

# NEWSLETTER

Volume 1 - 04/2020

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We are proud to release the first annual VIPER newsletter one year after the official start of the Research Training Group in April 2019. In our first issue, we will introduce VIPER, its students, PIs, and first activities. In the following issues, we will keep you updated on all VIPER activities, publications, and other achievements.

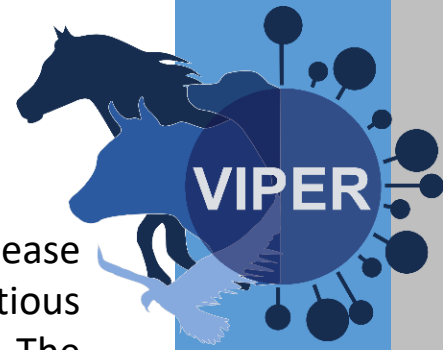
## Content

• Introduction – What is VIPER?	2
• VIPER student's profiles	3
• VIPER PI's profiles	9
• Recent activities	
• Kick-off meeting	11
• Film shooting – VIPER goes Hollywood	12
• Process evaluation by KHN	12
• "Spare" time – informal get-together	12
• En-block schools	13
• Travel reports	13
• Recent publications	23
• Prizes and awards	23
• Miscellaneous	24
• Outlook and announcements	25
• Impressum	25

## Introduction - What is VIPER?

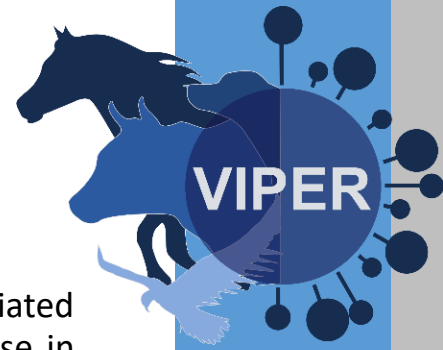
Viral diseases have to be investigated to prevent and fight disease outbreaks, in particular zoonoses. Zoonoses are infectious diseases that are transmitted between humans and animals. The Research Training Group (RTG) VIPER aims to support a new generation of young scientists that have the knowledge and skills to deal with new and re-emerging viral outbreaks. VIPER is funded by the German Research foundation (DFG) and is integrated into the Hannover Graduate School for Veterinary Pathobiology, Neuroinfectiology, and Translational Medicine (HGNI) at the University of Veterinary Medicine Hannover (TiHo). Twenty-eight PhD students will investigate viral diseases, their pathogenesis and possible intervention strategies and will submit their PhD thesis at the end of a three-year period of research and intensive training. To improve their skills, the training includes a variety of courses dealing with epidemiology, the interaction of viruses and their hosts as well as diagnostics and intervention strategies. Due to the involvement of various departments from human and veterinary medicine, students are trained in interdisciplinary communication and networking.

In accordance with the HGNI guidelines, students are enrolled on one of its three PhD programmes. They have to fulfil various criteria to attain their PhD, including poster and oral presentations at the Graduate School Day, soft skills trainings and specific pillar courses. In addition, VIPER offers a variety of courses for each student. The curriculum includes five en-block schools dealing with the fundamentals in theoretical and practical virology, parasitology, immunology as well as pathology, epidemiology, intervention, commercialization, entrepreneurship, and grant application. Additionally, each project offers specific courses for students to improve practical skills and knowledge. Furthermore, each student presents his/her project and results once a year to all members of the RTG during the trimestrial network meetings.



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# VIPER student's profiles



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## **Madeleine de le Roi**

“Investigation of potential viral etiology and associated pathogenesis in disease syndromes of unknown cause in domestic and wildlife carnivores.”

Department of Pathology, TiHo

Supervisors: Prof. Wolfgang Baumgärtner, Prof. Ursula Siebert, Prof. Klaus Jung



## **Sonja T. Jesse**

“Identification and characterization of novel avian metapneumoviruses from wild birds, that pose a threat to domestic poultry and mammals.”

Working Group Osterhaus – RIZ, TiHo

Supervisors: Prof. Albert Osterhaus, Prof. Silke Rautenschlein, Prof. Wolfgang Baumgärtner, Prof. Martin Stangel



## **Franziska Kaiser**

“Characterization of selected viruses identified in wildlife reservoirs, evaluating their risk to domestic animals and humans.”

Working Group Osterhaus – RIZ, TiHo

Supervisors: Prof. Albert Osterhaus, Prof. Ursula Siebert

## **Alina Schadenhofer**

“In vitro and ex vivo characterization of newly discovered and emerging respiratory viruses of humans and animals.”

Working Group Osterhaus – RIZ, TiHo

Supervisors: Prof. Albert Osterhaus, Prof. Ursula Siebert



## **Eva Barbara Gregersen**

“Wild boar and wild and zoo ruminant reservoirs for virus infections: virus detection and surveillance of viruses recently identified in domestic animals.”

Institute of Virology, TiHo

Supervisor: Prof. Paul Becher, Prof. Ursula Siebert, Dr. Reimar Johne



**Babak Saremi**

“Robust algorithms in bioinformatics”

Institute for Animal Breeding and Genetics, TiHo

Supervisor: Prof. Klaus Jung

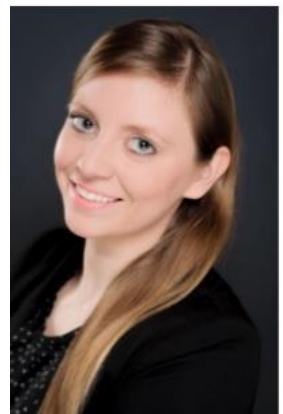


**Alexandra Herbst**

“Role of cellular importin- $\alpha$  isoforms in cross-species transmission of emerging viruses”

Clinic for Poultry, TiHo

Supervisors: Prof. Silke Rautenschlein, Prof. Gülsah Gabriel



**Mareike Heinig**

“iMINION – integrative mosquito intervention strategies”

Working Group Becker – RIZ and Institute for Parasitology, TiHo

Supervisor: Prof. Stefanie Becker, Dr. Kwang-Zin Lee, PD Dr. Michael Stern



**Frederik Bexter**

“Pathogen-host-interactions at the interface of the reproductive tract: Differences in avian metapneumovirus infections between chickens and turkeys”

Clinic for Poultry, TiHo

Supervisors: Prof. Silke Rautenschlein, Prof. Benedikt Kaufer, Prof. Beatrice Grummer



**Marc Zyche**

“Infection of differentiated bovine respiratory epithelial cells by bovine viral diarrhoea virus, paramyxoviruses, and other respiratory pathogens.”

Institute of Virology, TiHo

Supervisor: Prof. Paul Becher, Prof. Bernd Lепенies, Prof. Norbert Tautz



**Jana Breitfeld**

“Bovine hepatitis virus diversity and determinants of virus replication and translation.”

Institute of Virology, TiHo

Supervisor: Christine Bächlein, Ph.D.



**Sarah Schwarz**

“Comparative analysis of canine distemper virus replication and translation in neurons, glial cells, macrophages and cells of the respiratory tract and detection of new viruses.”

Department of Pathology, TiHo

Supervisors: Prof. Wolfgang Baumgärtner, Prof. Andrea Tipold, Prof. Peter Claus



**Franziska Geiselhardt**

“Identification of host and viral determinants of canine distemper virus interspecies transmission.”

Department of Pathology and Working Group Osterhaus – RIZ, TiHo

Supervisors: Prof. Andreas Beineke, Dr. Martin Ludlow



**Elisa Chludzinski**

“Characterization of pulmonary pathology and local immune response during canine distemper virus infection.”

Department of Pathology, TiHo

Supervisors: Prof. Andreas Beineke, Prof. Andrea Tipold, Prof. Abel Viejo-Borbolla

**Frederic Gusmag**

“Influence of genetic adaptation to vector populations on arbovirus emergence and spread.”

Working Group Becker – RIZ and Institute for Parasitology, TiHo

Supervisor: Prof. Stefanie Becker



**António Camarão**

“The role of flavivirus NS1 proteins in viral pathogenesis.”

Institute of Physiological Chemistry and Working Group Steffen - RIZ, TiHo

Supervisors: Dr. Imke Steffen, Prof. Wolfgang Löscher, Prof. Ulrich Kalinke



**Veronika Breilkopf**

“Identification of host requirements and restrictions of flavivirus entry and replication.”

Institute of Physiological Chemistry and Working Group Steffen - RIZ, TiHo

Supervisors: Dr. Imke Steffen, Prof. Paul Becher, Dr. Jens Bohne



**Kathleen Schön**

“The role of C-type lectin receptors in vector/host-virus interaction of arthropod-borne phleboviruses.”

Working Group Becker – RIZ and Institute for Parasitology, TiHo

Supervisors: Prof. Stefanie Becker, Prof. Bernd Lepenies, Prof. Paul Becher, Prof. Matthias Tenbusch

**André Gömer**

“Hepatitis C virus-related equine hepacivirus cell entry and receptor usage.”

Institute of Virology, TiHo and Molecular & Medical Virology, Ruhr-University Bochum

Supervisors: Prof. Paul Becher, Prof. Eike Steinmann

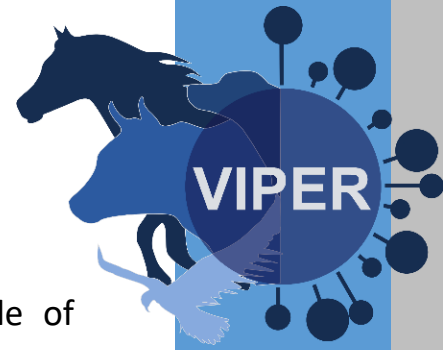


**Nele Gremmel**

“Hepatitis E virus: Importance of viral factors for infection and replication.”

Institute of Virology, TiHo

Supervisor: Christine Bächlein, Ph.D.



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### **Michael Wißing**

“Role of host determinants in the replication cycle of hepatitis E virus.”

Institute of Virology, TiHo and Molecular & Medical Virology, RUB Bochum

Supervisors: Prof. Paul Becher, Prof. Eike Steinmann

### **Zeinab Kanso**

“Viral sensing mechanisms within the central nervous system.”

TWINCORE

Supervisor: Prof. Ulrich Kalinke



### **Magdalena Kircher**

“Robust learning algorithms using high-throughput sequencing data from infection research.”

Institute for Animal Breeding and Genetics, TiHo

Supervisors: Prof. Klaus Jung, Prof. Andreas Beineke, Prof. Armin Schmitt



### **Mareike Kubinski**

“Recombinant modified vaccinia virus Ankara vaccines delivering tick-borne encephalitis virus antigens – search for correlates of protection against severe neurological disease.”

Working Group Rimmelzwaan – RIZ, TiHo

Supervisors: Prof. Guus Rimmelzwaan, Prof. Bernd Lepenies, Prof. Gerd Sutter



### **Jana Beicht**

“Detection of antibody- and T cell-mediated immunity to equine hepacivirus and tick-borne encephalitis virus using an influenza-based vector.”

Working Group Rimmelzwaan – RIZ, TiHo

Supervisors: Prof. Guus Rimmelzwaan, Prof. Bernd Lepenies, Prof. Eike Steinmann



**Janina Jansen**

“Immune evasion of influenza viruses from recognition by T cells.”

Working Group Rimmelzwaan – RIZ, TiHo

Supervisors: Prof. Guus Rimmelzwaan, Prof. Bernd Lepenies; Prof. Xavier Saelens

**Lucas Wilken**

“Viral vector-based vaccines against dengue.”

Working Group Rimmelzwaan – RIZ, TiHo

Supervisors: Prof. Guus Rimmelzwaan, Prof. Gülsah Gabriel, Prof. Jeroen Kortekaas



**Olivia Luise Gern**

“New strategies for the therapy of viral neuroinflammation.”

TWINCORE

Supervisor: Prof. Ulrich Kalinke, Prof. Guus Rimmelzwaan, Prof. Martin Stangel



# VIPER PI's profiles



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**Christine Bächlein, Ph.D.**  
Institute of Virology, TiHo



**Prof. Dr. Wolfgang Baumgärtner**  
Department of Pathology, TiHo  
Speaker of VIPER



**Prof. Dr. Paul Becher**  
Institute of Virology, TiHo  
Deputy speaker of VIPER



**Prof. Dr. Stefanie Becker**  
Institute of Parasitology and Research Center for Emerging  
Infections and Zoonoses, TiHo



**Prof. Dr. Andreas Beineke**  
Department of Pathology, TiHo



**Prof. Dr. Gülsah Gabriel**  
Heinrich-Pette Institute and Research Center for Emerging  
Infections and Zoonoses, TiHo



**Prof. Dr. Klaus Jung**  
Institute for Animal Breeding and  
Genetics and Research Center for  
Emerging Infections and Zoonoses,  
TiHo



**Prof. Dr. Ulrich Kalinke**  
Experimental Infection Research, TWINCORE

**Dr. Martin Ludlow**

Research Center for Emerging Infections and Zoonoses, TiHo



**Prof. Dr. Albert Osterhaus**

Research Center for Emerging Infections and Zoonoses, TiHo

**Prof. Dr. Silke Rautenschlein**

Clinic for Poultry, TiHo

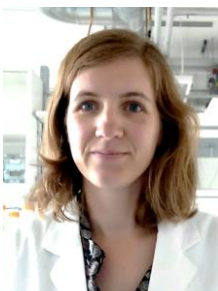


**Prof. Dr. Guus Rimmelzwaan**

Research Center for Emerging Infections and Zoonoses, TiHo

**Prof. Dr. Ursula Siebert**

Institute for Terrestrial and Aquatic Wildlife Research, TiHo



**Dr. Imke Steffen**

Department of Physiological Chemistry and Research Center for Emerging Infections and Zoonoses, TiHo

**Prof. Dr. Eike Steinmann**

Department of Molecular and Medical Virology, Ruhr-University Bochum



**Prof. Dr. Gerd Sutter**

Institute for Infectious Diseases and Zoonoses, LMU München



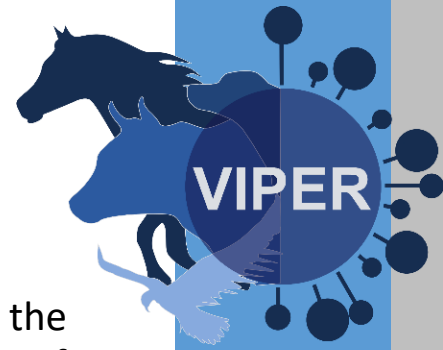
# Recent activities

## Kick-off meeting

After the official launch of VIPER in April 2019, the start of the initiative was celebrated on June 3<sup>rd</sup> in the Department of Pathology. After the president of the university Dr. Gerhard Greif had welcomed the students and teaching staff, the head of the RTG initiative Professor Dr. Wolfgang Baumgärtner presented the topics and organizational structure of VIPER in detail. The three VIPER pillars which deal with 'Virus discovery, host range and transmission', 'Virus-host cell interactions and pathogenesis' and 'Immune interference and intervention' are coordinated by Prof. Silke Rautenschlein, Prof. Andreas Beineke and Prof. Guus Rimmelzwaan who presented the research focus of their pillars and how they interact with one another. As a highlight, Prof. Albert Osterhaus presented a key note lecture about the importance of virus detection, especially within the scope of the One Health concept which was highly appreciated by all participants. The official presentations were followed by an informal get-together with finger food and drinks.



VIPER students, teaching staff and president of the TiHo Dr. Gerhard Greif. Photo: Sonja von Brethorst

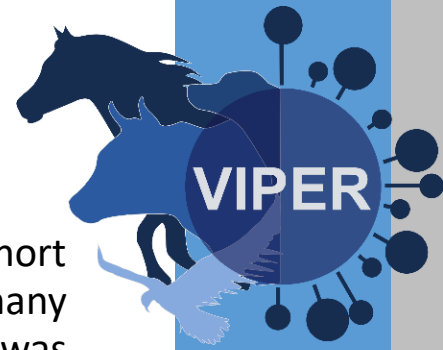


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## Film shooting – VIPER goes Hollywood

In the fall last year, VIPER started with the production of a short film about its work. The production was supported by many talented actresses and actors. The last of three shooting days was on February 25<sup>th</sup>. The film is now available:

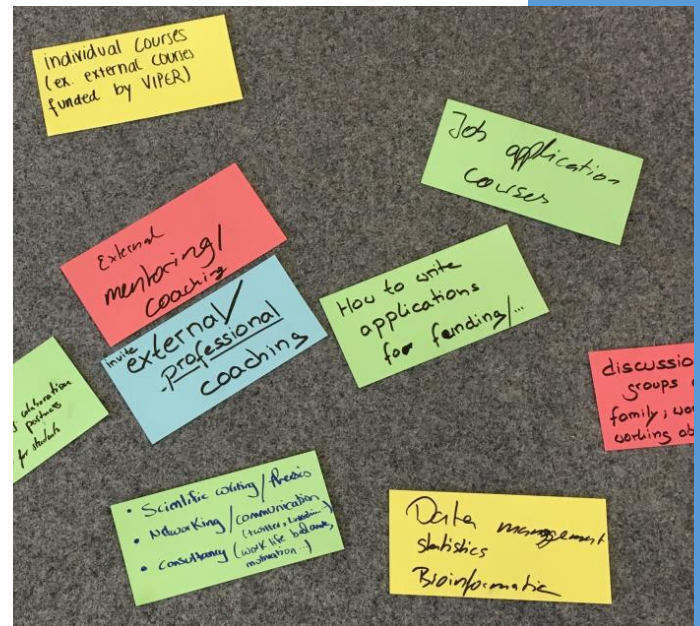
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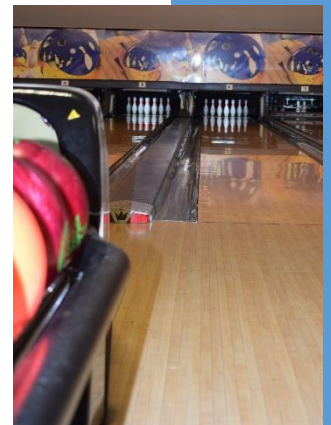
## Process evaluation by KHN

Since VIPER is still in his infancy and wants to become better and better in the coming years, the program is evaluated by external quality managers once a year. For this purpose, the VIPER students held two meetings with the Competence Center for University Didactics, Lower Saxony (KHN) to discuss the good and weak points of the program. Afterwards the teaching staff were briefed on the contents of an anonymous report so that they can adapt their work in the future.

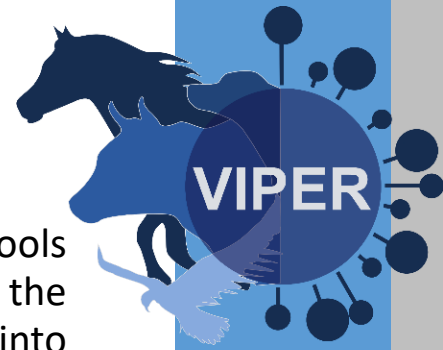


## “Spare” time – informal get-together

After a hard day with mathematical modeling, VIPER students met to exchange their recent experiences. The casual atmosphere enabled the students to get to know each other apart from the regular meetings. They could exchange information on personal challenges and problems encountered in their first year at VIPER.



# En-block schools and Meeting of the Scientific Advisory Board

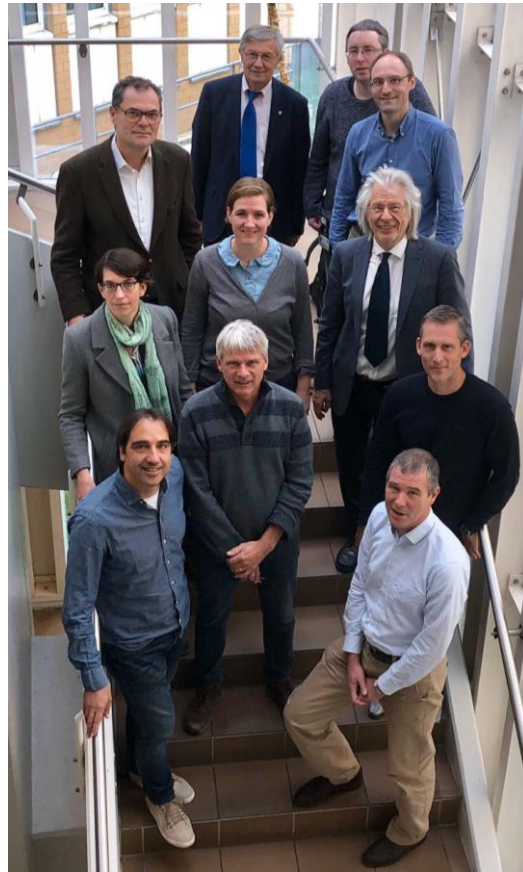


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In the fall of 2019 and early spring of 2020 two en-block schools provided specific training to the VIPER PhD students. During the freshman class in October, students were introduced into theoretical and practical fundamentals of virology, pathology, immunology, and ethics. At the same time, the Scientific Advisory Board, consisting of Prof. Dr. Martin Beer (FLI Riems), Prof. Dr. Jeroen Kortekaas (Wageningen University, The Netherlands), Prof. Dr. Bart Haagmans (Erasmus Medical Centre, Rotterdam, The

Netherlands) and Prof. Dr. Thijs Kuiken (Erasmus Medical Centre, Rotterdam, The Netherlands) met and discussed the aims and concept of the RTG and gave their advice.

The sophomore class in February dealt with specific topics of neuropathology, parasitology, epidemiology, and mathematical modeling. In hands-on courses, students could train their skills in tissue sampling, mosquito biology and infection, protein analysis as well as histology and animal husbandry. Dr. Dennis Rubbenstroth (FLI Riems) and Terry Jones (Charité Berlin) were invited as guest lecturers to introduce epidemiology and mathematical modeling to the VIPER students.



Meeting with the Scientific Advisory Board

## Travel reports

### Four-day intensive hands-on course on confocal microscopy in York, Great Britain

In September 2019, I was able to visit a hands-on course on confocal microscopy at the Imaging and Cytometry Technology Facility, Department of Biology, University of York. During the course, we were introduced to the fundamentals of fluorescence and confocal imaging, live cell imaging, FRET, FRAP and spectral unmixing. During the practical session, we were able to apply the theoretical topics on various microscopes. On the last day, the practical session included reflection on and imaging of own experiments.  
(Antonio Camarao)

## Joint congress of veterinary pathology and veterinary clinical pathology in Arnhem, The Netherlands

In September 2019, I was able to participate in the “Joint congress of veterinary pathology and veterinary clinical pathology”, which was held at the beautiful venue of the Burgers’ Zoo in Arnhem, the Netherlands. I presented a poster on my current research and was able to listen to many interesting talks on a wide variety of topics, ranging from marine mammal conservation to biochemical techniques and whole genome sequencing. I especially enjoyed the first day of the congress, which was specifically designed for residents and young researchers, where I really learned a lot in interactive workshops. Last but not least, we enjoyed a visit to the Burgers’ Zoo and the beautiful city of Arnhem. (Sarah Schwarz)

## Wildlife infectious disease monitoring - a Wadden Sea adventure in Büsum, Germany



Imagine this. It’s a Wednesday on a cold and foggy December morning. Four veterinarians in a car with a Hamburger license plate, filled to the brim with luggage, equipped with a shotgun in the trunk. They’re on their way to Büsum, a small town on the North Sea coast... of course, where else!

As all four of us (Sonja, Madeleine and the two Franzis) are working on viral pathogens in wildlife animals, we were given the opportunity to complete a mandatory two-week VIPER course in „Wildlife Infectious Disease Monitoring“ at the Institute for Terrestrial and Aquatic Wildlife (ITAW) research of TiHo in Büsum in the very north of Germany.

And so we hit the road in the morning and arrived safely at our destination at noon. To get the feeling for our coastal getaway we started our stay with some fish and chips as a welcome dish. It turned out that finding a place to feed us hungry girls was not as easy as you would expect. The picturesque, touristy town of Büsum in the winter months resembles more a ghost town, with most of the restaurants and shops closed in the off-season and not a soul to be seen.

The reason for our course taking place in this time of year, were the driven hunts for hares, which traditionally take place in the winter. Marcus, an ITAW veterinarian, writing his doctoral thesis on the health state of German hares, collects his samples at these traditional events. He took us along to get some hands-on experience in his field work. (This year, there was an international conference in Barcelona which most of the Institute staff went to, so it could not have been better that we came at this particular time to give Marcus a hand.) We were to take part in the hunts as drivers, except for hunter Franz K. Hence, our first official act was putting her shotgun to a seal hunter’s weapon locker where it was safely stored.

When we arrived at the institute, we were welcomed by Professor Ursula Siebert, the head of the ITAW. She gave us a short introduction on safety procedures, which was followed by a presentation of another veterinarian, Jan, who taught us



about parasites in marine mammals. Later on, we had the opportunity to visit the formalin-fixed archive to have a closer look at the collection of parasites, that Jan keeps for his projects. (Did you know that there are really nematodes living in porpoises’ ears? Ear worms....literally.) We also learned important facts about the expiration date of formalin vessels. (Never touch one that is dated 2004. Not that we had had any practical experience...) The next days we spent in the necropsy hall, dissecting porpoises and harbour seals, which are indigenous marine mammals in the North Sea. This was very interesting for us “normal” veterinarians as their anatomy varies considerably from our domestic animals we have seen previously in our studies.

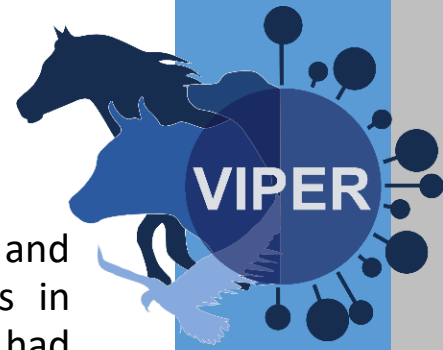
In addition, the necropsy work flow is quite different, as most samples were taken from animals, which were washed up by the sea to determine the death/ health status of the animals. This leaves many of the carcasses to deteriorate an “rotten”, as one might say colloquially. Nevertheless, each carcass evaluated individually and samples are taken depending on their autolytic status. The samples are either stored for later projects or sent to other institutes to test for infectious agents, toxic agents or microplastic pollution. A special focus is laid on the ears of harbor porpoises: Harbor porpoises are greatly dependent on their hearing ability for orientation. Due to recent blasting events of bombs and ammunition, remnants of the war in the Baltic sea, and an increase of fishing, each inner ear of harbor porpoises is dissected for damage assessment.

Then it was the day of the first hare hunt on Saturday. We were all quite excited since we didn’t know what to expect. We met the hunters, about 80 people and mostly men of all ages, at a local inn. Our hunter, Franzi K., was celebrated greatly by the members of the hunting party, as it was pleasantly different for them to have a female veterinarian at their prized event.



So, in keeping with the tradition, she had to bet how many hares there would be laying on the hunting area at the end. (Her estimation was 110) On we went: Wearing waders and neon-coloured rain jackets, we stepped into horse trailers (literally) that took us to the hunting grounds. The spectacle began: We walked over the muddy fields in a horizontal line, hunters and drivers alternating. Whenever someone spotted the silhouette of a hare, they shouted and chased them away.





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Everyone then stood still and the hunters pointed their guns and shot. Unfortunately, as veterinarians, we were not always in agreement with the hunters when it came to how animals had been shot. Nevertheless, the hunters gave us a warm welcome and it was a great workout with the caked muddy soil sticking to the soles of our boots.

But we hadn't accomplished our goal yet: we took ten of the 176 hares that had been shot. Some samples we had to take immediately i.e. blood, urine, oral and genital swabs and the eyes of each animal. The bodies were then packed in plastic bags and we headed home, thoroughly frozen and tired. We still had to go on our personal hunt for food – EDEKA was waiting for us, as it was every day!

After a quiet and less productive Sunday, we did the necropsies of the hares on Monday. A nice experience to have something fresh on the table – and with the right music, the atmosphere during work was a boost.

The following days, we continued with necropsies but were also taught how the age of seals and porpoises is determined. After demineralization, slicing and staining, it is a bit like counting the annual rings of a tree. Sadly, most of the animals didn't reach a high age at the time of their death.

We were lucky to be able to attend a meeting with a delegation from the University of Costa Rica. Since a collaboration is being pursued, Professor Siebert gave a presentation about the institute's current research. In exchange, the Costa Ricans also talked about one of their projects which sounded very exotic to us: A project on crocodiles which carry multiresistant germs.



After one week we had already established a routine and we knew where everything was in the necropsy hall. Good that we got to know Simon, who was in charge of otter dissections! Otters are fascinating animals: Their tails are the most muscular part of their body, making up a third of their body length.

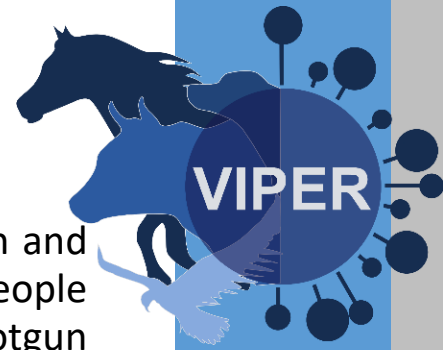
In our free time, we explored the region, at least as the weather allowed us to. During our time in Büsum, it rained all the time and was very stormy that we couldn't get closer than a few hundred meters away from the sea – the winds were just too strong! For this reason, the second hare hunt was a real challenge.

One activity not dependent on the weather was a visit to the „Multimar Wattforum“ in Tönning , a center dedicated to the wonders of th Wadden sea, which was very interactive and informative. Our highlight was the cinema-like, big fish tank where we spent about half an hour just watching and admiring the fish. And of course, the tide-tunnel, clearly intended for children as the size revealed – but this couldn't stop us from having fun underwater!



For our last two days, a real highlight was on our agenda: We were supposed to fly to Helgoland, an island far off the coast, where the gray seals give birth to their pups in winter. These are marked with flipper tags by employees of the ITAW. But luck wasn't on our side:

All of the flights were already full and we would have had to have taken the ferry from Cuxhaven which was too far and not manageable. Nevertheless, we were offered by Prof. Siebert to join in future field activities in the coming months!



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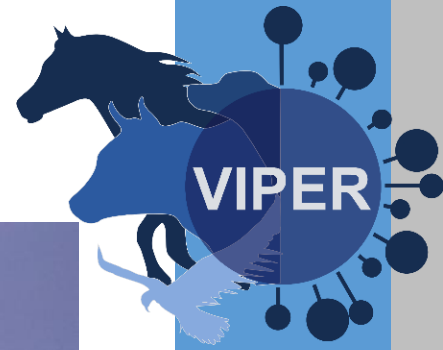
And so we ended our stay as we began it: We had some fish and chips (meanwhile, there were more open shops and more people as Christmas was approaching). We collected Franzi's shotgun from the seal hunter, head back to the highway 23, passing the ship cranes in the Hamburg harbor, then onto the A7 straight to Hannover. When we finally had returned our car and stepped into the cold winter air in Hannover, we could literally smell the city and stared at all the many people in astonishment. We weren't used to people after the two weeks in a ghost town. Büsum felt like a time spent in a different world!

(Franziska Kaiser, Franziska Geiselhardt, Sonja Jesse, Madeleine de le Roi)

## **Workshops on Computational Models in Biology and Medicine in Bonn, Germany**

The conference on Computational Models in Biology and Medicine in Bonn featured a variety of different topics and techniques. I had the chance to talk to different scientists specialized in topics ranging from human medicine to statistics and bioinformatics. Many of them presented mathematical models or machine learning approaches to answer clinical questions like how to account for individual heterogeneity in immune response or personalized medicine. The conference itself was rather small (around 40 people) which was actually quite nice. This allowed many conversations where I had the opportunity to not only learn from other PhD students and professors but also to discuss common problems which can occur when using their techniques over a beer. I can really recommend selecting such "small" conferences and even though my topic which focuses around virus detection was more "exotic" I got a lot of good ideas from the attendees. Props to Bonn :) (Babak Saremi)

## European Scientific Conference on Infectious Disease Epidemiology in Stockholm, Sweden



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Thanks to financial support through VIPER, I was able to attend the major meeting of infectious disease epidemiology and public health in Europe. The conference is annually organized by the European Center for Disease Prevention and Control and is integrated in the ECDC's fellowship programs. I gained interesting insights into the public health sector in Europe and heard fascinating talks about the dispersion of infectious diseases, novel surveillance techniques and warning systems, vaccine confidence and even the correlation of climate change and the spread of infectious diseases.

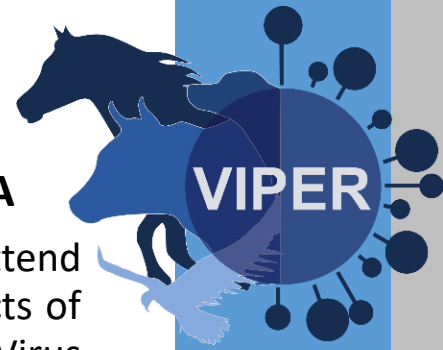
Since I am as well aspiring a career in the public health sector, this meeting enabled me to encounter very interesting and involved people. In this way, I learnt about a variety of different career paths and feel now assured that I am on the right track with VIPER and the network of different research groups that that I will come across . This conference also showed me



how important the work is we do every day and that there is a crucial need for everything we do, from virus discovery to pathogenicity, immune responses and finally vaccine development and research on treatment options.

(Olivia Luise Gern)

## 6th Annual Short Course in Basic and Translational Virology of the Global Virus Network in Baltimore, USA



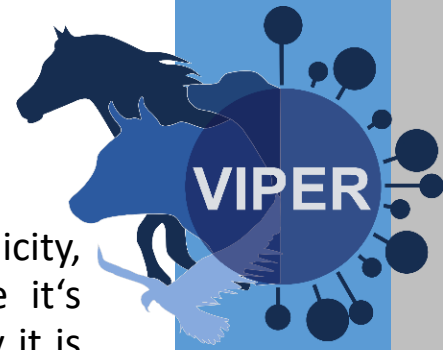
GRK 2485

From July 28th to August 3rd, 2019 I had the opportunity to attend the intensive course on basic, translational, and clinical aspects of viruses of importance to human health of the Global Virus Network. The meeting is aimed at early-career scientists and medics, working in the field of virology from all over the world.

Scientists from countries such as Japan, Kenya, Jamaica, South Korea, and many more, met to take part in a series of seminars held by leading experts in their field of virology, covering a broad spectrum of different viruses, vaccines, antivirals, development of diagnostic tests, global bio surveillance and –security .... to name just a few of the topics. The one-week course also included a tour of the NIH (National Institute of Health) campus, where we visited the NIAID (National Institute of Allergy and Infectious Diseases) and learned about their latest work in vaccine development. The NIH tour included a trip to the National Library of Medicine, where the Nobel prize of Marshall W. Nirenberg, the father of the genetic code, is housed the servers of PubMed are stored... which made my nerdy heart skip a beat. Another stop of the course was a tour of the massive insectary of the Johns Hopkins Bloomberg School of Public Health to learn how mosquitos are bred for research purposes.

Having some time after the course, I headed to Washington DC, this time as a tourist: I was lucky, that the Smithsonian National Museum of Natural History had a special exhibition: “Outbreak: Epidemics in a Connected World”. The exhibition is aimed at the general public and teaches about viral outbreaks of the past and subjects such as: Where do pandemic viruses come from? What role do zoonoses play in outbreaks? Why is it important to maintain proper health measures? etc.... With the current situation of COVID-19, a very trendy and foreshadowing subject.

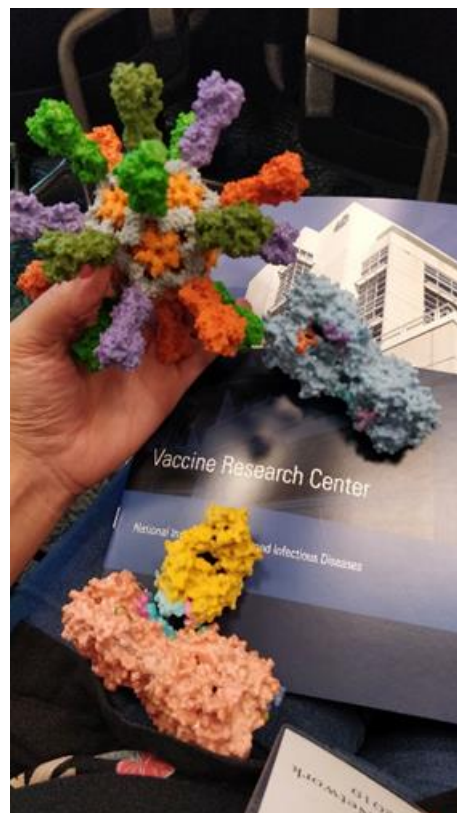
Overall, I enjoyed the course very much and would recommend it to anyone who aspires to work in public health or who is interested in broadening their horizons in translational virology. I learned a lot about political aspects, cultural aspects, biosafety issues, merging science and industry. Most of all, I enjoyed talks by scientists who are working in the field of viral outbreaks in developing countries. This was very impressive to me and made me appreciate the work of virologists even more. As scientists, we tend to be wrapped up in our own research topics.



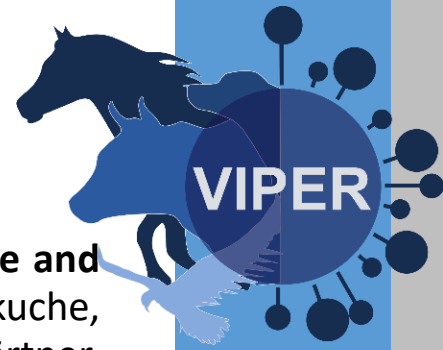
GRK 2485

Ideally we all become experts in replication, pathogenicity, epidemiology etc. of the virus we work with (in my case it's metapneumoviruses). This of course is important, but equally it is as important not to forget about other viruses and their global impact. I learned valuable lessons, speaking with participants from all over the world: Virologists are all in this together somehow, despite all the politics and competitiveness science tends to entail. 10 out of 10! I would recommend this course ;)

(Sonja Jesse)



## Recent VIPER publications

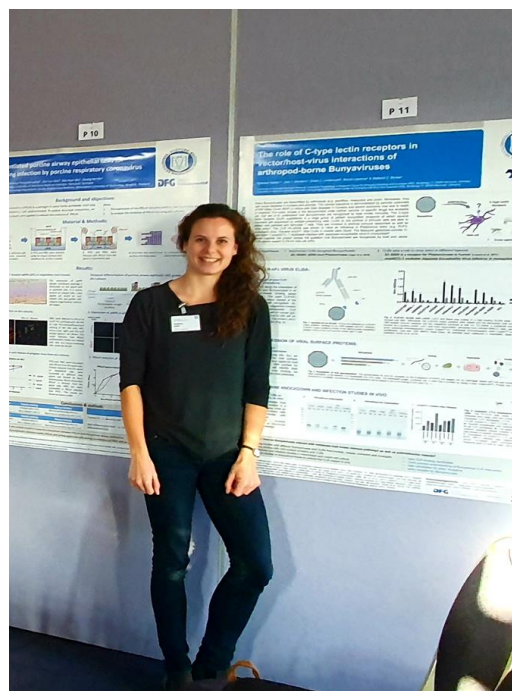


GRK 2485

- **Genetic variability of porcine pegivirus in pigs from Europe and China and insights into tissue tropism.** J. Kennedy, V. Pfankuche, D. Hoeltig, A. Postel, O. Keuling, M. Ciurkiewicz, W. Baumgärtner, P. Becher, C. Baechlein. *Scientific Reports* (2019), 9: 8174.
- **Robust hepatitis E virus infection and transcriptional response in human hepatocytes.** D. Todt, M. Friesland, N. Moeller, D. Praditya, V. Kinast, Y. Brüggemann, L. Knegeendorf, T. Burkarda, J. Steinmann, R. Burm, L. Verhoye, A. Wahid, T. Meister, M. Engelmann, V. Pfankuche, C. Puff, F. Vondran, W. Baumgärtner, P. Meuleman, P. Behrendt, E. Steinmann. *PNAS* (2020), 117: 1731-1741.
- **Oxidative stress in canine histiocytic sarcoma cells induced by an infection with Canine Distemper Virus led to a dysregulation of HIF-1 $\alpha$  downstream pathway resulting in a reduced expression of VEGF-B in vitro.** F. Armando, M. Gambini, A. Corradi, C. Giudice, V. Pfankuche, G. Brogden, F. Attig, M. von Köckritz-Blickwede, W. Baumgärtner, C. Puff. *Viruses* (2020), 12: 200.
- **Neurotrophic effects of GM1 ganglioside, NGF, and FGF2 on canine dorsal root ganglia neurons in vitro.** S. Schwarz, A. Lehmbecker, W. Tongtako, K. Hahn, Y. Wang, F. Felmy, I. Zdora, G. Brogden, K. Branitzki-Heinemann, M. von Köckritz-Blickwede, W. Baumgärtner & I. Gerhauser. *Scientific Reports* (2020), 10:5380.

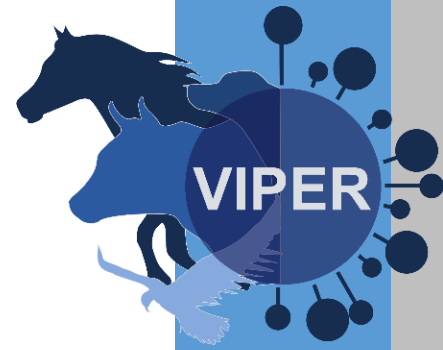
## Prizes and awards

- **Kathleen Schön: poster award “The role of C-type lectin receptors in vector/host-virus interactions of arthropod-borne Bunyaviruses”,** Graduate School Day of the HGNI, Bad Salzdetfurth, Germany, 2019
- **Babak Saremi: poster award “A bootstrap approach to estimate false positives in viral meta genomics”,** Workshop on Computational Models in Biology and Medicine, Bonn, Germany, 2020

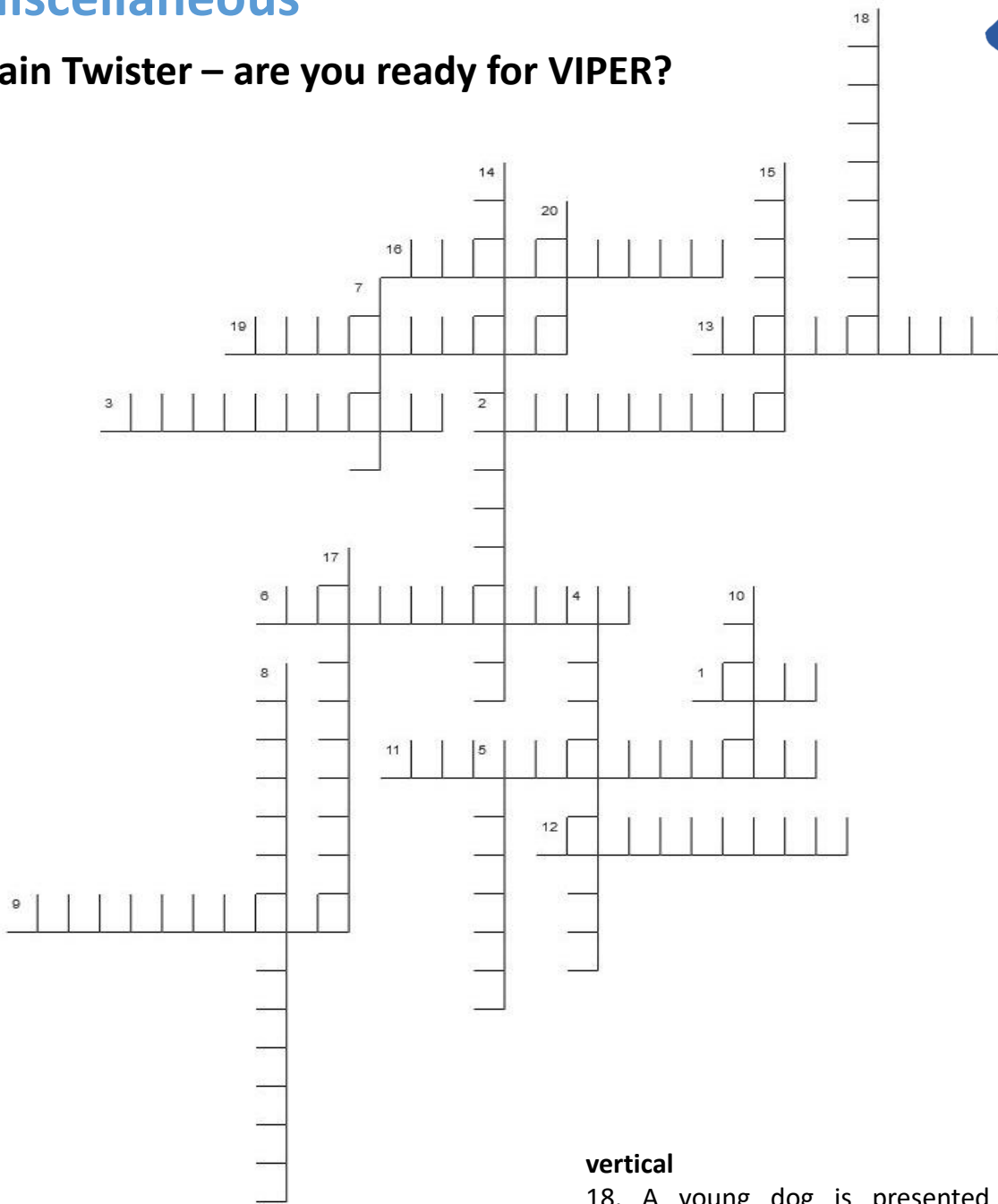


# Miscellaneous

## Brain Twister – are you ready for VIPER?



GRK 2485



### horizontal

16. Which cell type gives rise to neoplasias in bovine leukemia virus infection? 19. Abortions in mares can occur after infection with which virus? 13. Blue tongue virus belongs to which family? 3. You see proliferative skin lesions in a cat and its owner. Which virus should be taken into consideration? 2. Cerebellar hypoplasia in kitten is seen in association with which virus? 6. Tick-borne encephalitis virus belongs to which family? 1. Mucosal disease in cattle is caused by which virus? (abbreviation) 11. Cauliflower-like skin tumors in cattle are frequently related to which virus? 12. Botryoid inclusions in pigs can be recognized in ... infection. 9. Feline infectious peritonitis virus can cause FIP after mutation and replication in which cell type?

### vertical

18. A young dog is presented with pneumonia, diarrhea and skin lesions. Which disease should be taken into consideration? 14. Myxomatosis in rabbits is caused by which virus? 15. Classical swine fever causes intestinal lesions that are called ... . 20. Mad itch is relatively rarely seen in which species? 7. Inclusion bodies in rabies are called ... bodies. 17. Enzootic nasal tumor virus in sheep causes which kind of lesions? 4. Canine infectious hepatitis is caused by what kind of virus? 10. Which organ is most commonly affected in Rabbit hemorrhagic disease? 8. Malformation of limbs in Schmallenberg virus infection is called ... . 5. West Nile fever is transmitted via which animals?



## Outlook and announcements

Within the coming months VIPER will provide further training opportunities to the students. Quarterly, the VIPER network meetings with all members of the RTG will take place. On each date, a group of students will present their projects and achievements from the first year. Additionally, there will be en-block schools in October (“junior class”) and February (“senior class”). The students will be introduced to molecular and functional virology, next-generation-sequencing, and the development of intervention tools. In the evening, there will be an informal meeting of our students to exchange their experiences, challenges, and successes during their first year at VIPER.

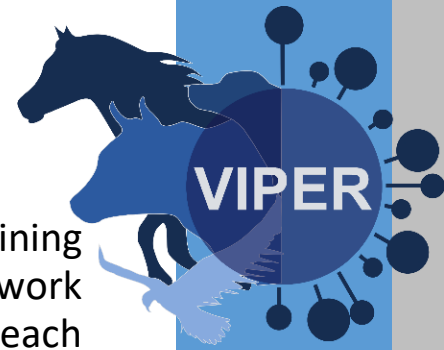
Additionally, there are lecture series during the summer term (“Seminar on infection biology”; “Current topics in Biomedicine”). VIPER has invited Dr. Benjamin Brennan (MRC-University of Glasgow Center for Virus Research) who will talk about “*Severe fever with thrombocytopenia syndrome (SFTS) phlebovirus (SFTSV) and vaccine development*” on July 6th, 2020.

Furthermore, students have the possibility to be introduced to genome editing methods (CRISPR/Cas) by the group of Professor Ulrich Kalinke at TWINCORE.

We hope that the current coronavirus outbreak will slow down and and at least some planned activities can take place. However, flexibility is required from all of us in these times.

### Stay healthy!

For further information about VIPER, please visit our website:  
[www.rtg-viper.com](http://www.rtg-viper.com)



GRK 2485

#### Impressum:

VIPER coordination office  
Wencke Reineking and Dr. Ann-Kathrin Haverkamp  
Department of Pathology  
University of Veterinary Medicine Hannover  
Bünteweg 17, 30559 Hannover  
[Wencke.Reineking@tiho-hannover.de](mailto:Wencke.Reineking@tiho-hannover.de)