and *Cryptosporidium* Conference

23-27 June 2019
Rouen, France

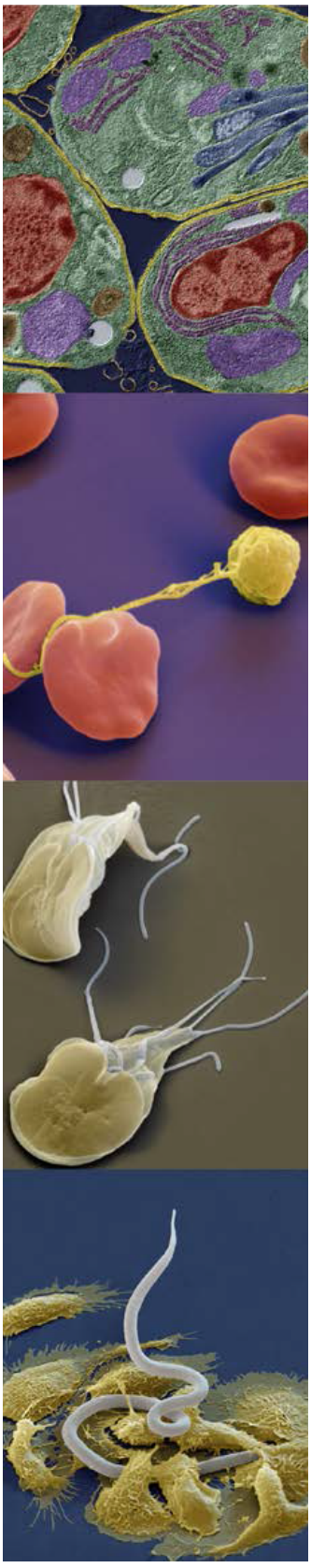
The International Giardia and Cryptosporidium Conference (IGCC) takes place every two years. This year it was held in Rouen in France. As the name already suggests it lays focus on research on *Giardia* and *Cryptosporidium* spp. The conference involved about 200 scientists from 34 countries and covered topics including diagnostics, epidemiology, cell and molecular biology, and host-pathogen interactions. Martin Kraft and Ivet Yordanova gave talks about their research with Ivet winning the award for "Best Young Researcher Presentation" on her presentation “Shifts in Treg/Th17 balance correlate with susceptibility to *Giardia muris* infection”. Totta Ehret Kasemo and David Holthaus presented their research in a 3 minute poster pitch-like presentation and then in the poster sessions. As the conference had a quite familiar atmosphere the GRK2046 PhD students all had discussions with colleagues from other groups and could learn from the progress of others’ research. Next to the scientific program, we were also able to enjoy the city of Rouen with its old inner city and the River Seine, and French culinary specialties at the Gala Dinner – an additional possibility to tie bonds with other researchers.

– Martin Kraft, Totta Ehret Kasemo, (guest attendee Mira Ehret), Ivet Yordanova and David Holthaus

5th International Mouse Meeting

23rd - 25th June 2019
Brno, Czech republic

The 5th International Mouse Meeting is an annual conference organized by the Czech Institute of Animal Physiology and Genetics, Institute of Vertebrate Biology and Department of Botany and Zoology. The conference was a meeting of scientists researching house mice and their use as a toolset for research in physiology, behavior, ecology, evolution



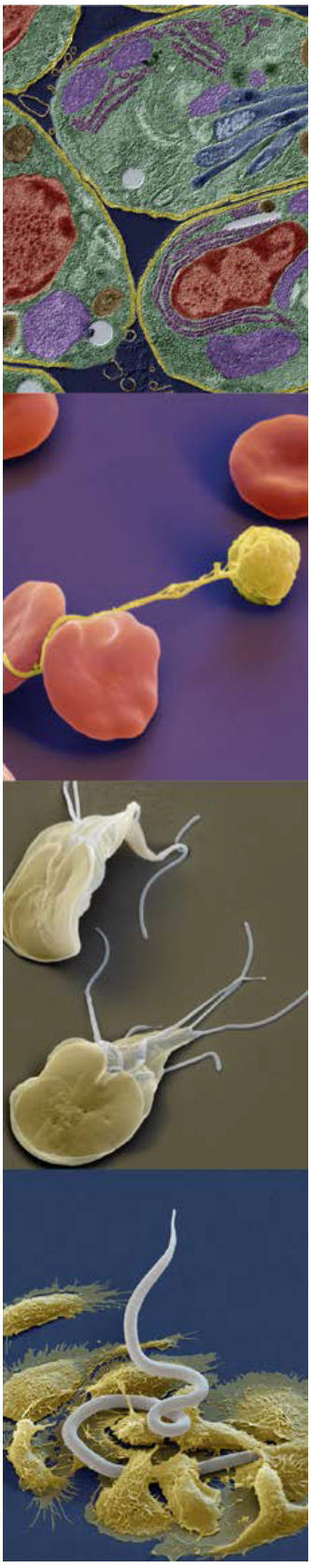
and genetics. Participants came from major mouse research groups in Germany, Czech Republic, USA, Austria and Switzerland. The presentations revolved around topics of Hybrid Zones and associated research, such as gene flow, pathogen epidemiology, evolution, behavior and immunology. I presented with the title: “Reduced intensities of Eimeria infection in hybrid vs. parental house mice - immune system or host-parasite compatibility?”, showing preliminary results of our wild, wild-derived and laboratory mouse studies, featuring gene expression and flow cytometer results. The work was well received and sparked a lengthy discussion with our collaborators and interested outside parties during the coffee breaks.
It was a pleasure to meet so many leading experts in the research fields focused on the house mice as a model, including interactions within the House Mouse Hybrid Zones (HMHZs). The conference was enriched by evening social events as well as visits to the St. Thomas’ Abbey - the site of Mendel’s famous pea experiments, The Mendelanium - a museum dedicated to J. G. Mendel’s work and finally the breeding facility in Studenec, which specializes in breeding of wild derived house mouse strains. Overall, the visit was incredibly educational and motivating, I would definitely recommend it for those interested in advances in murine models and the potential these tailored tools can provide. For those interested, the wild-derived strain facility has a website at https://housemice.cz/en

– Lubomír Bednář

27th Conference of the World Association for the Advancement of Veterinary Parasitology

7-11 July 2019
Madison, Wisconsin, USA

This years WAAVP conference was held along with the 64th American Association of Veterinary Parasitologist Annual Meeting (AAVP) in Madison, Wisconsin at the stunning Monona Terrace Community and Convention Center. Preceeding the conference, Irina Diekmann and myself as well as our supervisors Jürgen Krücken and Georg von Samson-Himmelstjerna participated in the 8th Consortium for Anthelmintic Resistance and Susceptibility (CARS) which featured talks by the leading scientist in



anthelmintic resistance and hence offered a great opportunity to meet and network with this international group of experts.
The conference focused on parasites of veterinary importance. Scientifically and methodically the topics and research was very diverse with talks and posters ranging from veterinary epidemiology to next-generation sequencing and molecular biology. My personal favorites were talks by Stephen Doyle, John Gilleard and Eileen Devaney who combined transcriptomic and genomic analysis of resistant *Haemonchus contortus* isolates and identified relevant resistance genes through repeated backcrossing into a susceptible background and repeated selection.

Most importantly, a wide range of social events and activities such as the fun run and a gala dinner allowed networking with this very open minded and friendly community of veterinary parasitologists.

– Alexander Gerhard

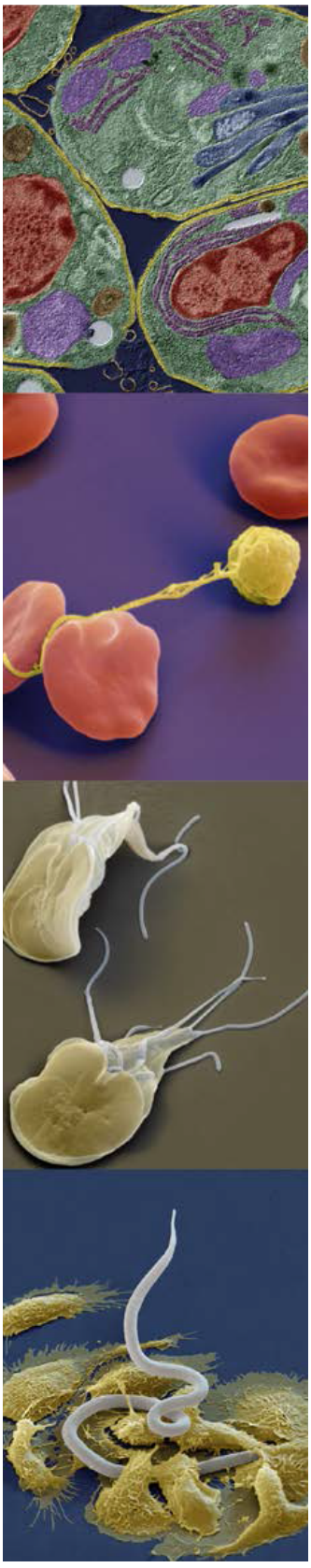
DGfI Veterinary Immunology Conference

9-10 September 2019
Munich

From the 9th – 10th September 2019 I attended a veterinary immunology conference in Munich organized by the German Society for Immunology (DGfI). This meeting, a prelude to the larger DGfI annual conference, was a great opportunity to network with other immunologists working on a wide range of non-murine animal models.

There were a diverse range of highly interesting talks, and the relatively small size of the conference facilitated plenty of informal interaction between attendees. I presented a poster outlining my current work on porcine dendritic cells, and it was really great to receive feedback and suggestions from other researchers who are also studying pig immunity. Overall it was a fantastic experience and I would be more than happy to attend again in future years.

– Benjamin Hamid



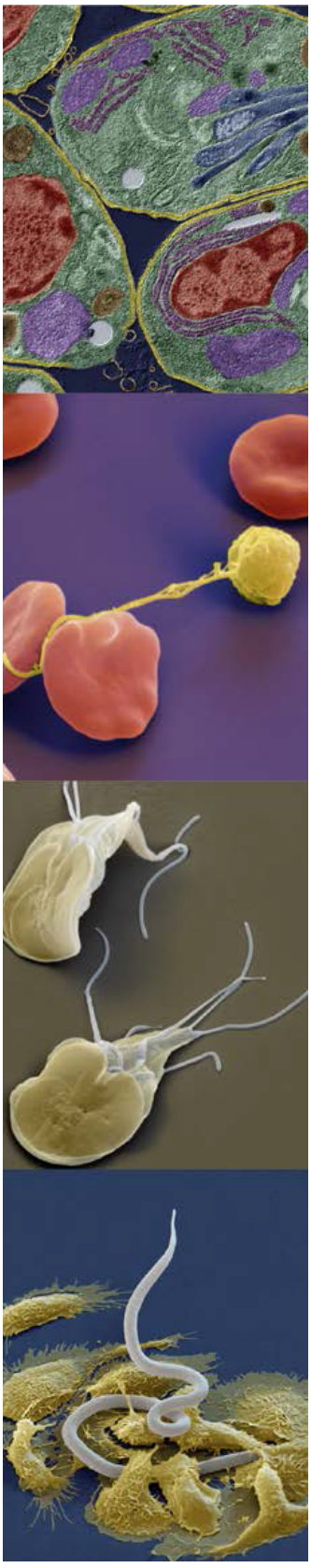
5th intranational meeting on apicomplexan parasites in farm animals

2- 4 October 2019
Munich

During last month I had the chance to attend a congress related to the role of apicomplexan parasites for the food industry worldwide. The meeting was covering all the aspects of parasite infection and its role in the production of food from the functional level of parasites till their regular habitats among farm animals. The main goal included understanding and preventing the parasites' infection so that treatments can be approached more effectively in order to protect the animals and increase the quality of our food production worldwide. The approaches presented during the meeting varied from immunology and molecular biology up to diagnostic methods and vaccination approaches for preventing infections.

I personally was able to introduce my work related to the role of phospholipids regulating the virulence of Toxoplasma gondii to my poster's visitors and able to receive some great feedback for my project. This meeting gave me a new wider understating of the role of apicomplexan parasites towards also how our nutritional habitats and diet could be also affected significantly by them if they were remained unchecked. Organizers gave their best efforts to organize a series of talks including a variety of guests of different backgrounds and also provide some comfort for all of us their guests. I would like to thank them for organizing this meeting and I am looking forward to being there again. Finally, I would like to thank GRK 2046 for their support of my participation.

– Dimitrios Alexandros Katelas



Serengeti Field Training Course, 2019

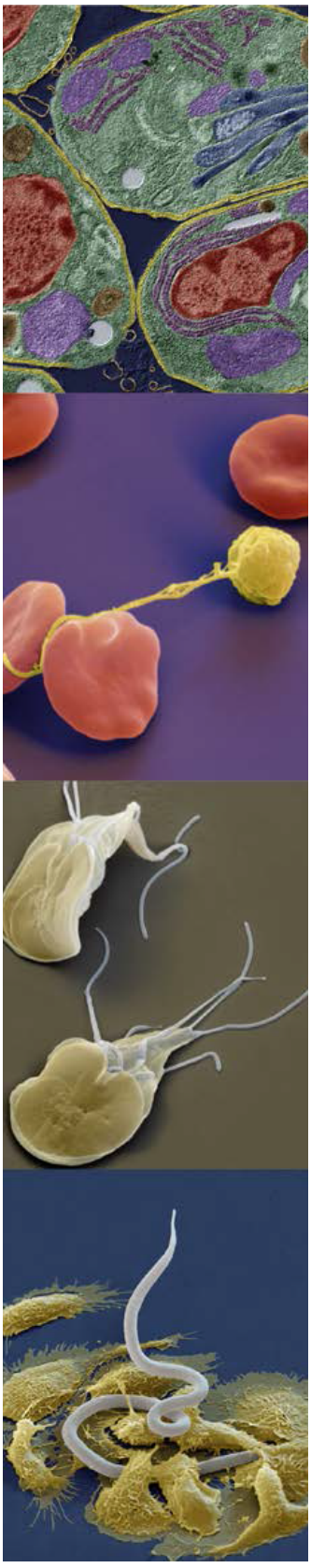
Participating GRK 2046 students and supervisors:

Alexander Gerhard, Ankur Midha, Benedikt Fabian, Benjamin Hamid, Irina Diekmann, Ivet Yordanova, Lubomír Bednář, Miguel Veiga, Prof. Emanuel Heitlinger, Prof. Georg von Samson-Himmelstjerna, Prof. Heribert Hofer, Prof. Marion East, Prof. Richard Lucius, Prof. Susanne Hartmann.

Summary

For the second time since the beginning of the GRK 2046, there was a chance for both, students and supervisors to get some hands-on experience on sampling design and methodology in an unmanaged wildlife setting. In the Serengeti National Park (NP), Tanzania, animals embrace no other laws than the ones imposed by nature, meaning that addressing research questions requires a change in mindset comparing to what we are mostly used to.

PhD students and Principal Investigators were all evidently very exhausted but happy on their way back from the Serengeti to Berlin. (from left to right: Livia Wicklein, Lubomír Bednář, Alexander Gerhard, Irina Diekmann, Georg von Samson-Himmelstjerna, Richard Lucius, Benjamin Hamid, Miguel Veiga, Ankur Midha, Emanuel Heitlinger, Benedikt Fabian, Susanne Hartmann, and Ivet Yordanova)



We were based at the Serengeti Wildlife Research Centre (SWRC), about 15 km from the park headquarters in Seronera –> in the centre of the Serengeti NP and accessible only by 12-passenger Cessna aircrafts. Since 1987, this is where the Leibniz-Institut für Zoo- und Wildtierforschung (IZW) spotted hyena project runs.

Our days were divided between: 1) going out in two 4x4 vehicles, guided by Marion, Heribert and Sonja, for hyena observation and samples collection (early morning & midafternoon) and 2) laboratory work. The projects focused on the study of parasite communities, mostly through non-invasive sampling, by gross and molecular parasite detection techniques.

All of the students would like to thank the GRK 2046 and the participating PIs for funding and organizing this incredible field training course. We will produce a separate booklet with much more information about the trip for those that are interested to read more. Hopefully it will be available at the GRK home page soon.

– Miguel Veiga

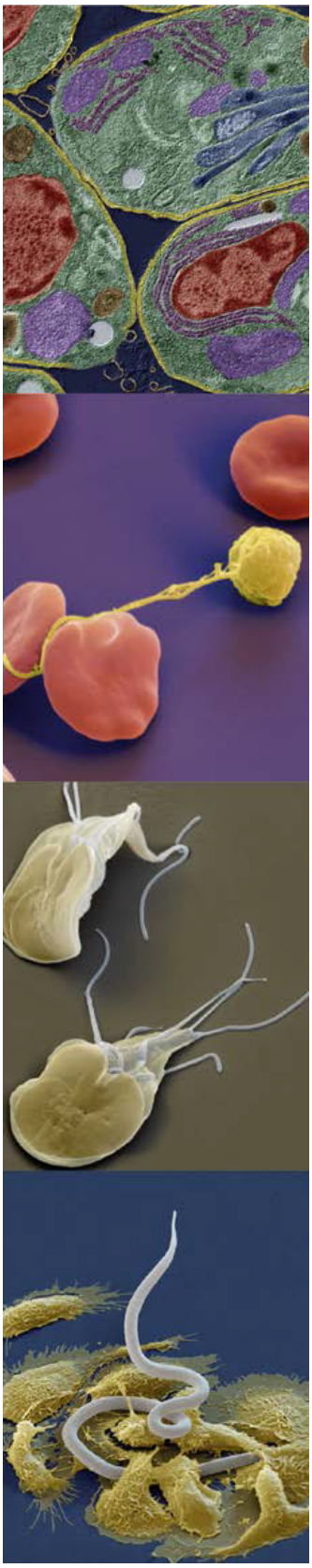
Berlin Parasitology Seminars (BPS)

Prof. Bernd Lepenies
Tierärztliche Hochschule Hannover

3rd September 2019

Prof. Dr. Bernd Lepenies is an Associate Professor for Infection Immunology at the University of Veterinary Medicine in Hannover. He has a long-standing interest in the role of C-type lectin receptors and their carbohydrate ligands in the initiation of immune responses to infection. His group studies the function of these receptors in different murine models of infection and autoimmunity, including various microbial infection models. He discussed some of his recent findings in a talk entitled “C-type lectin receptors as targets for immune modulation in (parasitic) infections”. The talk was accompanied by an informal discussion including food and beverages.

– Ankur Midha



Prof. Peter Geldhof and Aurélie Gagnaire, Ph.D.
Ghent University, Belgium

8th October 2019

For the October edition of our monthly BPS seminar series we hosted Prof. Peter Geldhof and Dr. Aurelie Gagnaire from the Faculty of Veterinary Medicine at Ghent University in Belgium. Our two guests joined us on a *Giardia*-focused mission to present some of their work on the prevalence and immune responses to *Giardia lamblia* infection in dairy cattle. In their talk they also focused on their most recent findings in neonatal mice and how the still developing immune response in neonates correlates with the efficiency of their intestinal IL-17A responses and hence with their susceptibility to infection with G. *muris* during early-life development. Towards the end of the seminar talk, Dr. Gagnaire also introduced the audience to exciting new projects they are now focusing on, looking at the impact of *Giardia* infection on host lipid metabolism and how intestinal commensals potentially influence lipid metabolism in the context of experimental *Giardia* infection. Following the BPS seminar, Prof. Geldhof and Dr. Gagnaire had further detailed discussions and exchanges of findings and ideas with Sebastian, Ivet and Susanne about building future collaborations between the two *Giardia*-enthusiast groups.

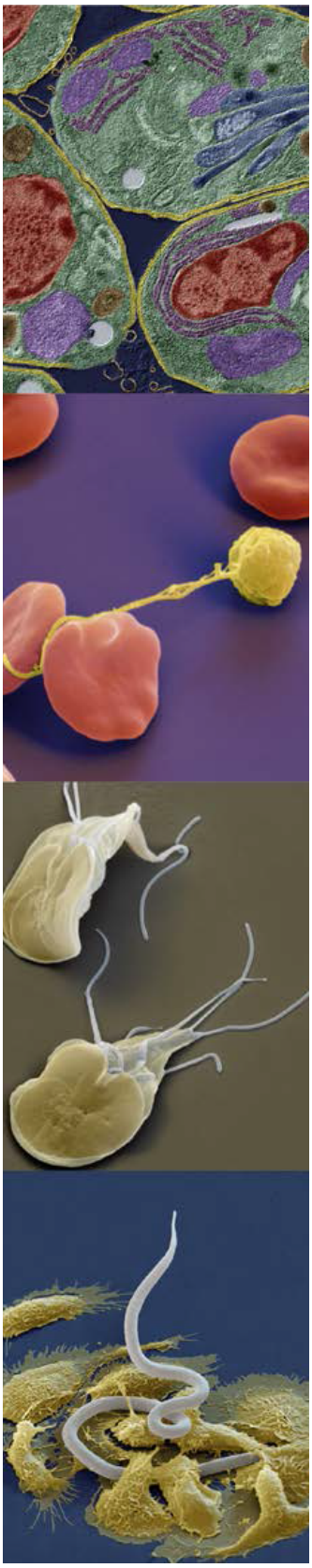
– Ivet Yordanova

Role Models Seminars

Prof. Laura Knoll
University of Wisconsin- Madison, Madison, USA

3rd September 2019

On September 3rd, Prof. Laura Knoll from the department for Medical Microbiology & Immunology at the University of Wisconsin – Madison gave a talk on '*Inhibition of delta-6-desaturase allows Toxoplasma gondii to have sex anywhere.*' Laura is interested in host-pathogen interactions and uses *Toxoplasma gondii* as a model to study those. Shortly before she gave the talk, her lab published a breakthrough paper in which they reported that *T. gondii* requires linoleic acid for sexual reproduction. By inhibiting an enzyme in mice and providing them with additional linoleic acid, Laura's lab was able to get mice to produce viable *T. gondii* oocysts. This is remarkable in that regard, that prior to Laura's findings, sexual



reproduction of *T. gondii* was only observed in feline hosts. The publication could pave the way to more efficient *T. gondii* research and an increase in research on the oocyst stage, which is vastly unterstudied as of yet.
Being a mother and a successful researcher, Prof. Laura Knoll is an excellent role model for PhD students and she shared her views and advice on combining private life and academic career.

– Benedikt Fabian

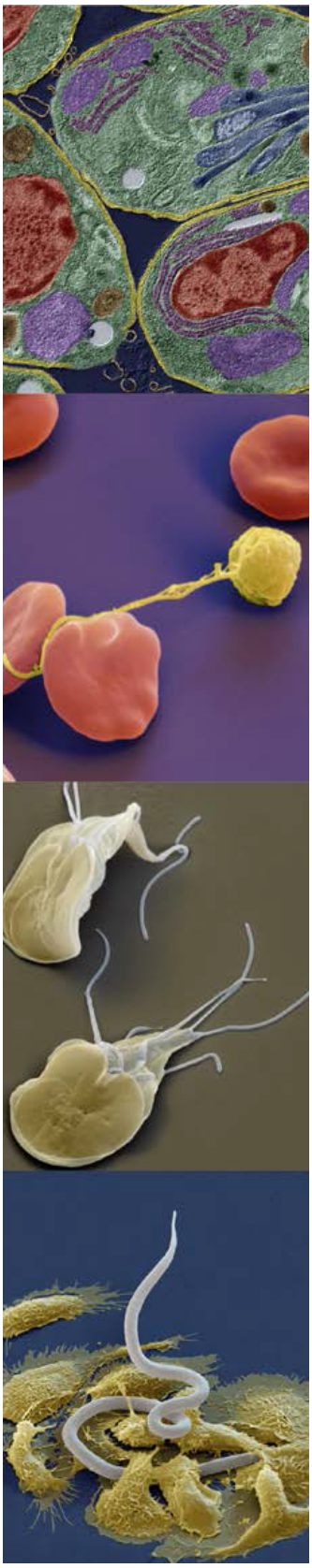
Prof. Malin Johansson
University of Gothenburg, Göteborg, Sweden

1st October 2019

On October 1st 2019, Assoc. Prof. Malin Johansson from University of Gothenburg and the Sahlgrenska University Hospital, Gothenburg, Sweden shared her experiences from biomedical research on intestinal mucus with the GRK2046 students. She presented various projects on e.g. mucin types in different organisms, methods for visualization and analysis, and specific genes which are important for production, secretion and function of mucin. Of special interest to the parasitology student, she also included what is known about some pathogens which possess unique genes to cleave mucins, the building blocks of the mucus.

Prof. Johansson started her studies and career as a biomedical assistant (BMA), but soon decided to pursue her own research on mucus. She entered into an immature field of research and has managed to receive independent funding from e.g. the renowned Wallenberg Foundation and NIH to establish herself as one of the top scientists in the field of mucus research in health and disease. Prof. Johansson shared with the students an unusual development of her career in which she had a postdoc-like position in the US before even finishing her PhD. She has combined family life with career while also struggling with a serious disease, which has influenced some of her career possibilities.

– Totta Ehret Kasemo



Dragana Jankovic, Ph.D.
National Institute of Allergy and Infectious Diseases, Bethesda, USA

24th October 2019

On the 24th October it was my pleasure to host Dr. Dragana Jankovic from the National Institute of Allergy and Infectious Diseases (Maryland, USA) for a Role Models seminar. Dr. Jankovic presented some of her extremely interesting work investigating the immunological responses to *Toxoplamsma gondii* in mice and humans, and the molecular pathways responsible for recognition of the parasite by host myeloid cells. I found it particularly enlightening to learn about her recent work studying the impact of acute Toxoplasmosis during juvenility on long-term lymphopoiesis.

As usual, the scientific seminar was followed by a careers' discussion with Dr. Jankovic, during which we learned about her unusual career journey from Serbia via Germany and France to the USA. We were fortunate to host Dr. Jankovic for the rest of the day at the Institute of Immunology, where she gave us many insightful suggestions for our ongoing projects.

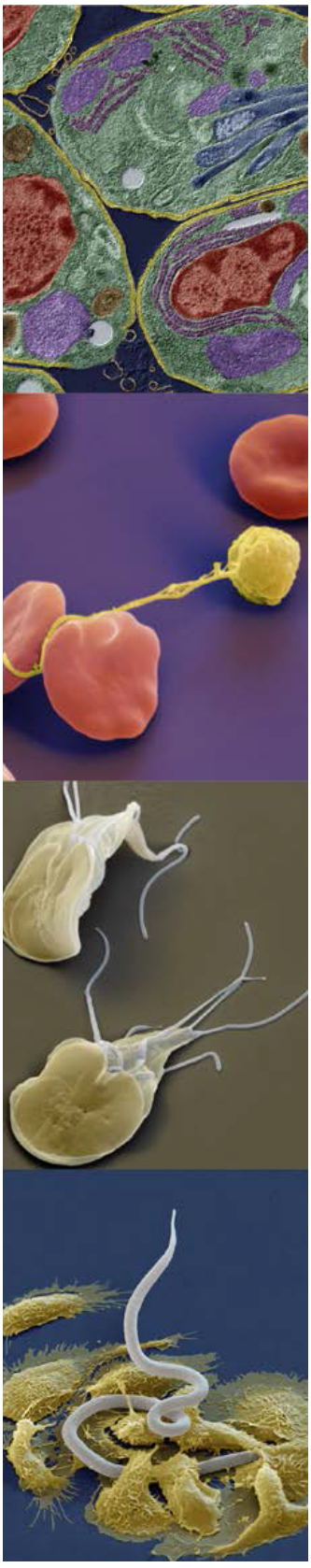
– Benjamin Hamid

Amy Buck, Ph.D.
The University of Edinburgh, Edinburgh, Great Britan

12th November 19

For the last Role Models in Infection Biology seminar of the year, our guest was Dr. Amy Buck from The University of Edinburgh. Dr. Buck's lab investigates RNA mediated communication between different genomes, cells, organisms and species. She presented her research in an insightful talk entitled, "RNA in communication: new insights into helminth-host interactions" where she focused on secretion of the protein argonaute and small RNAs by intestinal helminth *H. polygyrus* and interactions with host cells. The talk was followed by a small informal get together over the breakfast and later by a career-briefing session with the PhD students.

– Bhavya Kapse



Berlin Seminar for Resistance Research (BSfRR)

Sofia Forslund
Max-Delbrück-Centrum für Molekulare Medizin in der Helmholtz-Gemeinschaft, Berlin

16th August 2019

Dr. Sofia Forslund is a group leader at the Max Delbrück Center for Molecular Medicine in Berlin where her group explores human host-microbiome interactions and development toward health or disease by creating data-based models. In a talk entitled “Disease and drug signatures in the gut microbiome”, Dr. Forslund presented results from recent human trials involving dietary interventions in metabolic and cardiovascular diseases. These multi-center trials attempted to link microbiome, metabolome, and immune characteristics with patient outcomes. Dr. Forslund’s contribution to this work included analysis of microbiome changes as well as assessing populations of drug-resistance microbes. The seminar was followed by a very lively discussion.

– Ankur Midha

Upcoming Talks

Berlin Parasitology Seminars

14.01.2020, 17:00 – Ulrike Blohm RvO (Düppel)

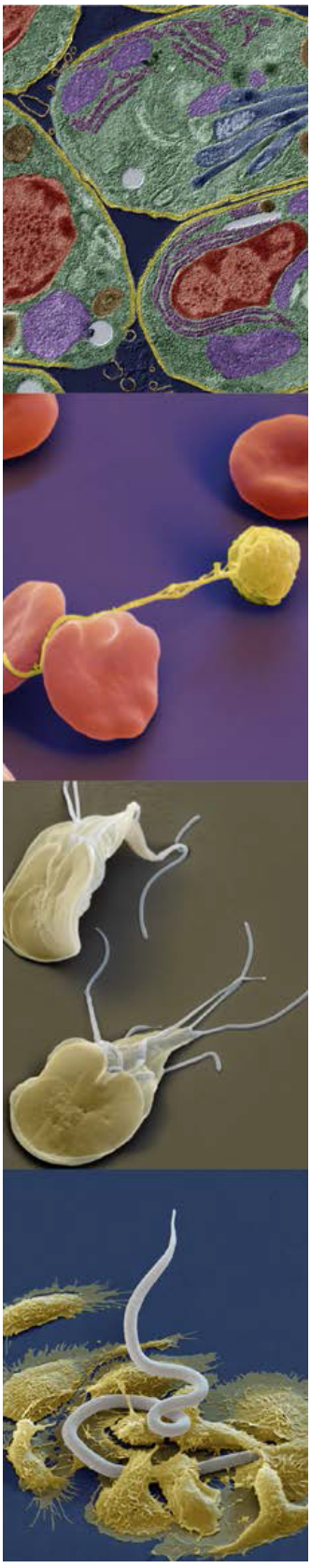
11.02.2020, 17:00 – José de la Fuente – RvO (Düppel)

10.03.2020, 17:00 – Francis Ndung‘u – RvO (Düppel)

24.03.2020, 17:00 – Bang Shen – HGS (Mitte)

Role Models in Infection Biology

18.02.2020, 15:00 – Christina Strube – VP (Düppel)



Graduated 1st generation students and date of defense

Oriana Kreutzfeld – 15.02.2019
Hanna Prüter – 28.06.2019
Susana Ferreira – 13.08.2019
Francesca Torelli – 13.08.2019
Christina Bredtmann – 05.09.2019
Nicole Affinass – 18.10.2019
Costanza Tacoli – 04.11.2019
Ivet Yordanova – 11.11.2019
Esra Yilmaz – 13.11.2019

Ivet (with supervisors Sebastian Rausch and Susanne Hartmann) has made it!

Congratulations!

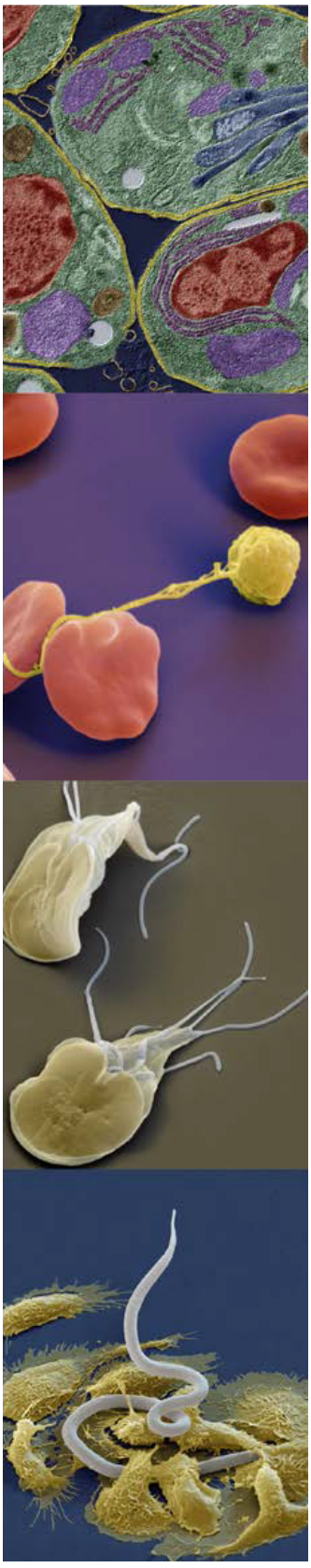
Publications

Nuclear and mitochondrial marker sequences reveal close relationship between Coronocyclus coronatus and a potential Cylicostephanus calicatus cryptic species complex

Christina Maria Bredtmann, **Jürgen Krücken**, Tetiana A. Kuzmina, Mariana Louro, Luis M. Madeira de Carvalho and **Georg von Samson-Himmelstjerna**, 2019, *Infection, Genetics and Evolution*, 9:75

Abstract

The Cyathostominae (Nematoda, Strongyloidea) parasitising equines represent a diverse group currently including 50 species. However, their taxonomy has been repeatedly revised and occasionally the presence of cryptic genospecies was suggested. Moreover, molecular- and morphology-based phylogenetic analyses give divergent results. For instance, molecular data have suggested close relationship between Coronocyclus coronatus and Cylicostephanus calicatus, although morphology-based taxonomy places them in different genera. Here, nuclear (internal transcribed spacer 2, ITS-2) and mitochondrial (cytochrome oxidase I, COI) sequences were obtained from the same individual, morphologically identified worms. In both morphospecies, two ITS-2 sequences types were observed: In Cor. coronatus, a small PCR product of 278 bp (nuclear haplotype group nHGBco) was always present but often in combination with a larger 369-370 bp fragment (nHGAco). In Cys. calicatus, either a large 370 bp product (nHGAca) or a short 281 bp amplicon (nHGBca) were found, but never both. Sequence identity between morphospecies was up to 100%. The smaller differed from the larger fragments by deletion of the region 110-198 in Cor. coronatus and



112-203 in Cys. calicatus. In COI, three and five mitochondrial haplotype groups (HGs), mtHG1co-mtHG3co and mtHG1ca-mtHG5ca were identified for Cor. coronatus and Cys. calicatus, respectively. In Cor. coronatus, there was no particular association of mtHG with nuclear genotypes (only nHGBco vs. both nHGBco plus nHGAco). In Cys. calicatus the nHGAca was always associated with the mtHG1ca, mtHG2ca or mtHG5ca whereas nHGBca was exclusively associated with mtHG3ca or mtHG4ca. Despite up to 100% identity in the nHGs, no mixing of mtHGs was observed between both species. Clear separation of certain nHGs with particular mtHGs in Cys. calicatus, despite the fact that the same host individuals were infected with both groups simultaneously, suggests presence of two non-interbreeding genospecies within Cys. calicatus, which needs further confirmation using additional samples from diverse geographical origins.

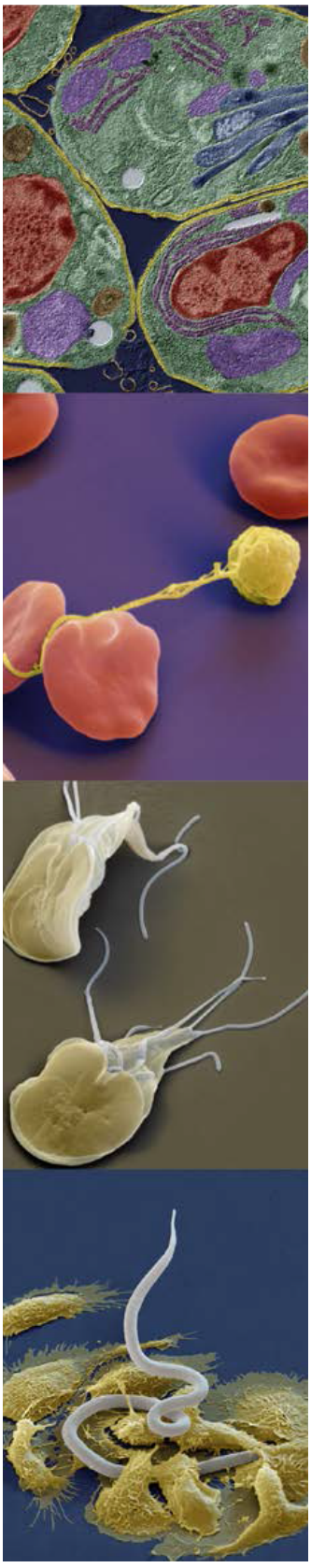
Detection and quantification of house mouse *Eimeria* at the species level – challenges and solutions for the assessment of Coccidia in wildlife

Victor Hugo Jarquín Díaz, Alice Balard, Jennz Jost, Julia Kraft, Mert Naci Dikmen, Jana Kvičerová and **Emanuel Heitlinger**, 2019, *International Journal for Parasitology: Parasites and Wildlife*, 10:29-40

Abstract

Detection and quantification of coccidia in studies of wildlife can be challenging. Therefore, prevalence of coccidia is often not assessed at the parasite species level in non-livestock animals. Parasite species – specific prevalences are especially important when studying evolutionary questions in wild populations. We might expect, for example, highly prevalent parasite species to have a lower virulence than lowly prevalent species.

We studied free-living commensal populations of the house mouse (*Mus musculus*) in Germany, and established a strategy to detect and quantify *Eimeria* infections. We show that a novel diagnostic primer targeting the apicoplast genome (Ap5) and coprological assessment after flotation provide complementary detection results increasing sensitivity. Genotyping PCRs confirm detection in a subset of samples and cross-validation of different PCR markers does not indicate bias towards a particular parasite species in genotyping. We were able to detect double infections and to determine the preferred parasite occurrence along the distal-proximal axis of the intestine. Parasite genotyping from tissue



samples provides additional indication for the absence of species bias in genotyping amplifications. Three *Eimeria* species were found infecting house mice at different prevalences: *Eimeria ferrisi* (16.1%; 95% CI 12.7 – 20.2), *E. falciformis* (4.2%; 95% CI 2.6 – 6.8) and *E. vermiformis* (1.1%; 95% CI 0.4 – 2.7).
We provide methods for the assessment of prevalences of coccidia at the species level in rodent systems. We discuss the need for broader species level assessment in Coccidia. Prevalence negatively correlates with virulence for *Eimeria* species of house mice, as the more prevalent *E. ferrisi* has been shown to be less virulent than *E. falciformis*. It is an open question whether house mouse *Eimeria* are host specialist and whether prevalence in our system correlates with host range.

Duffy antigen receptor for chemokines gene polymorphisms and malaria in Mangaluru, India

Prabhanjan P. Gai, **Welmoed van Loon**, Konrad Siegert, Jakob Wedam, Suyamindra S. Kulkarni, Rashmi Rasalkar, Archith Boloor, Arun Kumar, Animesh Jain, Chakrapani Mahabala, Shantaram Baliga, Rajeshwari Devi, Damodara Shenoy, Pramod Gai, and **Frank P. Mockenhaupt**, 2019, *Malaria Journal*, 18:328

Abstract

BACKGROUND:

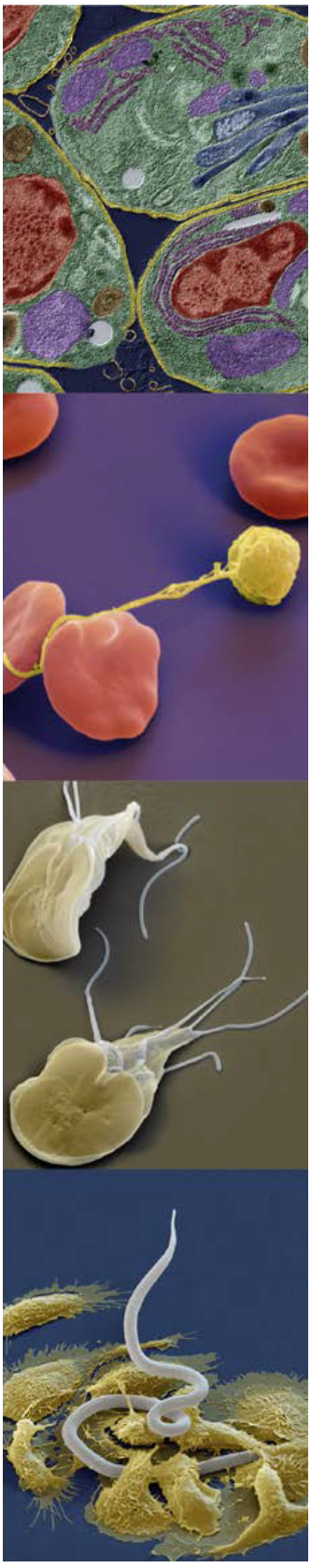
Duffy blood group antigens serve as receptors for Plasmodium vivax invasion into erythrocytes, and they are determined by polymorphisms of the Duffy antigen receptor for chemokines (DARC), also known as Fy glycoprotein (FY). Duffy negativity, i.e., absence of the antigens, protects against P. vivax infection and is rare among non-African populations. However, data on DARC polymorphisms and their impact on Plasmodium infection in India are scarce.

METHODS:

In a case-control study among 909 malaria patients and 909 healthy community controls in Mangaluru, southwestern India, DARC polymorphisms T-33C (rs2814778), G125A (rs12075), C265T (rs34599082), and G298A (rs13962) were genotyped. Associations of the polymorphisms with the odds of malaria, parasite species and manifestation were assessed.

RESULTS:

Among patients, vivax malaria (70%) predominated over falciparum malaria (9%) and mixed species infections (21%). DARC T-33C was absent and C265T was rare (1%). FYB carriage (deduced from DARC



G125A) was not associated with the risk of malaria per se but it protected against severe falciparum malaria (P = 0.03), and hospitalization (P = 0.006) due to falciparum malaria. Vice versa, carriage of DARC 298A was associated with increased odds of malaria (aOR, 1.46 (1.07-1.99), P = 0.015) and vivax malaria (aOR, 1.60 (1.14-2.22), P = 0.006) and with several reported symptoms and findings of the patients.

CONCLUSION:

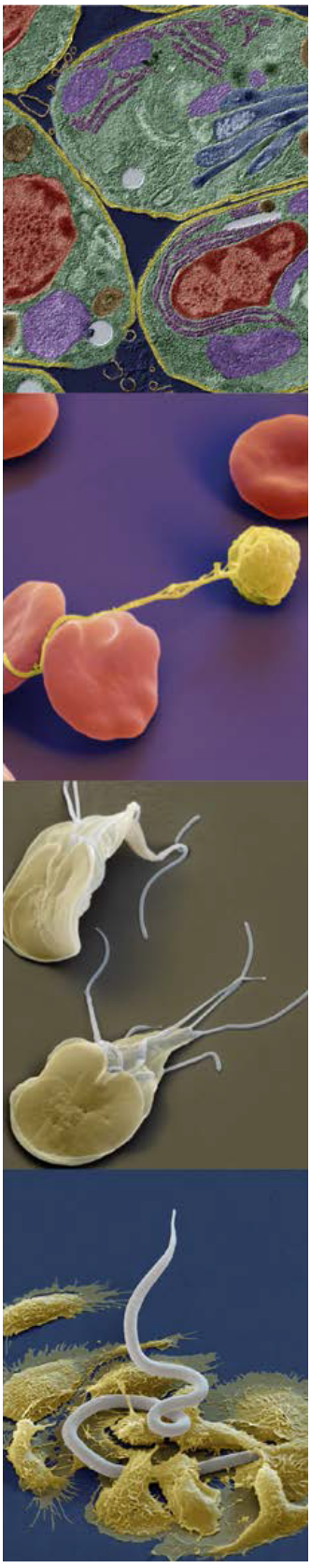
This report from southern India is the first to show an independent effect of the DARC 298A polymorphism on the risk of malaria. Functional studies are required to understand the underlying mechanism. Moreover, FYB carriage appears to protect against severe falciparum malaria in southern India.

Characterization of Plasmodium vivax pvmdr1 Polymorphisms in Isolates from Mangaluru, India

Costanza Tacoli, Prabhanjan P. Gai, Konrad Siegert, Jakob Wedam, Suyamindra S. Kulkarni, Rashmi Rasalkar, Archith Boloor, Animesh Jain, Chakrapani Mahabala, Shantaram Baliga, Damodara Shenoy, Pramod Gai, Rajeshwari Devi, **Frank P. Mockenhaupt**, 2019, *American Journal of Tropical Medicine and Hygiene*, 101:416-417

Abstract

India accounts for approximately half of the global Plasmodium vivax cases, but information as to the presence of chloroquine (CQ) resistance is scarce. In an observational study in Mangaluru, south-western India, of 116 vivax malaria patients analyzed, 89.5% (102/114) had cleared parasitemia on days two or three of CQ treatment. Two remaining patients presented on days four and five without parasitemia. One hundred eight isolates of these 116 patients were successfully sequenced for pvmdr1 polymorphisms. Eight non-synonymous polymorphisms but no wild-type isolate were detected. Ten pvmdr1 haplotypes were observed with mutations T958M and F1076L occurring in all isolates, whereas the candidate CQ resistance marker Y976F was present in one isolate only. Pvmdr1 polymorphisms were not associated with early parasite clearance. The high proportion of early parasite clearance and the virtual absence of pvmdr1 Y976F and of sextuple pvmdr1 mutants suggest that CQ in the study area is still sufficiently effective. However, the abundance of pvmdr1 mutations in the local parasite population warrants monitoring.



Retreat

Again, our annual Retreat in 2019 took place in the Veterinarium Progressum located on the beautiful though afield Freie Universität Campus Düppel. It can be a very quiet place ideal for a retreat. Almost all 2nd generation PhD students gave a talk on the topic of their projects and on most recent results with a discussion afterwards. Projects were set in four different sessions: Protozoan parasites, Vectors & Vector-borne diseases, Wildlife parasitology, and Nematode infections. After session 2 doctoral students and PIs enjoyed the lunch time. The caterer Café Seidenfaden (FrauSuchtZukunft) that presented a wonderful well-tasting lunch has a serious and social background. It is committed to provide a helping hand for deprived and underprivileged women to become clean of drugs and alcohol. We were happy to support this.

As usual, after the four sessions, the Retreat harboured information sessions for PhD students and for PIs. After a hard day full of scientific discussions, we had an intimidating BBQ with many kinds of sausages and meat, also vegan or vegetarian style! Not so easy to choose!
Thank you very much to the organisers Miguel, Ben F. and Alex G.

– Marko Janke