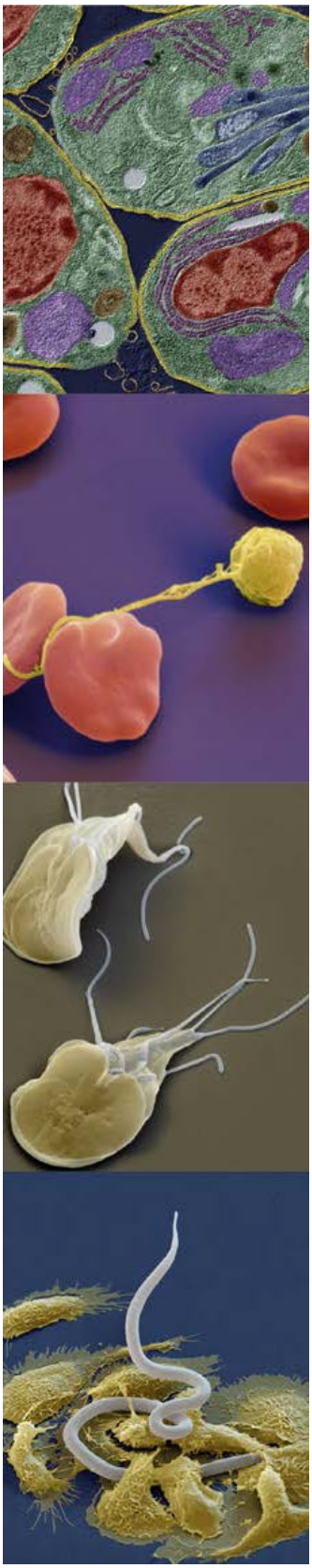
GRK 2046 Newsletter
December 2021



Summary, Update and News

Good Morning,

When I got the 1st draft of this newsletter (12th Edition, edited by Marta) I was amazed by how many reports we had on conferences, workshops and seminars attended by GRK 2046 PhD students during these pandemic times. Most events still can take place virtually only, which result in millions of vacant lecture halls, see below. For a long time, we tried to predict if events like our yearly retreat could take place in person again or not. The pandemic situation seemed to decline, and so we organized hybrid events. Our retreat (at least day 1) could bring together all new and old faces of GRK 2046. For the first time, our 3rd PhD student generation could meet in person with all other students and PIs. However, just as we tried to return to meetings in person (we report on the first hybrid meetings here), the 4th wave of the SARS-CoV-2 pandemic hit us right in the face. So, our lecture series PILS was organized as virtual only event. In addition, other planned hybrid events in the near future might have to be downsized from hybrid to virtual only. However, our PhD students were very active in attending interesting workshops (virtually) for beginners (Time management, Networking) or for more experienced students (Getting funded). Please check out the student reports on these workshops. The general feedback of attended events by PhD students can be summarized as: Virtual is nice, but events in person are much more fun and better.

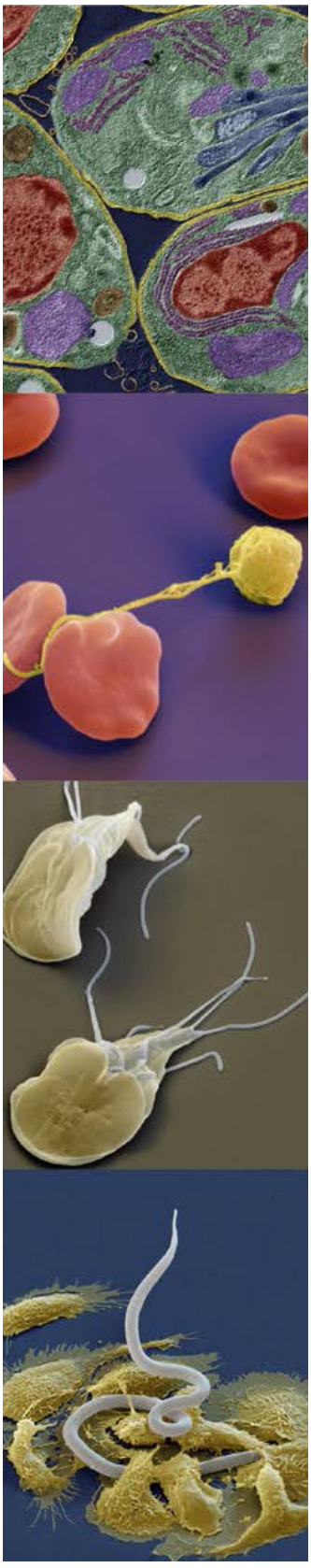
Please read all the comments and reports from our GRK 2046 PhD students below. We report on new PhD students, conferences, workshops, seminars, lectures and publications.

ENJOY! (and unavoidable: Merry Christmas!)

– Marko

Photo by Marko Janke

Pandemic – “Enjoying” the silence



New Students

All photos in the "New Students" Section are private photos.

Fay Webster (Project C4, IZW)

Hello everyone! My name is Fay Webster and I started working as a PhD student in the GRK2046 family in April 2021. Born and raised in Cyprus, I moved to Germany after turning 18. Initially, I spent a year in Heidelberg to learn German before moving to Berlin to study veterinary medicine. During my studies, I developed a strong interest in parasitology and research. To support this enthusiasm, I worked as a student assistant in two projects of the research training group involving parasitic infections in wild carnivores. Moreover, during the final practical year of my studies, I completed several internships on the topics of practical field parasitology, molecular biology of ticks and the immunology of cheetahs.
Currently, I am a part of the research group of Professor Emanuel Heitlinger at the Institute of Zoo- and Wildlife Research and at the Molecular Parasitology of the Humboldt-Universität zu Berlin. My research interests are wild hybrid mice from the house mouse hybrid zone and how they deal with parasitic infections. I am using a vast amount of data collected in the wild or produced during experimental lab infections to decipher the background of these infections in hybrid mice. Finally, I will be implementing an analysis of correlated gene expression and genotyping for *Eimeria ferrisi* and house mice to further investigate what happens in the house mouse hybrid zone.

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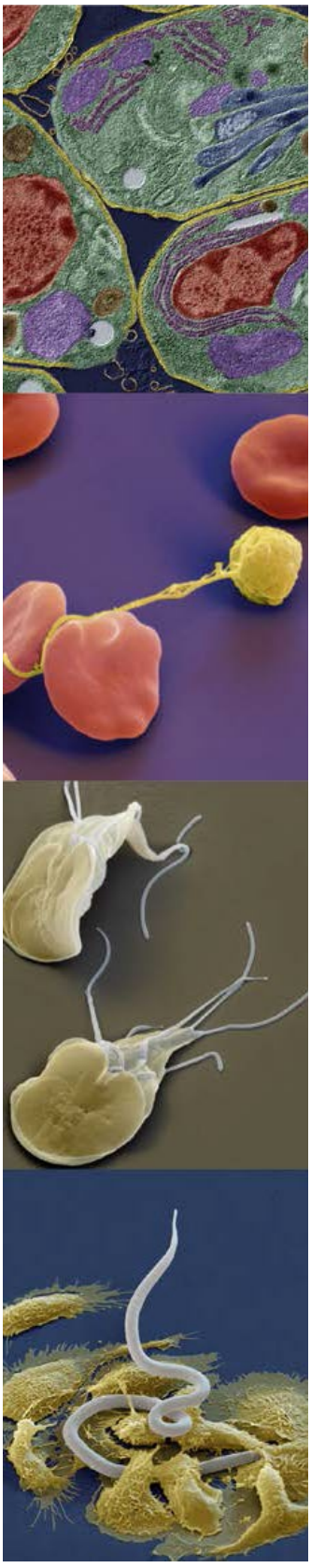

Antonia Müller (Project B3, RKI)

After studying Biology at the FSU Jena for my bachelor degree, I decided to pursue my master's in Biochemistry. I developed the wish to keep working in parasitology whilst working on my Master Thesis at the RKI, investigating the impact of TNF-alpha on epithelial barrier breakdown in *Giardia*-infected small intestinal organoids. For my PhD, I continue to work at the RKI under supervision of Toni Aebischer and Christian Klotz, focusing on the role of the Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) in pathogenesis of *Giardia duodenalis* infections.

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Zaneta Kidiavai (Project B4-associated, FUB)

My name is Zaneta and I started my PhD in April, 2021. I, however, joined the GRK2046 community in June. I am Kenyan and did both my B.Sc (Biochemistry) and MSc.(Bioinformatics) at the University of Nairobi, Kenya. My Masters thesis involved analysis of genes related to the immune system and I found the immunological aspect quite interesting so I decided to get in depth knowledge in cellular immunity. I am pursuing my PhD at the institute of immunology, Freie Universität Berlin, under the supervision of Prof. Dr. Susanne Hartmann. My project focuses on the effect of artemisinin on the host immune response against intestinal nematode infection.

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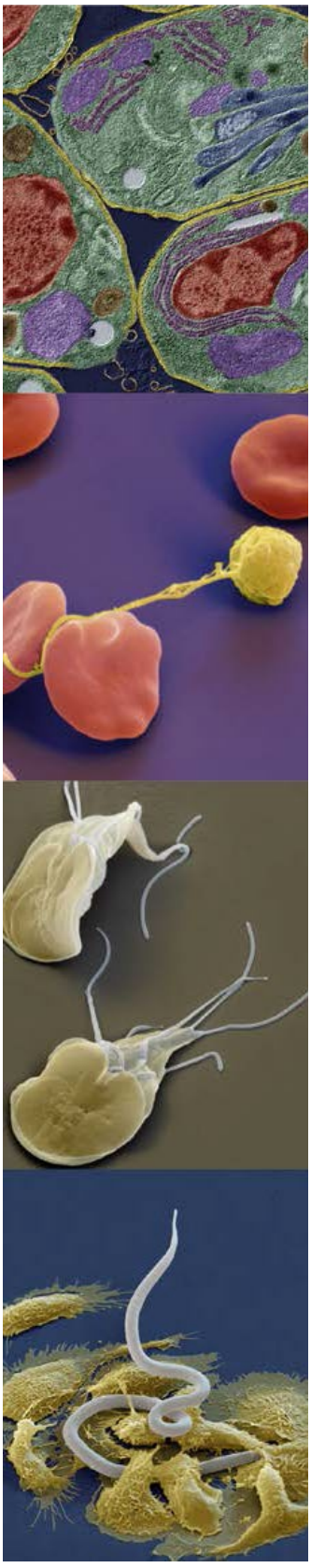

Robert Mugo (Project C9-associated, FUB)

My name is Robert Mugo, I hold an M.Sc. in Immunology, a Postgraduate Diploma in Health Research Methods from Pwani University-Kenya, and a Bachelor's degree in Medical Laboratory Science from Kenyatta University. During my masters, I worked on the kinetics and longevity of RTS,S/AS01 induced anti-CSP antibodies in young Kenyan children. Previously, I worked on sequencing and phylogenetic analysis of Rotavirus strains, to find out whether there is potential for the development of vaccine escape mutants. I am currently interested in determining the role of *Ascaris* spp. infection on infectious pneumonia.

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Grace Klass (Project C5, FUB)

I'm Australian-German and studied veterinary medicine at Freie Universität Berlin. As a participant in the Cornell Veterinary Leadership Program 2018, I spent a summer in the United States studying a novel equine parvo-virus (EqPV-H) and its infection routes. After graduating as a veterinarian, I joined the Institute of Parasitology in August 2021 to work on my PhD project. I am researching cyathostomins and the equine microbiome.

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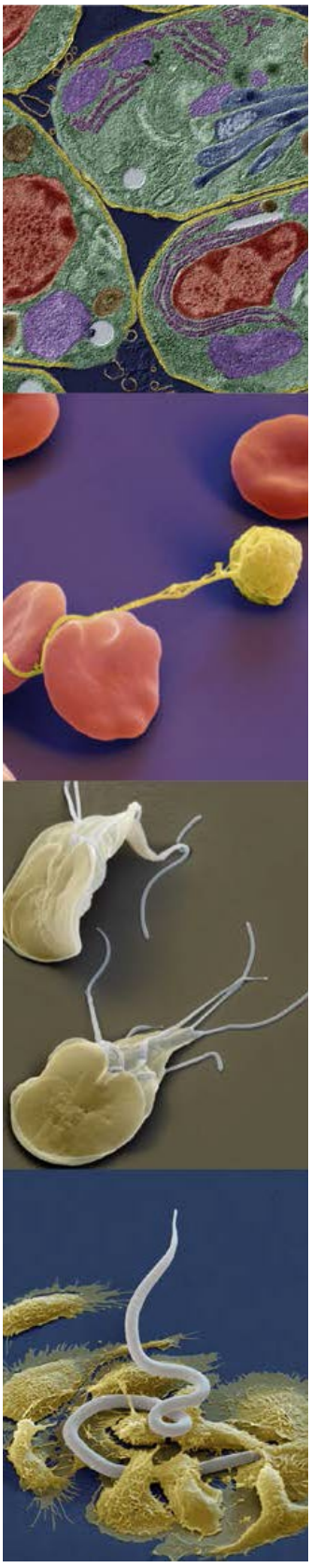

Arkadi Kundik (Project B4-associated, FUB)

Hi! My name is Arkadi; I studied Biology and completed both the BSc and MSc at Freie Universität Berlin (FUB). I have great interest in vaccine development, especially against parasitic infections. In March 2021, I joined the Hartmann Lab at the FUB as a PhD candidate in a joint project that includes partners from the Leibniz Institute for Zoo and Wildlife Research and the Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy. The project aims to investigate the impact of an ultrafast pulsed laser regime on embryonated *Ascaris suum* eggs with the intention to develop a novel and standardisable approach for attenuation of infective *Ascaris* eggs.

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Marta Muniz (Project A5, FUB)

Hello everyone! My name is Marta and joined the Research Training Group in September. I'm currently studying the role of drug metabolism pathways in anthelminthic resistance. I studied Veterinary Medicine and did my master's in Cell and Molecular Biology in Brazil. Previously, I studied a bit of everything: biochemical blood parameters in agoutis, epigenetics of jet lag in mice, educational profiling, environmental risk assessment of GMOs, and ecotoxicology of agrochemicals. For my master's thesis, I spent three months at the Helmholtz Center for Environmental Research in Leipzig, where I studied the spatial distribution of moxidectin in zebrafish embryos. During my master's, I became fascinated by the toxicology of macrocyclic lactones – and now I'm following up on that by studying anthelminthic metabolism in parasitic nematodes.

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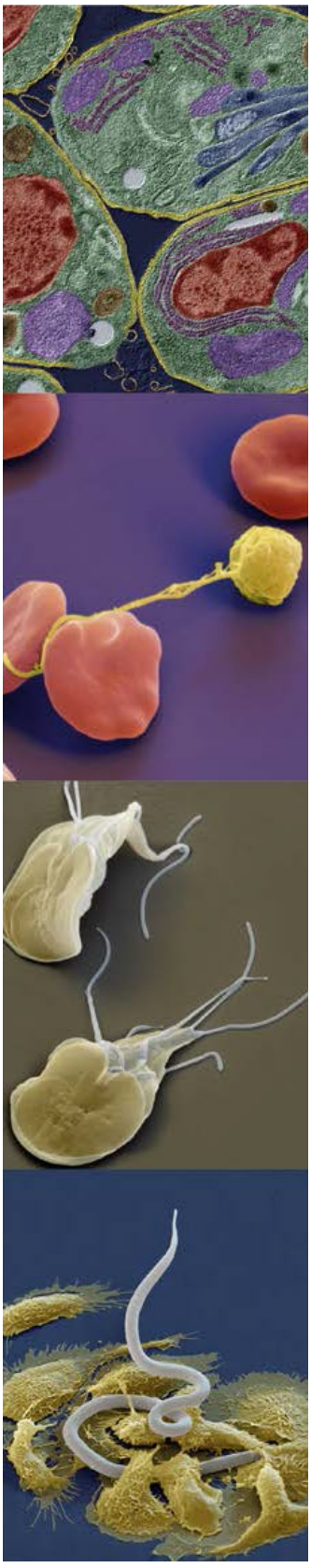


GRK 2046 Retreat

In the beginning, it was not clear whether we need to organize a virtual 2-day retreat, like in 2020, or whether we can meet in person again. We decided to prepare at least one day for a meeting in presence. It was not easy to find a suitable location and catering to meet all university rules and regulations during the pandemic. The organizers Marly and Grace took care of the schedule, booklet and catering. In addition, by a simple game, they found a way to introduce and integrate the new (3rd) generation of PhD students that have never met before in person. However, we were lucky with the weather, so we could meet and eat in the breaks outside the building. Between the breaks, PhD students gave a talk on their projects. The schedule was divided into three main topics, “Nematode Infections”, “Tropical Diseases and Wildlife Parasitology” and “Protozoan Infections”. Using Hybrid technology, we could ensure that people who could not be with us in person were able to give their talk or input virtually. I guess everybody enjoyed the meeting in person, or what do you mean David, Calvin and Tinghuan???

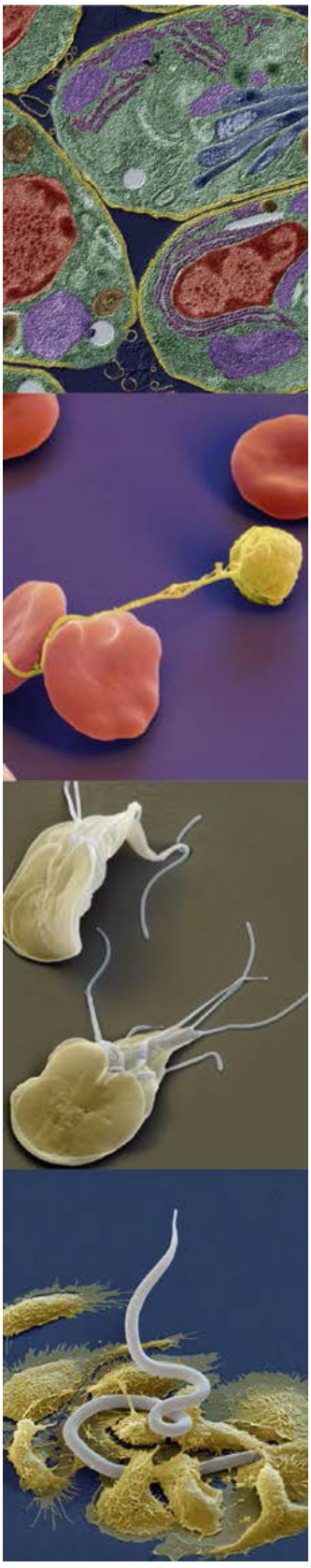
– Marko

“After months of online-only meetings, it was a special delight to hold our 2021 retreat in person, especially for the new 3rd generation students who finally met most of their GRK 2046 colleagues in real life for the first time. I very much enjoyed listening to many excellent presentations covering the wide range of fascinating topics of our graduate school, and getting the opportunity to socialize between sessions. All this took place in beautiful golden October weather and with great catering, plenty of snacks and refreshments. Many thanks to all the presenters, participants, and the organizers for this successful retreat!”

– David Warschkau

“After having attended many events online for as long as I could remember, the GRK 2046 retreat was a nice change of scenery where we could finally interact with our fellow GRK colleagues in-person and have a good banter and catch-up session over food and drinks (applicable only to Day 1 of the retreat, of course). Having other scientists and friends within arm's reach definitely offers a totally different and much better vibe compared to seeing them on the computer screen. Last but not least, it was great to see how the COVID-19 pandemic has pushed modern technology to the point where it has enabled us to simultaneously and efficiently run the retreat in-person and online.”

– Calvin Hon



"During the retreat it was kind of surreal to finally meet most of the GRK fellow students and PIs in person. It felt good to present in person and also way easier to socialize. It was interesting to listen to other students' projects which I might not be so familiar with, and of course I gained some useful information that I could potentially use for my project from the constructive discussions. At the end of the day, we elected two new student representatives, and I hope it would be a great start to make more changes. However, the second day of the retreat was online, and it was somehow less interactive than the first day. After the retreat, my supervisors and I both felt like we received very on-point feedbacks, and hopefully we have some nice inputs to others in return. All in all, I am very much looking forward to the next big event, fingers crossed that it'll be in person again."

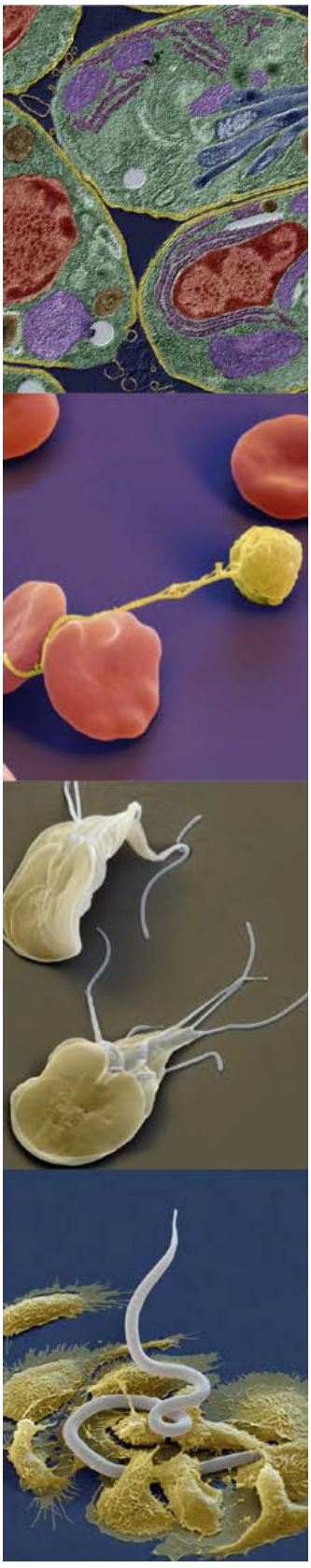
– Tinghuan Song

Photo by Joel Hornby

It's amazing how happy everybody (in person) is, right after lunch…(the Italian food came in 3 flavors: vegetarian, vegan and gluten-free-vegan-based).

PS: There was no money flow between commenting students above and coordinator! Students' comments are TOTALLY real and I did not change a single word in the students' comments, I swear!

– Marko



Conferences & Workshops

Workshop ZIBI Presentation Skills - Design and Visualisation
May 27-28, online

I had the opportunity to participate in the online course: "Presentation design and visualisation" in May 2021. The course was held by Dr. Sascha Vogel and was done online due to the pandemic restrictions. The eight-hour course included a wide range of topics such as data visualization, working with templates, desing of appealing and understandable slides, working with color palettes and presentation preparation. The seminar was very interactive, as we had to prepare presentations within the group that were judged by ourselves in small groups of students.

This course was incredibly valuable for me in terms of preparing and planning presentations. It was rich with many tips and concrete material. I highly recommend it because as PhD students we are preparing presentations constantly and we need to know how to communicate our work properly.

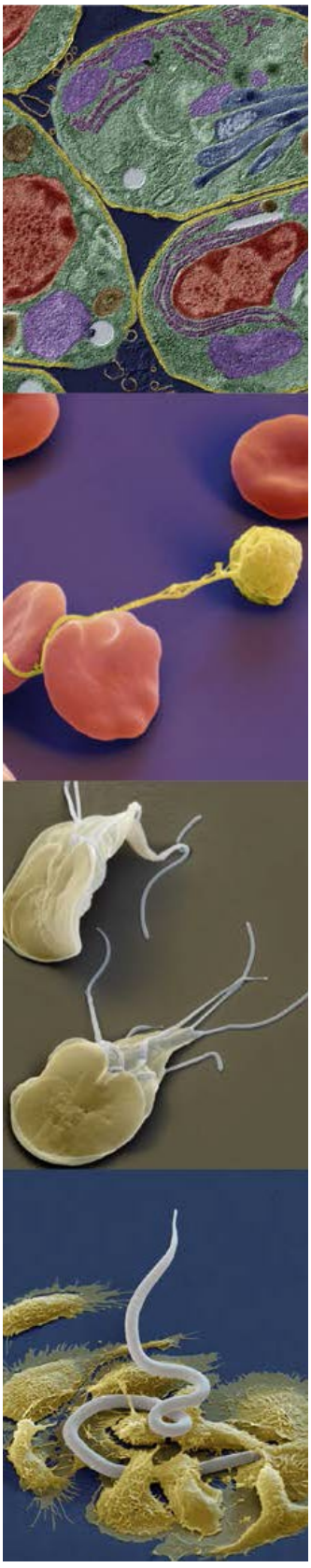
– Marly Erazo

Workshop ZIBI Self and time management
May 31–Jun 2, online

Sabine Lerch . soft skills for science
Taken from https://sabinelerch.de/

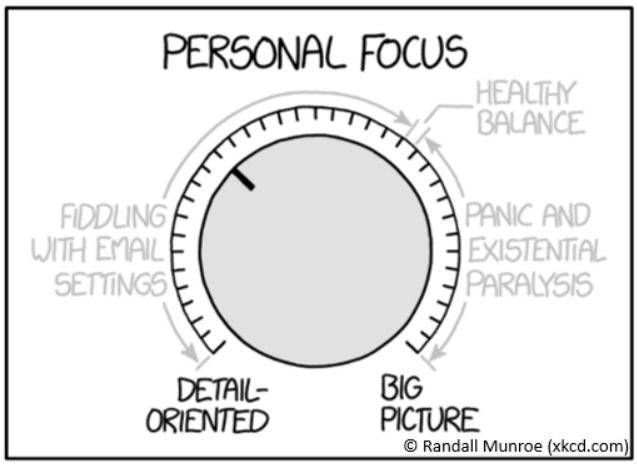
Between the 31st of May and the 2nd of June, a ZIBI workshop on Self and Time Management took place online. It was recommended to early career researchers at the beginning of their Ph.D. to learn/improve these soft skills.

To set the basis for "how to deal with time?" valuable concepts like the bio-rhythm ("inner clock"), stress, and the FLOW were introduced early on. The recognition of one's own Personal and Professional Values in a



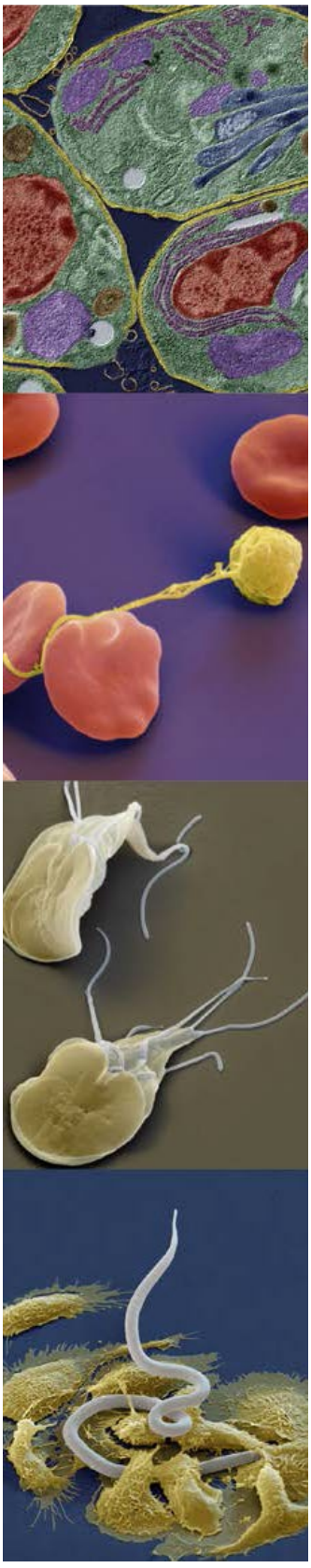
Mind map made it easier to understand how to formulate goals using the SMART WIP approach and to estimate the effort to conclude them. This led to the development of timelines, like the GANTT chart, to keep track of what still needs to be accomplished. Tips on how to monitor, evaluate and control these planning processes were given throughout several practical exercises. Time management matrix of Priorities, Resilience, and how to Balance the Human Needs healthily were also presented in this workshop for reflection.

Timewasters couldn't be left out of these sessions. After inquiring the participants, the ones that were further studied included: Procrastination, Distractions, Indecision, Inability to say NO, Lack of motivation, Stress and fatigue, and Excessive internet use/availability. For each, the situations that triggered them were discussed, the consequences were enumerated and the reasons behind them were pointed out so that possible solutions could be made available.



Despite the numerous concepts related to time and management, plenty of time was also allocated to allow the active participation of the students in their exploration and posing questions by self-reflection time-offs, group work in break-out rooms, discussions, and planning sessions. This workshop was conducted in a safe and friendly environment where people felt at ease, allowing the free sharing of their experiences, limitations, and needs, which further improved the overall content of this coursework. By being online it provided a great opportunity to meet other Ph.D. students outside the GRK program. Students that were in different stages of their careers, so more examples of what awaits in the future and how to deal with them time-efficiently were analyzed and enriched these sessions.

To sum up: this workshop on self and time management is a highly recommended one not only for those that struggle with managing time, but for those that persistently overmanage it, or even for those that were able to manage time in the past, but now need a little help again.... it is



ideal for everyone independently on what stage in their careers they are now!

Valuable tip: Remember to always schedule your breaks and times for planning when organizing your day!

– Susana Soares

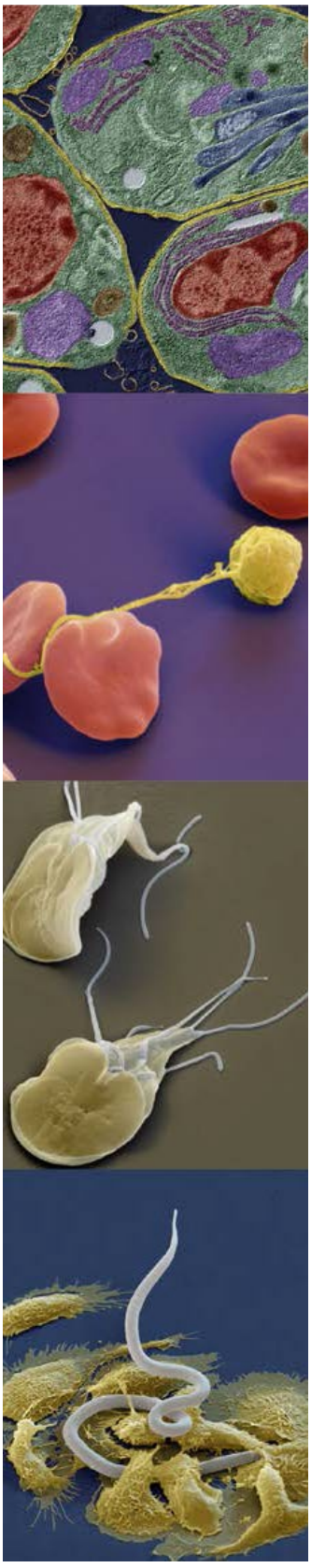
28th International Conference of the World Association for the Advancement of Veterinary Parasitology (WAAVP 2021)

Taken from waavp2021.com

19th -22nd July 2021, online

The theme of the WAAVP conference was "Parasitologists without borders". This was achieved through a well-structured and designed online conference. The posters and presentations focused on the veterinary importance of parasites; the topics were very diverse. The topics discussed ranged from anthelmintic resistance, diagnostics, parasite control, and the use of molecular methods to answer scientific questions. Natalie Jakobs presented her data on ivermectin susceptibility in *Caenorhabditis elegans* N2, which is reduced by transgenic expression of *Haemonchus contortus* cytochrome P450 HCOI00827700. I had the opportunity to present my data on DNA barcoding for efficient identification of the most common cyathostomin species based on comparative phylogenetic evaluation of COI and ITS-2 genes. After the presentations, the projects were discussed with renowned and international scientists. Although the scientific contributions left nothing to be desired, we missed direct interactions, collaborations, and social events. Hopefully, the next conference will be in person or possibly a hybrid conference.

– Irina Diekmann



Workshop ZIBI Getting funded

August 12, 13 and 17, Berlin

After already hearing so much praise about this course before, I felt very lucky when I got a spot in the "Getting Funded" workshop by Dr. Ruth Willmott. The workshop is meant for PhD students in their final year who wish to stay in academia for a postdoc and to apply for suitable fellowships. Ruth covered all aspects of a fellowship application from preparing a cohesive CV to writing a convincing justification of your host lab to answering interview questions. We learnt about the requirements for fellowship applications, the deadlines, the decision-making process, etc. The course was very interactive: for instance, we would write our own CVs, letters to potential PIs or host lab justifications and then review each other. We also simulated application interviews that were recorded and replayed for group feedback.

After more than a year of virtual-only courses due to the pandemic, it felt exciting to have a workshop in person again. I did not realize before how much I had missed that and it contributed to the focused and motivated atmosphere of the workshop. All in all, we had three very intense and productive workshop days and I would highly recommend this workshop to anyone who is planning to stay in academia after their PhD.

– Felix Goerdeler

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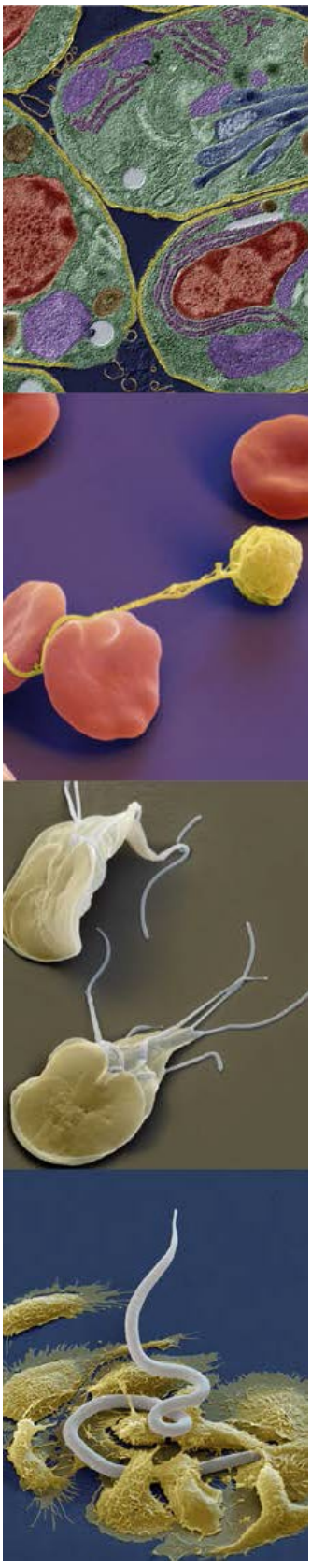
"Spare a dollar for some lab consumables, buddy?"



Coursera, Datacamp

Ongoing since August, online

The metamorphosis – or how to transform a vet into a bioinformatician

Unlike a character in the realm of Kafka, it is fairly impossible to transform yourself into a successful R-user within a night. The last months have been filled with trial and error, where I tried two different courses with different success stories:

1. Coursera – R course, Johns Hopkins University. I wouldn't recommend this course to beginners. The theoretical part of the course was light years apart from the practical exercises. The deadlines were also strict and it took me much longer than expected to finish each week's activities. Definitely better for someone with more experience.

2. Data Camp: Different R courses (Introduction to R, Intermediate R, Tidyverse, Data Manipulation etc). I like these courses as they are short and flexible to my time schedule (no deadlines - you are your own boss!). The exercises are easier and in case you get stuck somewhere, you can still continue. It is less similar to "real-life" coding, as the interface is a very safe environment where everything works. On the other hand, you get to know the basics and progress a bit faster.

The best way to learn is to quickly practice on real data and see what happens (or rather what doesn't happen).

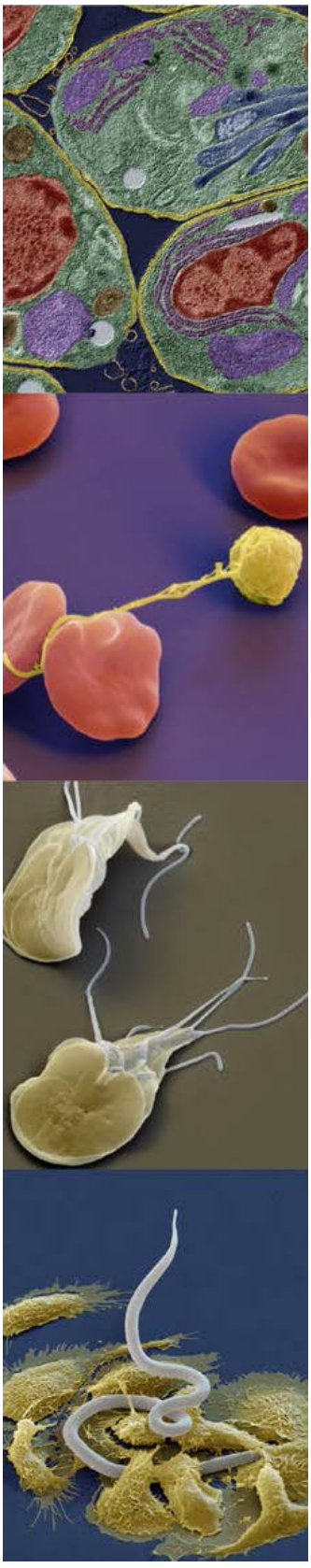
– Fay Webster

7th European Veterinary Immunology Workshop

August 29–31, online

Taken from iuis.org/events/7th-european-veterinary-immunology-workshop

From 29th – 31st August I attended the 7th triennial European Veterinary Immunology Workshop, which was held online, hosted from Belgrade,



Serbia. The conference included talks from a diverse range of veterinary immunologists from across Europe, and I presented a poster outlining my recently published work on early immune activation by porcine myeloid and NK cells.

– Benjamin Hamid

73th DGHM Conference

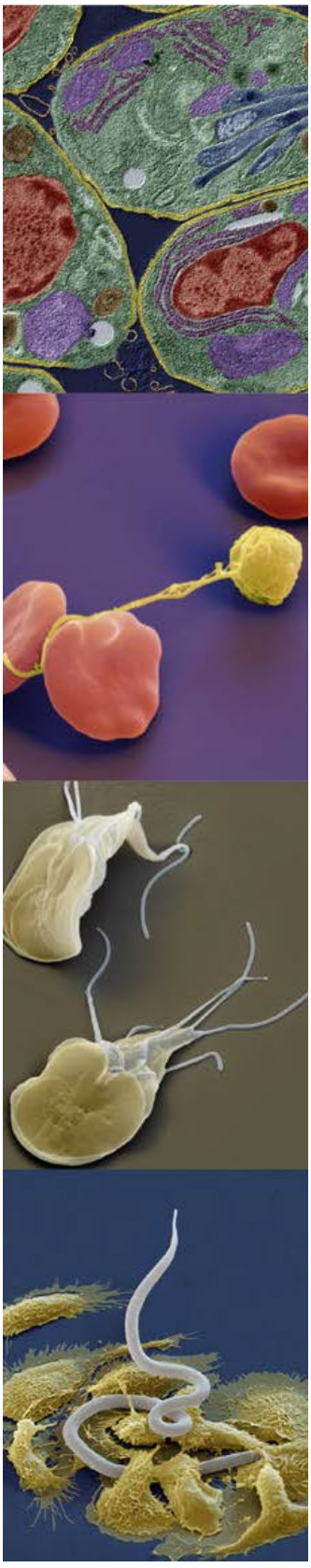
September 12–14, online

DGHM logo (dghm-kongress.de)

Apart from the awards ceremony, this year's Deutsche Gesellschaft für Hygiene und Mikrobiologie (DGHM) conference took place online. The virtual surroundings were well structured and talks included a broad range of topics including Science and Politics, Infection control, Bacteria & Genotoxity, Vaccination, Digitality, and Healthcare Associated Infections (HAI) / Pandemic Preparedness. For me personally, the talks by Jens Puschhof (Hubrecht Institute, Utrecht, NL) and Ugur Sahin (BioNTech) were the highlights of the conference. Jens Puschhof just finished his PhD in the lab of Hans Clevers who is the best in organoid research. In consequence, his research is of direct importance for my current and future projects. Of course, it was also interesting to gain new insights in mRNA vaccine developments in the talk by Ugur Sahin.

I was grateful to present my own research in this context in a talk about the characterization of *Giardia duodenalis*-induced barrier break down that was followed by discussions with attending listeners. However, I think especially the discussions would have profited from an in-person meeting.

– David Holthaus



4th International Tight Junction Conference

September 27-29, Berlin

Taken from certificate of attendance

At the end of September, I attended the 4th International Tight Junction Conference which was organized by DFG Research Training Group "TJ-Train" (GRK 2318) and associated scientists. The conference was one of the first in-person meetings that were organized again. I did present a poster and held a short presentation about the induction of barrier break down in organoid-derived duodenal monolayers by *Giardia duodenalis*. As tight junctions are not the main study focus of my project, I was amazed how stimulating the congress actually was for my whole project. PIs and doctoral students both engaged in lively discussions. I liked that during organization and discussions doctoral student were greatly involved and consequently very technical aspects could also be addressed. I profited with gaining new insights and ideas for my current and future research. During the conference it became quite clear that a lot of groups are shifting from immortalized cell lines to organoid technology, so knowledge could also be exchanged in this research area.

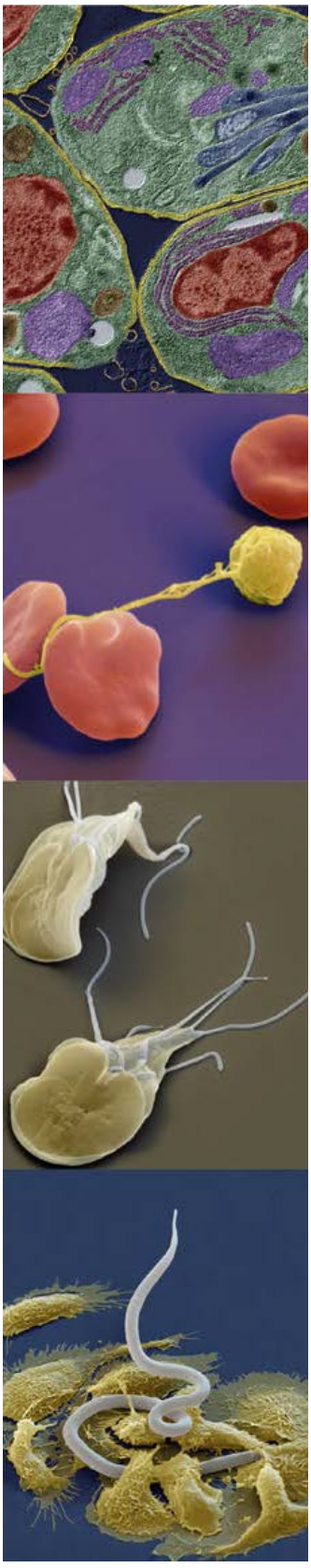
All in all, I enjoyed the attendance of the conference and would recommend it to everyone that is even closely interested in tight junctions or related diseases.

– David Holthaus

Zoonoses 2021 – International Symposium on Zoonoses Research

October 13-15, online

In October, we attended the International Symposium on Zoonoses Research that was largely dominated by SARS-CoV2 research with the main topic being “From Disease Ecology to SARS-CoV-2”. Topics included Antimicrobial Use and Resistance, Bioinformatics, Ecology of



Zoonotic Infections, Vaccines, Innate and Adaptive Immune Response, New and Re-Emerging Zoonotic Diseases, Diagnostics and NGS, Parasites, Pathogen-Cell Interaction, Pathogenesis and Modelling of Zoonotic Diseases, and others. However, as the whole congress was largely focused on SARS-CoV2 research other topics got relatively few attention. I presented data on the potential use of organoid-derived monolayers from various species to study *Giardia duodenalis* infection and zoonotic potential. I think that the discussions would have profited from an in-person event, especially as streams were organized in two different livestreams, that made it sometimes hard to follow. Generally, the conference is probably a good conference to attend in post-COVID times as it is organized in Berlin and provides good opportunities for young researchers.

– David Holthaus & Estefanía Delgado-Betancourt

Taken from: zoonosen.net/zoonoses-2021-international-symposium-zoonoses-research

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International Equine Infectious Diseases Conference

September 27–October 1, online

This year's IEIDC was hosted online by the University of Kentucky, substituting the cancelled plans for the live conference 2020 in Normandy, France. In addition to hundreds of pre-recorded conference contributions on a large variety of infectious diseases, there were two live Q&A panels on focus topics each day and a "practitioner's day".

I found the scientific exchange very stimulating and got some vital input for my own project from it. The host's technical expertise made access and participation easy and very enjoyable. I am looking forward to live interaction with this group of assorted experts and peers at the next IEDIC.

– Grace Klass

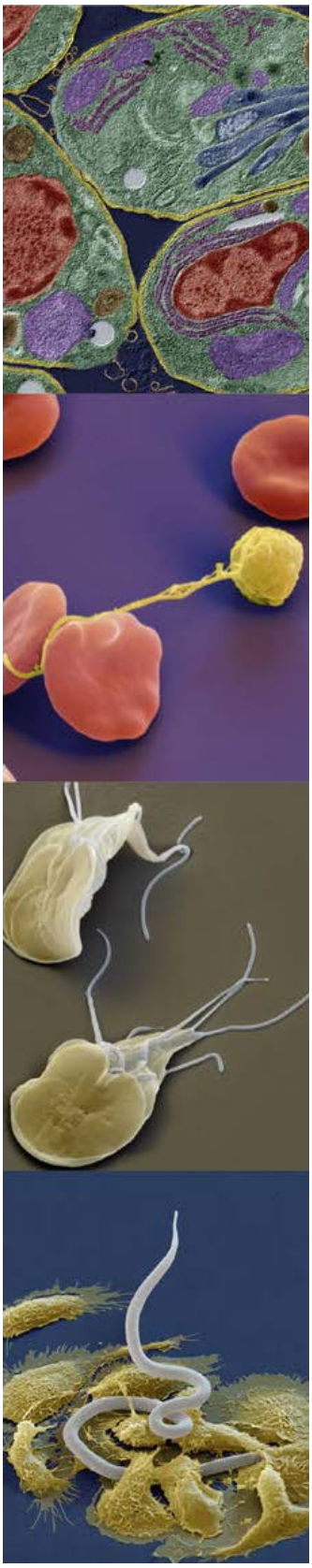


Photo by Grace Klass

Horse vs. Alpaka contest: Part 1 – the Horse

Nanobodies

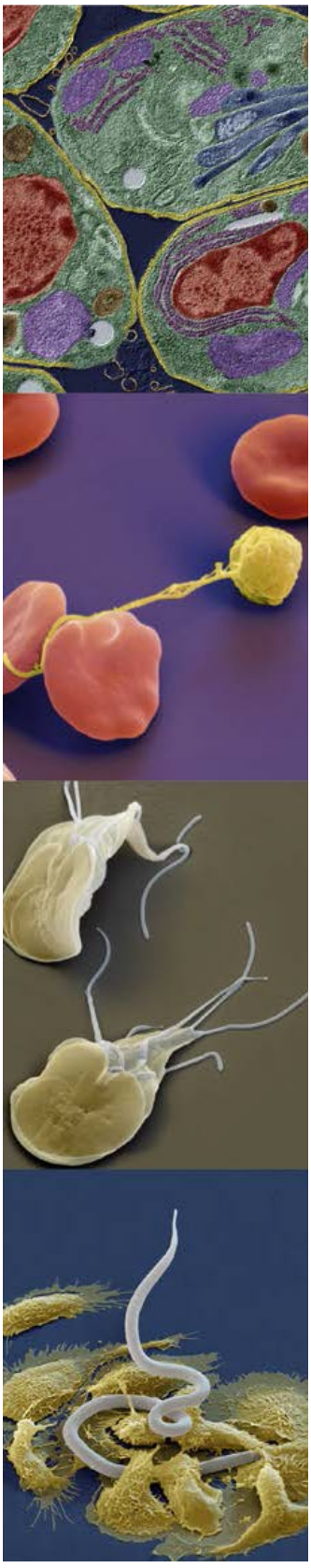
September 8–10, hybrid

Taken from: vibconferences.be/events/nanobodies-hybrid-2nd-edition

Horse vs. Alpaka contest: Part 2 – the Alpaka

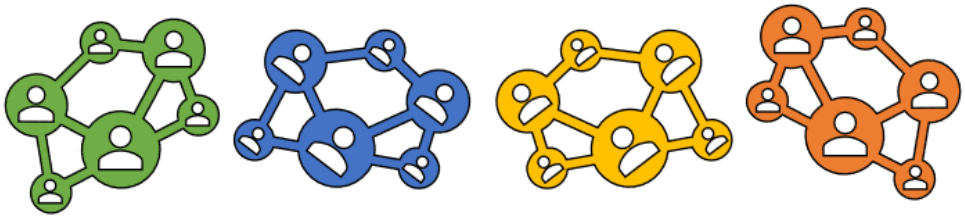
In September 2021, the second edition of the international Nanobody conference took place – in the birthplace of nanobodies (Brussels). Unfortunately, my lab mates and I could only attend virtually, as it was a hybrid event and the travel regulations from the university were strict. Nevertheless, it was an exciting experience to hear all the great talks about nanobody generation and application. There was also an interactive poster session online, where we could present our own data about parasite-directed nanobodies and have nice discussions with other people from the field about our projects.

– Jost Lühle



Workshop ZIBI Networking in the academic context

November 3, online

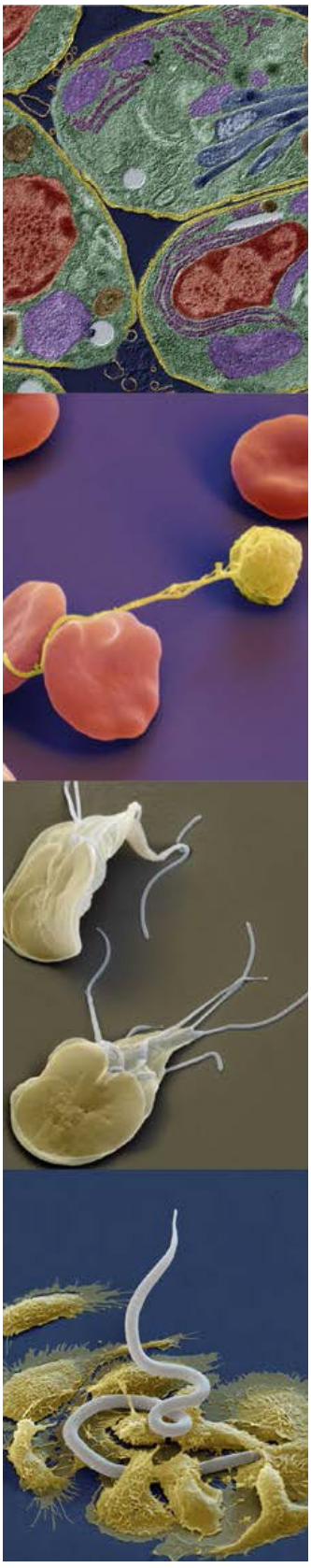


On November 3rd, the ZIBI Graduate School offered an online workshop called “Networking in the academic context”. The course began with an untraditional introduction round. All participants were asked to choose an object from a given list of peculiar items. This list included different objects such as a figure of an astronaut, a hammer, and a toy dinosaur. Furthermore, the task required to describe the importance of the chosen item in an academic networking context. Highly creative answers were given which helped to break the ice between all participants. Afterwards, a first theoretical input on the basics of networking was introduced. Then, the importance of a flourishing network was discussed, both in the professional and personal life, placing emphasis on how to find a balance between both. The course allowed for self-reflection but also gave sufficient time for interactions between students.

After the lunch break, there was a continuation of theoretical principles on how to evolve personal strategies when networking while considering external factors, such as gender. Also, advice was given on how to best take opportunities and leave the comfort zone to spring into action.

In order to practice the newly acquired knowledge, an extensive role-play was performed. For this, participants were asked to give a short science pitch. It consisted of three parts: a hook, the catchy opener to attract attention; a solution, where the major findings were summarized; and the reasons why, outlining the importance of the pitch. Different scenarios were illustrated, for example: how to invite scientists to a seminar, how to ask for collaborations and how to best raise gender awareness at the workspace. Finally, the day concluded with a lively discussion about the best way to approach potential collaborators, and on how to stay in contact with the newly acquired networking partners by taking advantage of both, digital and analog methods.

– Larissa Oser



Workshop ZIBI Presentation skills – Body language

November 10-11, online

On November 10 & 11, I had the opportunity to attend the workshop Presentation skills & Body language organized by ZIBI graduate school. During this 2-day course, situations faced when preparing for a presentation and occurring while performing a presentation were addressed. Particularly, we talk about body language, voice intonation, speech structure, confidence at stage, warming up before a presentation and tips to become a better presenter. In fact, short presentations prepared during the course in many different formats allowed me to feel each time more confident and improve with the feedback received from the other people participating in the course. I definitely recommend the course for people interested in practicing and get feedback about their way of presenting. The only drawback of the course is that body language is not ideally evaluated and practiced due to the limitations that online format exhibit. At the end, I just hope the course can be offered for more students as an in-person event for a more enriching experience.

– Luis Elizalde

Kick-off Your Doctorate – Berlin University Alliance Retreat

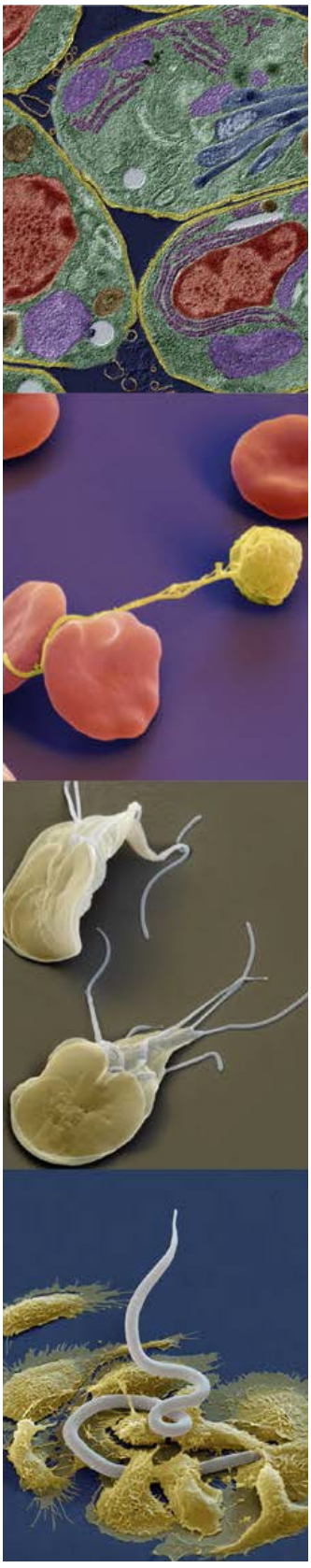
November 15-19, online

Berlin University Alliance

Official Logo BUA, taken from: drs.fu-berlin.de/node/50850/

This semester's BUA retreat was online once again. It was week-long retreat with PhD students from several disciplines within the BUA. The event was more about the overarching theme of being a PhD student, so a range of speakers and coaches talked openly to us about bureaucracies, motivation, ethics, time management, mental health, the German job market, etc. This was all done rather lightly with group activities and mandatory breaks.

I also found it interesting that most of the event was held in gathertown.com, which is a platform that gamifies online events. You can



choose an avatar, dress it up, and sit at a virtual table to talk to someone – or go to a "virtual carpet" where a talk is being held. In all honesty, this can get a bit awkward, but it provides a dynamic virtual environment with super flexible breakout rooms, which provides a nice flow to online group activities.

We also met important contacts within the universities such as the BUA contact people in each university, as well as one ombudsperson who we can contact in case we are concerned about misconduct.

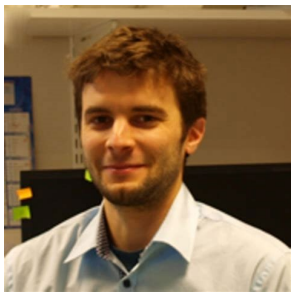
All in all, I think this was quite useful to understand the systems within the university and what resources are available through the BUA. It was also a lot of fun to talk to people in several disciplines, from History to Theoretical Physics.

– Marta Muniz

Berlin Parasitology Seminars (BPS)

Guillaume Sallé
INRAE Val de Loire Research Center, Université de Tours, France

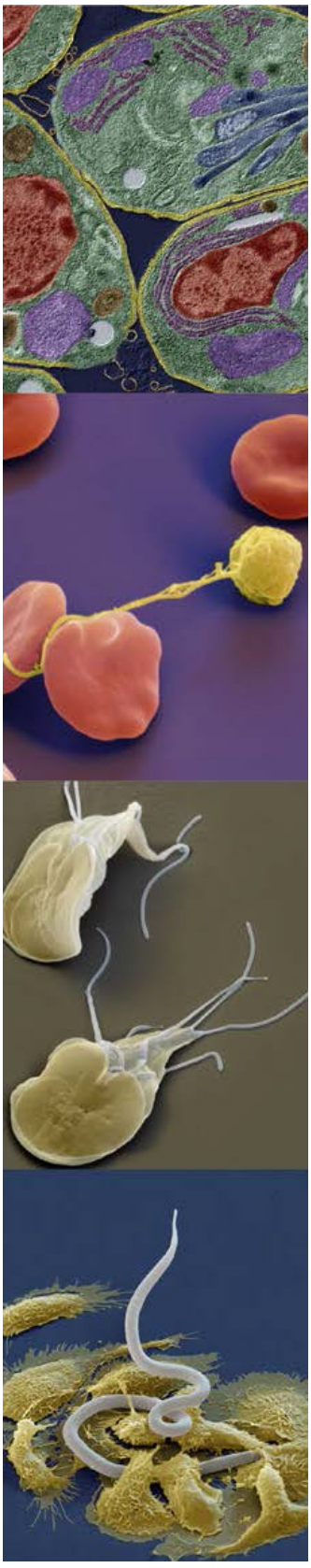
26th October 2021 (online)



Taken from:
https://www.researchgate.net/profile/Guillaume-Salle

Guillaume Sallé from the INRAE Val de Loire Research Center, Université de Tours France, gave a talk entitled "Exploring genetic variation in host-strongyle systems." His research mainly focused on characterizing the underpinnings of inter-individual variation in susceptibility to parasitic nematode infection. He studies the resilience and adaptation of parasite populations to selective forces such as anthelmintics or climatic factors. In his talk, Guillaume presented data on life-history traits and the effects of climate concerning sheep parasites such as *Haemonchus contortus*. A lively discussion followed this interesting talk.

– Irina Diekmann



Elia Tait Wojno
University of Washington, U.S.A.

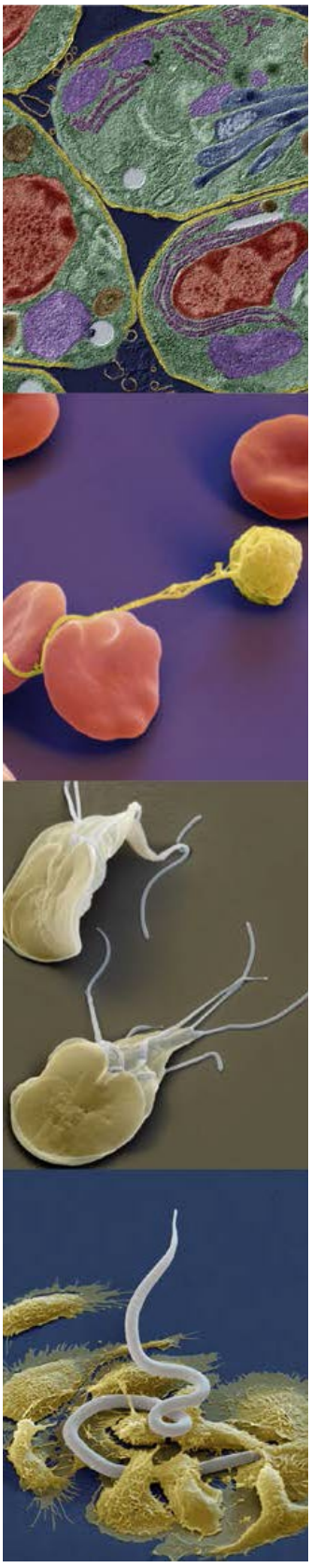
November 9, hybrid

Photo by Marko Janke

Hybrid: Act 1 – in person

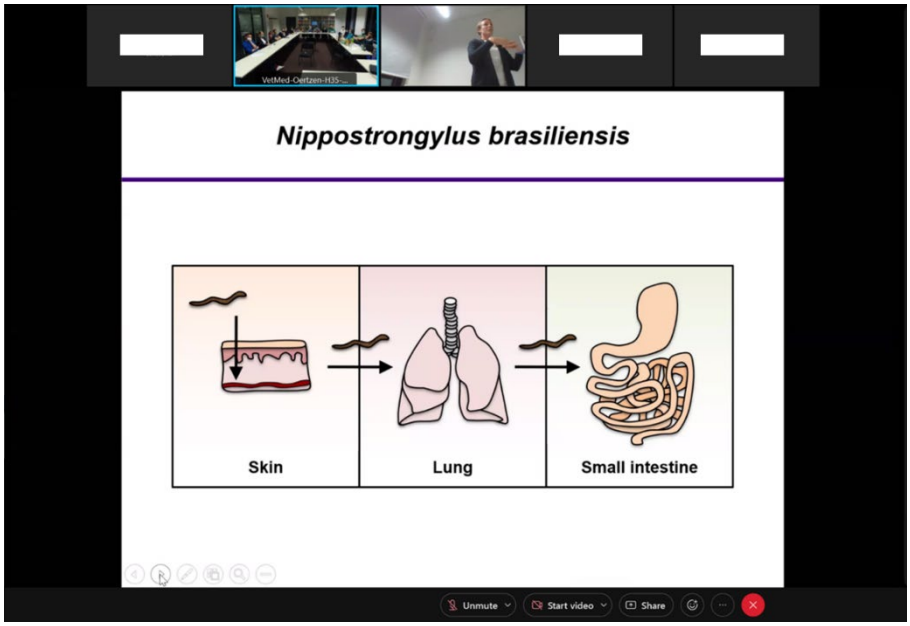
On November 9th, as part of our BPS series we had the opportunity to hear the latest findings Dr. Elia Tait Wojno encountered at University of Washington regarding “Prostaglandin regulation of type 2 inflammation during helminth infection”.

In fact, during her interesting talk about prostaglandins, we heard about the role Prostaglandin D2 Receptor CRTH2 has on group 2 innate lymphoid cells (ILC2s) migration. She demonstrated that CRTH2-deficient ILC2s were less capable to reach the lungs than WT ILC2s when inflammation was elicited by recombinant murine (rm)IL-33. Indeed, CRTH2-deficient mice and WT mice increased the expression of Prostaglandin D2 (PGD2) production enzymes when rmIL-33 was administered, suggesting altered ILC2 migration pattern was only associated to the lack of CRTH2 on ILC2s. Additionally, Dr. Elia Tait addressed during her talk how intestinal epithelial responses are regulated by PGD2 and CRTH2 in the context of a helminth infection. She particularly mentioned that mice deficient in CRTH2 had enhanced worm expulsion and increased goblet cell hyperplasia compared with WT control mice, despite the pro-inflammatory role discovered for PGD2–CRTH2 in the lung. However, Dr. Elia Tait clarified at the end of the talk through several *in vivo* and *in vitro* experiments with organoids the regulatory role PGD2 has towards type 2 inflammation when interacting with CRTH2 on intestinal epithelial cells. All in all, Dr. Elia Tait’s talk as



well as feedback to as many of us brought a lot of innovative insight into the study of type 2 immune responses during helminth infection.

– Luis Elizalde



Screenshot by Marko Janke

Hybrid: Act 2 – virtual

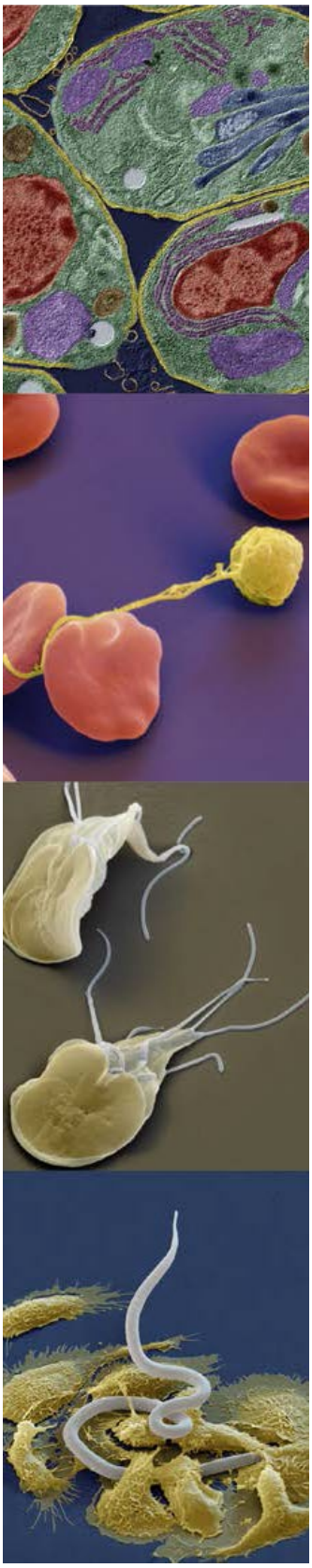
Role Models in Infection Biology

Flaminia Catteruccia
Harvard T.H. Chan School of Public Health, U.S.A.

September 21, hybrid

Hooray, our first in-person-but-still-hybrid meeting in corona-era! After more than a year of doing all talks and meetings online, we could finally meet up with the students for a Role Model Session. For the 3rd generation PhD students, this was the first opportunity to attend a talk in person. Our guest speaker Prof Flaminia Catteruccia attended and presented virtually. A difficult format, but it worked out.

Prof Catteruccia is a group leader at the Harvard T.H. Chan School of Public Health, where her group studies interactions between malaria and Anopheles mosquitoes. She integrates basic molecular biology with high-impact translational studies, and she has made fundamental



contributions to the field of malaria mosquito research using transformative genetic tools. Very exciting that Prof Catteruccia enthusiastically agreed on participating in our Role Model series!

Screenshot by Marko Janke

In her talk entitled “Sex, blood and parasites: uncovering malaria transmission by the Anopheles mosquito”, she presented an impressive amount of data with beautiful figures explaining complex experiments. As for the career briefing, a big topic was “surviving your PhD”. Prof Catteruccia leads a large research group, including many PhD students, and she could contribute a lot to this discussion.

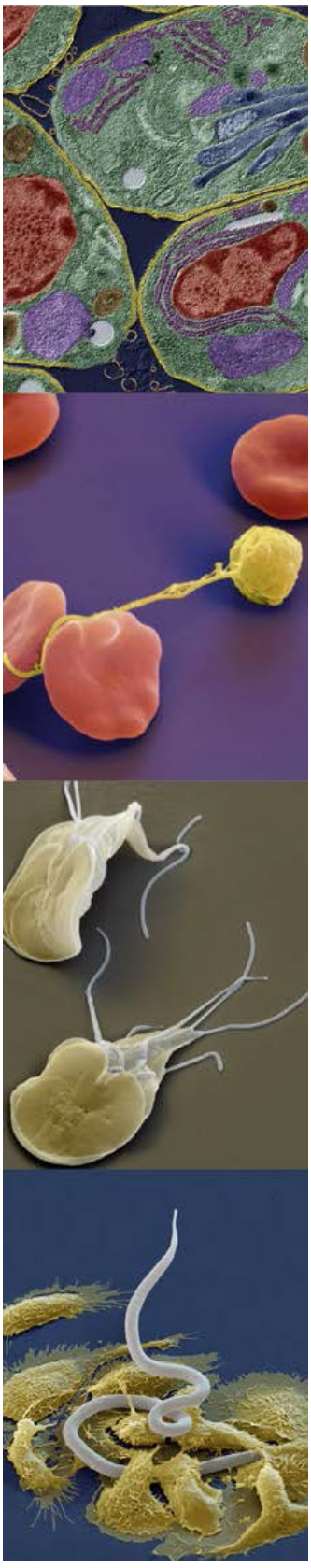
– Welmoed van Loon

Kerstin Mair
Veterinärmedizinische Universität Wien, Austria

October 18, hybrid

Taken from: https://www.vetmeduni.ac.at/immunologie/ueber-uns/personen/wissenschaftliche-mitarbeiter/innen

On Tuesday 18th October we were joined in-person by Dr Kerstin Mair from Veterinärmedizinische Universität Wein for our regular Role Models in Infection Biology seminar and careers discussion. Dr. Mair is the head of the Christian Doppler Laboratory for Optimized Prediction of Vaccination Success in Pigs, and the title of her talk was “Peculiarities of Porcine NK Cells and Challenges in Species



Comparability". She discussed the high diversity of NK cell subsets in the pig compared to other species. In particular she highlighted porcine uterine NK cells – which make up 30-40% of uterine cells in the pig – and speculated on their possible involvement in protection against pathogens such as PRRSV which can breach the uterine barrier. In the career's discussion session, we talked about the unique funding situation of the Christian Doppler laboratories – which are jointly financed by public funds and an industrial partner, in this case Boehringer Ingelheim.

– Benjamin Hamid

Dame Sally Davies
Master of Trinity College and UK Special Envoy Antimicrobial Resistance, United Kingdom

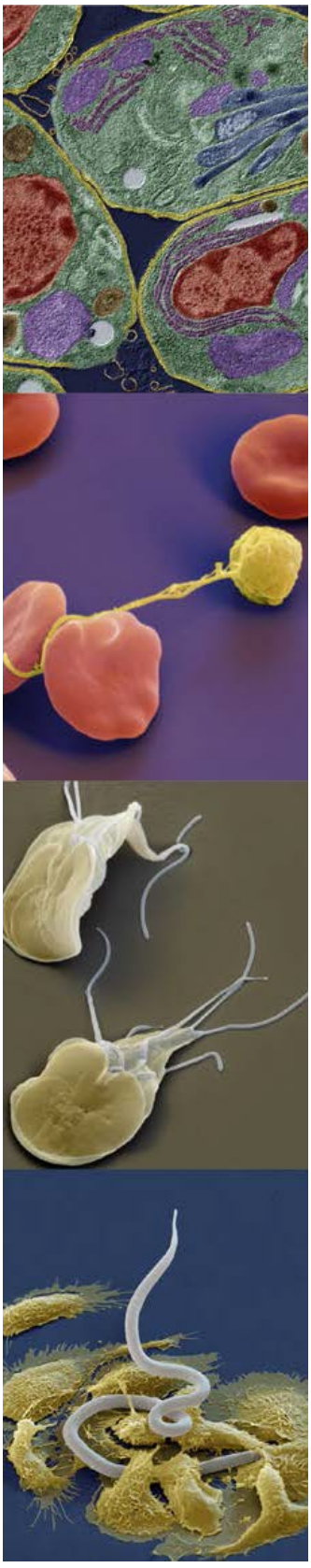
October 25, hybrid

I often tune in to the Guilty Feminist podcast while in the lab -comedy and feminism turn out to be my ideal companions in sterile conditions. One of the pandemic episodes (Women in Medicine) hosted Dame Sally Davies, who I decided afterwards to invite for our Role Model series.

Photo by Marko Janke

Dame Sally is a physician who served as the Chief Medical Officer for England for almost 10 years, and is now Master of Trinity College, Cambridge, and UK Special Envoy Antimicrobial Resistance. What a surprise and an honour that she accepted our invitation to talk at our Role Model session!
Her talk entitled "Local, National, and Global leadership in Health" was an inspiring journey through Dame Sally's career path, and the challenges that she faced. Afterwards we had a nice and open career discussion ranging from personal experiences to advice on how to build a career in health politics. "Enjoy every part of the ride" is one of Dame Sallies quotes that we repeat a lot in our lab until today.

– Welmoed van Loon



Sophie Duraffour
Bernhard Nocht Institute for Tropical Medicine (BNITM), Germany

November 23, hybrid

Since attending the hand-out of the Preis für Tropenmedizin by the Deutsche Gesellschaft für Tropenmedizin (DTG) in 2019, I have a professional crush on Dr Sophie Duraffour, who won that year's award. No surprise thus, that I invited her for our Role Models series.
Dr Duraffour is a senior researcher at the Department of Virology at the Bernhard Nocht Institute for Tropical Medicine (BNITM). She does operational research and molecular epidemiology in Africa: Ebola, Lassa and of course a bit of SARS-CoV-2. She pioneers in elaborate sequencing in real-time to enable rapid sequencing for unknown outbreak pathogens in field conditions. Her awarded work contributed greatly to important insights on how to combat virus outbreaks such as the 2014 Ebola outbreak in West Africa and the 2018 Lassa fever outbreak in Nigeria.

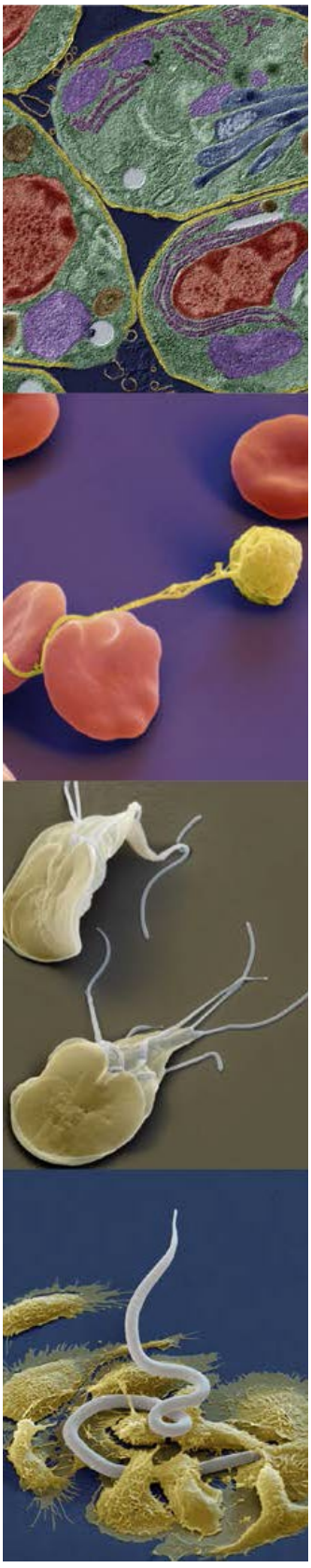
Photo by Marko Janke

Look who is talking…

Dr Duraffour's talk entitled "Molecular epidemiology of viral hemorrhagic fevers in support to outbreak response" presented her group's data and its implications as well as the challenging situations in which her group operates. I believe that dedication, passion and excitement are the correct words to describe the atmosphere of the talk as well as the lively discussion that followed!

– Welmoed van Loon

GRK 2046 Newsletter December 2021



Parasite Infection Lecture Series (PILS)

For the third and probably last time, we started a lecture series about Parasite Infections mainly for our GRK 2046 PhD students. However, non-GRK2046 doctoral candidates and even veterinary medicine students took great interest in PILS. All GRK 2046 PIs are involved to give a detailed view on parasites in general, and especially on the four Parasite groups, which we study in our Research Training Group (nematodes, Plasmodium, Giardia and Toxoplasma). The lectures series will run for the complete winter term 2021 / 2022.

https://www.vetmed.fu-berlin.de/en/einrichtungen/sonstige/grk2046/study_program/index.html

Berlin Seminar for Resistance Research

Good news: the Berlin Seminar for Resistance Research will be relaunched **next year**! It has been included in this semester's course offers and is planned to start again in the beginning of 2022.

More invormation available online: https://www.vetmed.fu-berlin.de/einrichtungen/institute/we06/studium-und-lehre/vorlesung-und-vortragsreihen/index.html

Upcoming Talks

Berlin Parasitology Seminars

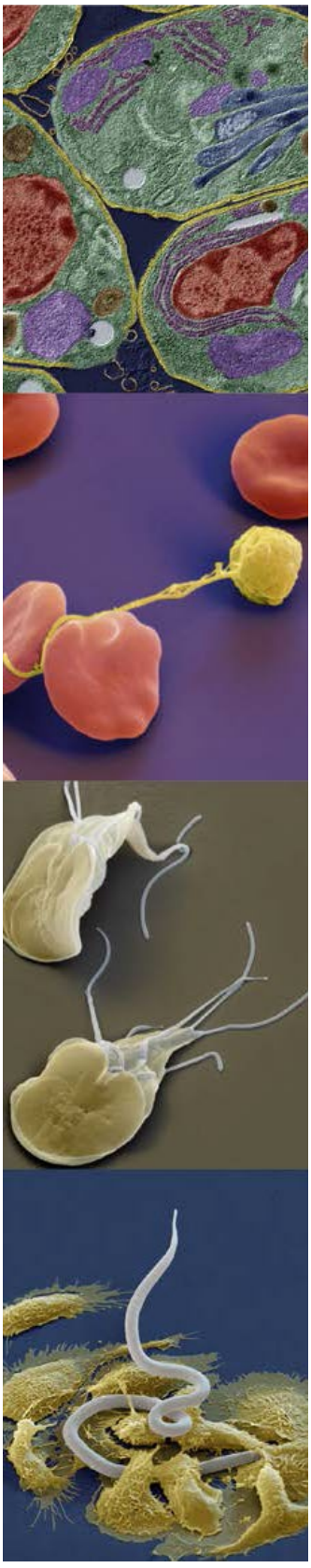
February 08, 2022, 5pm – Pedro H Gazzinelli-Guimaraes (hybrid)

March 01, 2022, 5pm – Jakob von Moltke (hybrid)

Role Models in Infection Biology

February 15, 2022, 9am – Sophie Armitage (hybrid)

GRK 2046 Newsletter December 2021



Graduated 1st generation students and date of defense

Manuela Merling de Chapa – 21.04.2021

Alexander Gerhard – 11.08.2021

Congratulations!

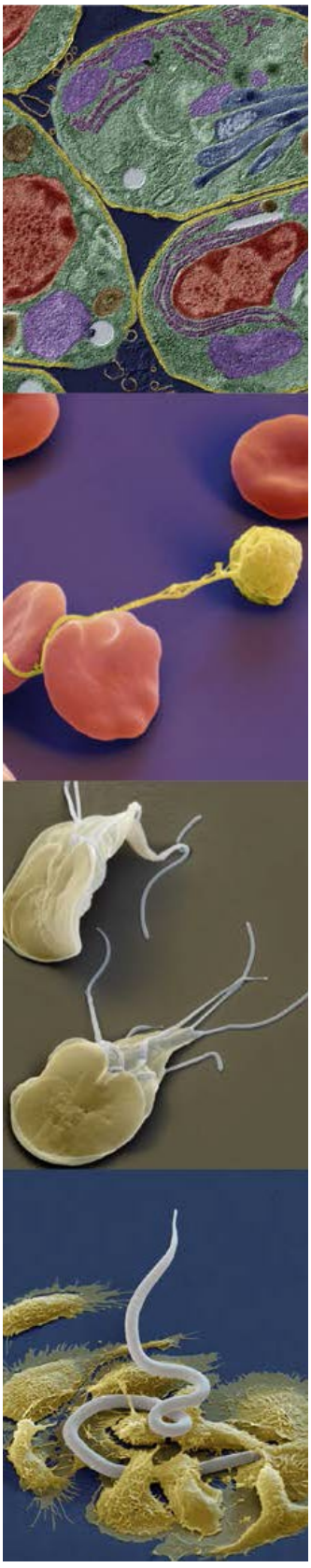
Was er wohl in seiner Tüte hat der frischgebackene Dr. Gerhard? Auf jeden Fall sehr stylisch, wenn da bloß der komische Hut nicht wäre…

Publications

Dissection of barrier dysfunction in organoid-derived human intestinal epithelia induced by *Giardia duodenalis*.

Holthaus D, **Kraft MR**, Krug SM, Wolf S, **Müller A**, **Delgado Betancourt E**, Schorr M, Holland G, Knauf F, **Schulzke JD**, **Aebischer T**, **Klotz C**. (2021). ***Gastroenterology*** S0016-5085(21)03798-7. doi: 10.1053/j.gastro.2021.11.022

Abstract:
Background & Aims: The protozoa *Giardia duodenalis* is a major cause of gastrointestinal illness worldwide, but underlying pathophysiological mechanisms remain obscure, partly due to the absence of adequate cellular models. We aimed at overcoming these limitations and recapitulating the authentic series of pathogenic events in the primary human duodenal tissue by using the human organoid system.
Methods: We established a compartmentalized cellular transwell system with electrophysiological and barrier properties akin to duodenal mucosa and dissected the events leading to *G. duodenalis*-induced barrier breakdown by functional analysis of transcriptional, electrophysiological and tight junction components.
Results: Organoid-derived cell layers of different donors showed a time- and parasite load-dependent leak flux indicated by collapse of epithelial barrier upon

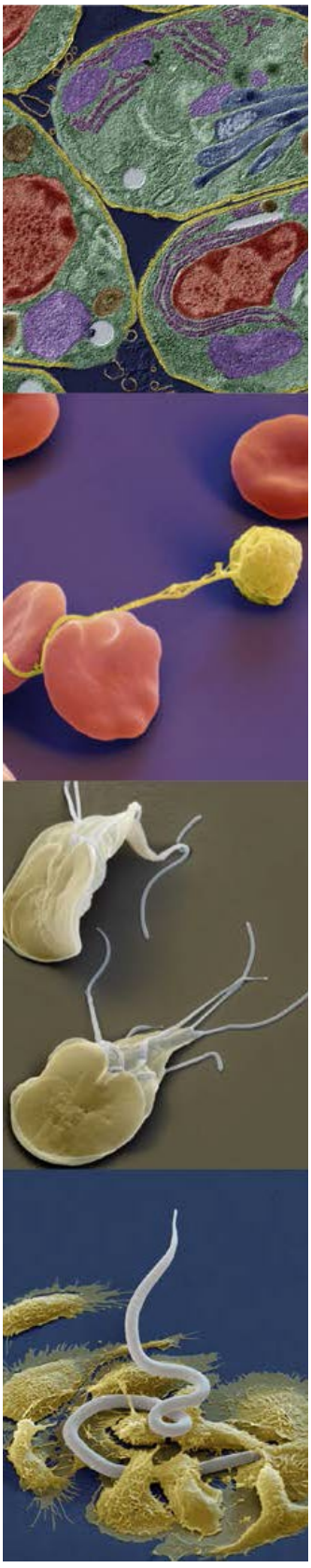


G. duodenalis infection. Gene set enrichment analysis suggested major expression changes including gene sets contributing to ion transport and tight junction structure. SLC12A2/NKCC1- and CFTR-dependent chloride secretion was reduced early after infection, while changes in the tight junction composition, localization and structural organization occurred later as revealed by immunofluorescence analysis and freeze fracture electron microscopy. Functionally, barrier loss was linked to the cAMP/PKA-CREB signaling pathway. *Conclusion*: Data suggest a previously unknown sequence of events culminating in intestinal barrier dysfunction upon *G. duodenalis* infection during which alterations of cellular ion transport were followed by breakdown of the tight junctional complex and loss of epithelial integrity, events involving a cAMP/PKA-CREB mechanism. These findings and the newly established organoid-derived model to study *G. duodenalis* infection may help to explore new options for intervening with disease and infection, in particular relevant for chronic cases of giardiasis.

Influence of Nutrition and Maternal Bonding on Postnatal Lung Development in the Newborn Pig

Schlosser-Brandenburg J, **Ebner F**, Klopfleisch R, Kühl AA, Zentek J, Pieper R, **Hartmann S**. (2021).
Front Immunol 12:734153. doi: 10.3389/fimmu.2021.734153.

Abstract:
Background: Microbial colonization and immune cell maturation coincide at mucosal sites and are decisive for postnatal lung development. How external factors influence neonatal pulmonary immune development is poorly understood.
Objective: To elucidate the impact of key determinants in early life, nutrition, and maternal bonding, on postnatal lung maturation in a human-relevant animal model. To investigate the underlying immunological changes of impaired lung maturation and study the mechanisms of conversion.
Methods: Newborn piglets were kept with or without isolation from their mothers and fed bovine milk-based infant formula or received milk of sow. Lung growth, histomorphology, respiratory immune responses, and lung microbiota were analyzed. Mother- and sow-milk-deprived piglets received maternal material or were reintroduced to the maternal environment at varying intervals to study options for reversal.
Results: Formula feeding combined with isolation of newborn piglets resulted in disturbed postnatal lung maturation. Reduced lung growth correlated with dampened IL-33 expression, impaired lung myeloid cell activation, and decreased Th1 differentiation, along with diminished richness and diversity of the lung microbiota. Transfer of bacteria-enriched maternal material reversed the negative effects on pulmonary immune maturation. Early (within 3 days) but not late (within 7 days) reintroduction to the mother allowed restoration of normal lung development.



Conclusion: Our findings reveal that lung growth, respiratory immunity, and microbial lung colonization in newborns depend on postnatal diet and maternal contact, and targeting these key regulators could promote lung development during this critical life stage.

To get sick or not to get sick—*Trichomonas* infections in two *Accipiter* species from Germany.

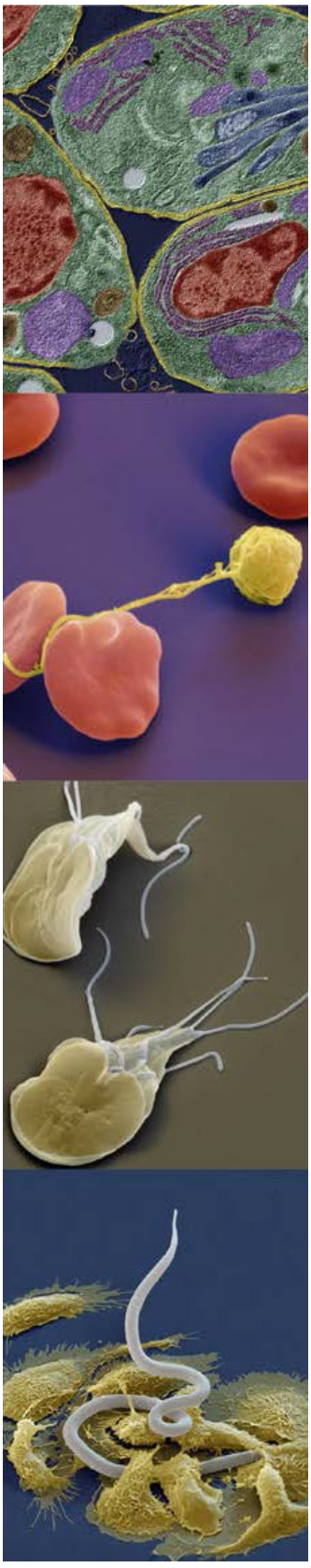
Merling de Chapa M, Auls S, Kenntner N, Krone O. (2021).
Parasitology Research 2021 Sep 4. doi: 10.1007/s00436-021-07299-1.

Abstract:
Trichomonosis caused by the flagellate *Trichomonas gallinae* is one of the most important avian diseases worldwide. The parasite is localised in the oesophageal area of its host and mainly infects pigeon and dove species. During the last decade, a host expansion to passerine birds occurred, making the disease a potential threat for passerine predators as naïve host species. Here, we investigated the effect of the parasite on two *Accipiter* species in Germany which show a comparable lifestyle but differ in prey choice, the Northern goshawk (*Accipiter gentilis*) mainly hunting pigeons and the Eurasian sparrowhawk (*Accipiter nisus*) mainly feeding on passerines. We genetically identified the parasite strains using the Fe-Hydrogenase gene as marker locus and compared the incidence of parasite presence and clinical signs of trichomonosis between nestlings of the two *Accipiter* species. In total, we identified 14 strains, with nine strains unknown so far. There was a higher strain diversity and prevalence of *Trichomonas* spp. in goshawks than sparrowhawks (42.4% vs. 21.2%) whereas sparrowhawks when being infected more often displayed clinical signs of trichomonosis than goshawks (37.1% vs. 6.1%). Even though sparrowhawks were mainly infected with the finch epidemic strain and genetic data indicated some variation between isolates, no correlation with virulence could be detected. All in all, goshawks seem to be better adapted to *Trichomonas* infections, whereas to sparrowhawks, this is a novel disease with more severe manifestations, from individual morbidity to a higher risk of population decline caused by trichomonosis.

Early Immune Initiation by Porcine Cells following *Toxoplasma gondii* Infection versus TLR Ligation

Hamid B, Schlosser-Brandenburg J, **Bechtold L, Ebner F, Rausch S, Hartmann S.** (2021).
Microorganisms 9:1828. doi: 10.3390/microorganisms9091828.

Abstract:
Containment of acute *Toxoplasma gondii* infection is dependent on an efficient interferon gamma response. However, the earliest steps of immune response

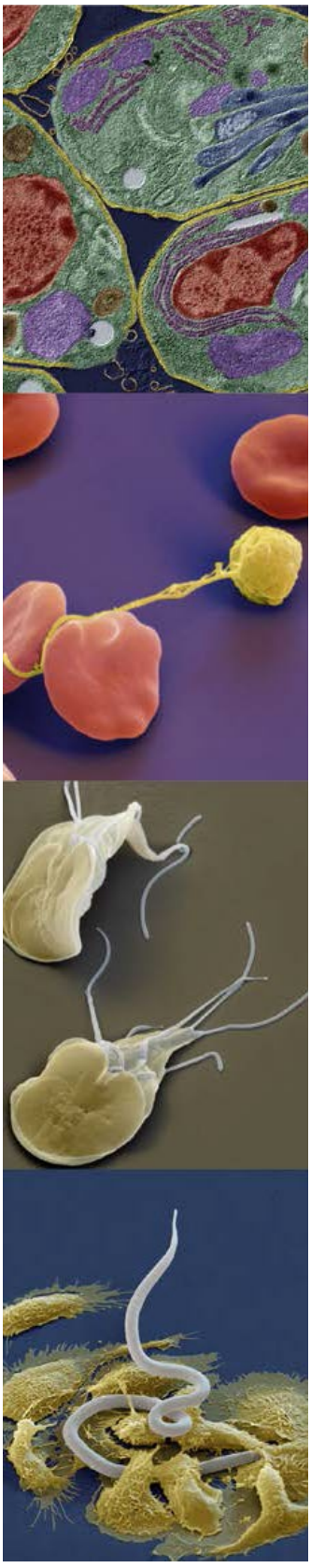


initiation immediately following exposure to the parasite have not been previously characterized in pigs. Murine and human myeloid cells produce large quantities of interleukin (IL)-12 during early *T. gondii* infection. We therefore examined IL-12 expression by porcine peripheral blood monocytes and dendritic cell (DC) subsets following toll-like receptor (TLR) ligation and controlled *T. gondii* tachyzoite infection. We detected IL-12p40 expression by porcine plasmacytoid DC, but not conventional or monocyte-derived DC following TLR ligation. Unexpectedly, we also observed considerable IL-12p40 production by porcine CD3– NKp46+ cells—a classical natural killer cell phenotype—following TLR ligation. However, in response to *T. gondii* exposure, no IL-12 production was observed by either DC or CD3– NKp46+ cells. Despite this, IL-18 production by DC-enriched peripheral blood mononuclear cells was detected following live *T. gondii* tachyzoite exposure. Only combined stimulation of porcine peripheral blood mononuclear cells with recombinant IL-12p70 and IL-18 induced innate interferon gamma production by natural killer cells, while T cells and myeloid cells did not respond. Therefore, porcine CD3– NKp46+ cells serve as important IL-12 producers following TLR ligation, while IL-18 likely plays a prominent role in early immune response initiation in the pig following *T. gondii* infection.

Conservation of S20 as an Ineffective and Disposable IFNγ-Inducing Determinant of *Plasmodium* Sporozoites Indicates Diversion of Cellular Immunity

Hon C, Friesen J, **Ingmundson A**, Scheppan D, Hafalla JCR, **Müller K, Matuschewski K.** (2021).
Front Microbiol 12:703804. doi: 10.3389/fmicb.2021.703804.

Abstract:
Despite many decades of research to develop a malaria vaccine, only one vaccine candidate has been explored in pivotal phase III clinical trials. This candidate subunit vaccine consists of a portion of a single *Plasmodium* antigen, circumsporozoite protein (CSP). This antigen was initially identified in the murine malaria model and shown to contain an immunodominant and protective CD8+ T cell epitope specific to the H-2Kd (BALB/c)-restricted genetic background. A high-content screen for CD8+ epitopes in the H2Kb/Db (C57BL/6)-restricted genetic background, identified two distinct dominant epitopes. In this study, we present a characterization of one corresponding antigen, the Plasmodium sporozoite-specific protein S20. Plasmodium berghei S20 knockout sporozoites and liver stages developed normally in vitro and in vivo. This potent infectivity of s20(-) sporozoites permitted comparative analysis of knockout and wild-type parasites in cell-based vaccination. Protective immunity of irradiation-arrested s20(-) sporozoites in single, double and triple immunizations was similar to irradiated unaltered sporozoites in homologous challenge experiments. These findings demonstrate the presence of an immunogenic *Plasmodium* pre-erythrocytic determinant, which is not essential



for eliciting protection. Although S20 is not needed for colonization of the mammalian host and for initiation of a blood infection, it is conserved amongst *Plasmodium* species. Malarial parasites express conserved, immunogenic proteins that are not required to establish infection but might play potential roles in diverting cellular immune responses.

Lectin-Mediated Bacterial Modulation by the Intestinal Nematode *Ascaris suum*

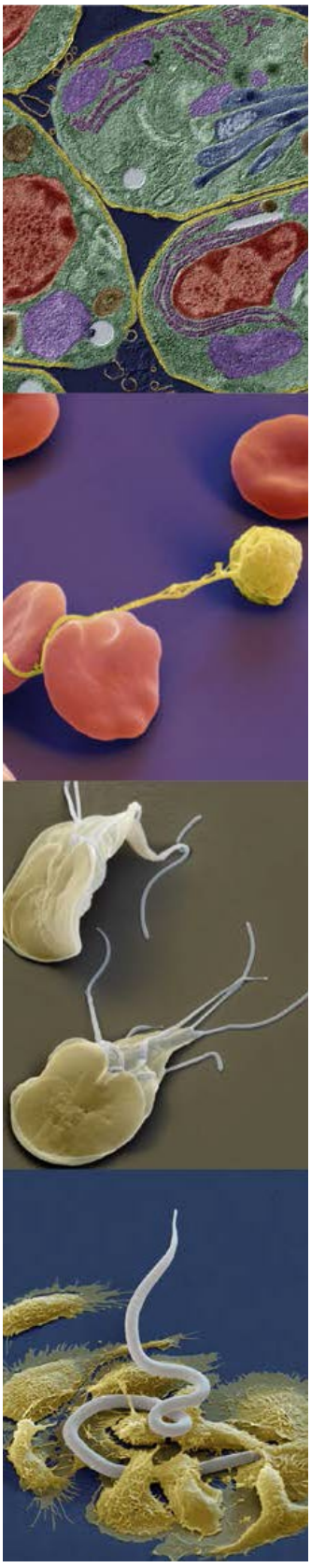
Midha A, Goyette-Desjardins G, **Goerdeler F, Moscovitz O, Seeberger PH**, Tedin K, Bertzbach LD, Lepenies B, **Hartmann S.**
Int. J. Mol. Sci.22, 8739. doi: 10.3390/ijms22168739.

Abstract:
Ascariasis is a global health problem for humans and animals. Adult *Ascaris* nematodes are long-lived in the host intestine where they interact with host cells as well as members of the microbiota resulting in chronic infections. Nematode interactions with host cells and the microbial environment are prominently mediated by parasite-secreted proteins and peptides possessing immunomodulatory and antimicrobial activities. Previously, we discovered the C-type lectin protein AsCTL-42 in the secreted products of adult *Ascaris* worms. Here we tested recombinant AsCTL-42 for its ability to interact with bacterial and host cells. We found that AsCTL-42 lacks bactericidal activity but neutralized bacterial cells without killing them. Treatment of bacterial cells with AsCTL-42 reduced invasion of intestinal epithelial cells by *Salmonella*. Furthermore, AsCTL-42 interacted with host myeloid C-type lectin receptors. Thus, AsCTL-42 is a parasite protein involved in the triad relationship between *Ascaris*, host cells, and the microbiota.

The Changing pattern of *Plasmodium falciparum* multi-drug resistance-1 gene polymorphisms in southern Rwanda.

van Loon W, Bergmann C, Habarugira F, **Tacoli C**, Savelsberg D, Oliveira R, Mbarushimana D, Ndoli J, Sendegeya A, Bayingana C, **Mockenhaupt FP**. (2021).
Antimicrob Agents Chemother 65:e0090121. doi: 10.1128/AAC.00901-21.

Abstract
Plasmodium falciparum multidrug resistance-1 gene (pfmdr1) polymorphisms associate with altered antimalarial susceptibility. Between 2010 and 2018/2019, we observed that the prevalence of the wild-type allele N86 and the wild-type combination NYD increased 10-fold (4% versus 40%) and more than 2-fold (18% versus 44%), respectively. Haplotypes other than NYD or NFD declined by up to >90%. Our molecular data suggest the pfmdr1 pattern shifted toward one associated with artemether-lumefantrine resistance.



Unveiling the Sugary Secrets of *Plasmodium* Parasites.

Goerdeler F, Seeberger PH, Moscovitz O. (2021).
Front Microbiol 12:712538. doi: 10.3389/fmicb.2021.71253.

Abstract
Plasmodium parasites cause malaria disease, one of the leading global health burdens for humanity, infecting hundreds of millions of people each year. Different glycans on the parasite and the host cell surface play significant roles in both malaria pathogenesis and host defense mechanisms. So far, only small, truncated N- and O-glycans have been identified in *Plasmodium* species. In contrast, complex glycosylphosphatidylinositol (GPI) glycolipids are highly abundant on the parasite's cell membrane and are essential for its survival. Moreover, the parasites express lectins that bind and exploit the host cell surface glycans for different aspects of the parasite life cycle, such as adherence, invasion, and evasion of the host immune system. In parallel, the host cell glycocalyx and lectin expression serve as the first line of defense against *Plasmodium* parasites and directly dictate susceptibility to *Plasmodium* infection. This review provides an overview of the glycobiology involved in *Plasmodium*-host interactions and its contribution to malaria pathogenesis. Recent findings are presented and evaluated in the context of potential therapeutic exploitation.

Happy holidays!

We all expected that 2021 would be corona-free – or at least corona-light. Our expectations were not met, but our Research Training Group still managed to be an active academic player: we published, we showed up to all kinds of online events, and we even had a glimpse of normalcy through hybrid events such as our RTG retreat and some of our BPS/RM talks.

As we close the year with rising corona numbers, we may find ourselves retreating back into home office and grey skies. The good news is that we have a toolbelt of vaccines and lessons from the past two years to hold up against the next waves.

So stay optimistic and stay safe!

Happy holidays!

– Marta & Marko