03
Winter
2021

NEWS

RESIST – Resolving Infection Susceptibility

RESIST

I wish you a more **"normal" year 2022**

GREETINGS FROM PROF. SCHULZ AT THE TURN OF THE YEAR

When I wrote a similar introduction to a RESIST Newsletter a year ago, I concluded by wishing everybody a "less strenuous and more 'normal' year 2021" after having learnt to live with CoVID-19 restrictions in 2020. Well, we nearly got there, were it not for the rapidly deteriorating situation and massively increasing SARS-CoV-2 infection rates over the last few weeks. So, after a brief respite over the summer months, the prospect of a 'return to normal' has dimmed, and we are again facing a lot of uncertainty as to whether daily (and academic) life will be again subject to restrictions. All the more annoying, since we know that this could have been avoided with a better vaccine uptake and a more decisive political response.

Thankfully, in RESIST our progress has not been subject to similar fluctuations. On the contrary, the SARS-CoV-2 pandemic has stimulated new research initiatives in RESIST on broadly neutralizing human monoclonal antibodies, new antiviral drugs, vaccines and also on a better understanding of the COVID-19 pathogenesis and these are beginning to bear fruit. We are grateful for the additional support provided by the Lower Saxony Ministry of Science and Culture to help start some of these new projects. October 2021 has also seen the first student intake of our new MSc course 'Biomedical Data Analysis', initiated by RESIST in close collaboration with Prof. Marschollek and his colleagues at the Peter L. Reichertz Institute for Medical Informatics (PLRI) of the MHH and the TU Braunschweig. We are pleased that the new intake includes students with either a medical or life sciences degree – this should allow us to achieve one of the aims of this new MSc course, i.e. to train both clinicians and scientists in the art of large scale data handling.

Also in October 2021, we had our second joint symposium together with the Collaborative Research Centre 900, on the theme of "Determinants of Infection Susceptibility and Microbial Persistence". Thirteen invited speakers and twenty RESIST or SFB900 speakers presented exciting data on this theme, as summarized in a separate article in this Newsletter. It was a great relief to be able to meet again in person, to discuss findings and devise new plans and collaborations and to get away from MS Teams, Zoom and Cisco Webex.

Following this symposium, we also had a short meeting with our Scientific Advisory Board, who will help us with the internal evaluation of RESIST projects that we have planned for early 2022. The preparations for this important event are ongoing. The outcome of this internal evaluation will shape the direction and focus of RESIST for the remainder of the current funding period, the halfway mark of which we will have reached in just over six months from now.

I therefore believe that at the end of 2021 we in RESIST can look back on another successful year. I wish everybody in RESIST and all the readers of this newsletter a Merry Christmas as well as an equally successful and hopefully this time really more 'normal' year 2022.

The RESIST speaker team: Prof. Schulz (in the middle) and the two co-speakers Prof. Förster (left) and Prof. Hansen (right).

Researching far away – or: What is home?

MANY RESIST RESEARCHERS HAVE COME TO HANNOVER FROM ABROAD, OFTEN VIA CONVOLUTED ROUTE, AND THEY HAVE OFTEN SPENT LONGER ABROAD THAN IN THEIR HOME COUNTRY. HOW DID END UP IN HANNOVER? WHAT IS DIFFERENT FOR THEM HERE? AND WHAT IS "HOME" ACTUALLY FOR THEM? SOME REPORTS.

Prof. Dr. Daniel Depledge

The European: Prof. Depledge

For Prof. Depledge it is quite clear: neither England, where he was born, went to university and spent his first years as a researcher, nor Denmark and Hong Kong – where he spent parts of his childhood – nor New York, where he lived for the past four years, does he call home. "My home is Europe," the 40-year-old sums up. It is thanks to a job advertisement that he has now become Professor of Systems Biology of Viruses at the MHH Institute of Virology. "It was as if the offer was written for me," he recalls. Since June, he and his team have now been researching within the DZIF how herpes-viruses remain permanently in the body after infection. "To do this, we combine computational biology with molecular biology and with genomic-transcriptomic approaches in various viral model systems. In this way, we want to find important gene products of the human cells and the viruses that control the survival and reactivation of herpes-viruses," he explains – in English. He already understands German reasonably well, but when he speaks it, it is still mixed with Danish and Dutch, the mother tongue of his wife, which she speaks with their three-year-old daughter.

Prior to Prof. Depledge moving to Hannover with his family, he only knew it from stories told by friends who had visited or lived here previously. His only previous experience of Germany came from a few short visits to the cities of Berlin and Düsseldorf. "I find the work-life balance here better than in England and the US," he says. He also likes the less extreme political attitudes, but not the weather.

Roots in Afghanistan: Dr. Atschekzei

Fearing for her life, Dr. Atschekzei fled Kabul in 1995, where she had grown up and had just finished her medical studies. "Actually, I wanted to stay in Afghanistan, the country needs doctors," she says. She persevered – despite the sometimes chaotic conditions. After all, civil war had been raging in Kabul since 1992, which meant months of hiding in a cellar.
She held out until the Taliban came. Then her only option was to flee – to Germany, where her fiancé was already living. "Of course I was happy to be safe, but I could only relax a little when my mother and most of my siblings were also able to come to Germany in 1998," Dr. Atschekzei recalls. In the meantime, she had become the mother of a one-year-old son and had also learned German in evening classes, which she soon mastered fluently – in addition to her mother tongue Persian and Afghanistan's second national language Pashto. Later, she added English, the "language of research", to her language repertoire.

Dr. Atzschekzei has been a scientist at the MHH Department of Rheumatology and Immunology for eight years. She heads the Molecular Immunology working group and researches the molecular genetics of primary immunodeficiencies. She is also investigating how these diseases are influenced by epigenetic factors. The aim is to provide each of these patients with an individual and targeted therapy in the near future. For this, the now 48-year-old previously studied biology again and earned her doctorate in biomedicine in 2011.

"I have now spent about half my life in Germany and both countries have become home to me," she says. "But I have my roots in Afghanistan."

Prof. Li – Family is home

"Home is where the family is," says Prof. Li. Since 2019, her home has thus mainly been Hanover, where she lives with her husband and younger daughter. Groningen, where she did research for a long time and received her doctorate in 2010, is also part of it; her older daughter stayed there to

Dr. Faranaz Atschekzei

Prof. Dr. Yang Li

study. And her parents live in China; she herself studied in Hunan and did research there until 2005.

Today, Prof. Li heads the HZI department "Bioinformatics of Individualised Medicine" at the Centre for Individualised Infection Medicine (CiiM), which she co-directs – together with Prof. Cornberg. Until the CiiM building is completed she and her constantly growing team will be guests at Twincore: there she extracts useful biological information from extensive, multi-dimensional and highly complex data sets ("Big Data"). "Our goal is to find genetic risk factors for susceptibility to infection and to elucidate the subsequent molecular processes," explains the 47-year-old. In this way, infectious diseases should be better understood as well as treated, and patients at risk should be better identified.

Prof. Li is happy about her decision to come to Hanover. She enjoys the "first-class research environment" – the alliance with the MHH, the state-of-the-art omics platforms, the Hannover Unified Biobank and the numerous cohorts. Only in terms of language was it easier for her in the Netherlands, where much more English is used, which she knows perfectly.

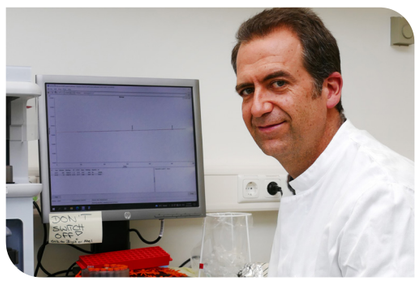
Prof. Viejo-Borbolla's home country

Spanish, English, some Portuguese and a little French – these are the languages Prof. Viejo-Borbolla speaks. He understands German well, depending on the type of conversation, only when it comes to speaking he is less confident – except when it relates to football vocabulary, as he often accompanies his two sons to games. He himself plays basketball. "In the process, I noticed that Germans plan their social gatherings more than in other places. Spontaneous outings happen less often than I would like," says the bioscientist.

The 47-year-old studied in Madrid and Leeds. He earned his doctorate in Liverpool in 2002; Prof. Schulz was one of his two doctoral supervisors. He followed him to Germany in 2000 to devote himself to research on Kaposi's sarcoma-associated herpes viruses. Until then he had never been to Germany, he had only met a few German students in Liverpool. "When I arrived in Germany, I had to get used to the fact that hierarchies played a much bigger role here than in Liverpool. Whether that's good or bad – it depends on the situation," he recalls.

He didn't stay in Germany straight away, however, but first worked again in Madrid and New York until he returned to the MHH in 2013 – first as an assistant professor and since 2019 as APL professor for Experimental Virology at the MHH Institute of Virology. These days, his research revolves around varicella-zoster viruses (VZV): with his international team, he identifies and characterises the human and viral genetic determinants responsible for exacerbating VZV disease. He is also investigating epigenetic changes in the viral and human genome during the establishment of VZV latency.

For Prof. Viejo-Borbolla, despite feeling at home in Hannover and having enjoyed living in other countries, his homeland is still Spain, where most of his family and friends live.



Prof. Dr. Abel Viejo-Borbolla

Great joy thanks to a live event

MPRESSIONS OF THE SECOND RESIST / SFB900 SYMPOSIUM IN 2021 – WRITTEN BY PROF. SCHULZ

On 4 and 5 October 2021, the second international symposium jointly organised by SFB900 and EXC RESIST took place at the Courtyard Hotel at the Maschsee in Hanover. After 18 months in which the SARS-CoV-2 pandemic and the associated restrictions had only allowed scientific meetings and congresses on online platforms, the unanimous reaction of all participants was that a 'real' conference was something quite different after all, and that everyone very much enjoyed being able to talk and have informal discussions again in small circles, over coffee, on the balcony overlooking the Maschsee. The feeling of relief, and the hope that perhaps the worst of the SARS-CoV-2 pandemic was over and that it would be possible to return to normal life, was widespread. I am writing this at the beginning of November 2021, and unfortunately the wind has shifted again and infection rates have exploded again in recent days; in retrospect, our joint congress seems like a momentary sigh of relief.

The theme of the symposium was "Determinants of Infection Susceptibility and Microbial Persistence" – under this thematic umbrella there was room for topics from both SFB900 ("Chronic Infections: Microbial Persistence and its Control") and the Cluster of Excellence RESIST ("Resolving Infection Susceptibility"). The first part of the symposium was dedicated to the response of the infected host to a chronic infectious agent. This part focused on gamma-delta T cells (Immo Prinz, Sarina Ravens), antigen-specific gamma-delta T cells (Britta Maecker-Kolhoff), the modulation of cytokine-dependent cell migration by glycoprotein C of the herpes simplex virus (Abel Viejo-Borbolla) and transcriptome analyses of cytomegalovirus-infected human myeloid cells (Ulrich Kalinke). Furthermore, a group of lectures dealt with new approaches for the development of preventive or therapeutic vaccines against hepatitis B and C viruses (Heiner Wedemeyer and Markus Cornberg, Ellie Barnes from Oxford, Dorothea Bankwitz/Thomas Pietschmann). Finally, Maura Dandri (Hamburg) gave an overview of the different influences of hepatitis B and hepatitis D viruses on the innate immune response as well as cellular mechanisms underlying the persistence of the hepatitis B virus.

The second part dealt with the evolution and variability of bacterial species and bacterial communities, as well as their role in bacterial persistence and colonisation. Sebastian Suerbaum shed light on these topics from the point of view of the persistence of *Helicobacter pylori* in the stomach, and Burkhard Tümmler and Pradeep Singh (University of Washington) for *Pseudomonas aeruginosa* in the lungs of patients with cystic fibrosis. Felix Key (Berlin) showed how a mutation in the genome of *Staphylococcus aureus* enables this germ to persist and spread on the skin of patients with atopic dermatitis. Guntram Graßl presented data on a section of the *Salmonella* genome that is important for the survival and reproduction of this pathogen in macrophages. Bacteria often live in complex communities, and Till Strowig showed how 'harmless' variants of *Klebsiella* prevent pathogenic variants from overgrowing the intestinal flora, while Franziska Faber (Würzburg) reported on bacterial metabolic products that control the coexistence of bacterial communities.

Symposium participants in front of the hotel and conference centre "Courtyard Hannover Maschsee".

At the end of the first day, a concert took place in the old town hall in Hanover. This was arranged especially for this conference by Catherine Myerscough, a violinist in Hanover's NDR Radiophilharmonie orchestra, and was performed by herself and four colleagues (Eriona Jaho, Upendo Mascerenhas, Jan Hendrik Rübel and Birgit Bachhuber). A journey through the history of music, performed with verve and received with enthusiasm by the audience, brought the first day of this symposium to a beautiful close.

The second day continued with the highly topical subject of "SARS-CoV-2/Covid-19". Coronaviruses are complex RNA viruses with many enzymatic functions and John Ziebuhr (Giessen) reported on his many years of work on the function of individual genome sections during replication of the viral genome. Volker Thiel (Bern), also a long-standing expert in the coronavirus field, presented his groundbreaking results in establishing rapid reverse genetics methods for SARS-CoV-2 and other coronaviruses. Wendy Barclay has elucidated the role of a proteolytic cleavage site in the spike protein of SARS-CoV-2 and how it is affected by mutations that play a key role in the even more infectious "Variants of Concern" (VOCs) of SARS-CoV-2 now circulating. A quartet of researchers in RESIST, who all started their work on SARS-CoV-2 just over a year ago, represented SARS-CoV-2 research in the field: Thomas Krey reported on the cloning of broadly neutralising human monoclonal antibodies against SARS-CoV-2, Reinhold Förster on vaccination studies conducted at MHH, Kay Grünewald (Hamburg) on the discovery of a pore in the membrane of SARS-CoV-2 replication organelles, and Luka Čičin-Šain on a novel experimental cytomegalovirus-based vaccine against SARS-CoV-2.

The following part discussed: Mechanisms of innate and intrinsic immune responses using the example of SARS-CoV-2 (Susan Weiss, University of Pennsylvania), the regulation of TLR-dependent immune responses (Olivia Majer, Berlin), the interferon-induced MxB protein in intracellular defence against herpesviral capsids (Beate Sodeik) and the restriction of HIV infection (Christine Goffinet, Berlin) as well as the role of further innate defence mechanisms in herpesviruses (Melanie Brinkmann). Bacteria also modulate such mechanisms of innate immunity and Christine Josenhans was able to illustrate this with the example of the *Helicopacter pylori* cag pathogenicity island.

The last section dealt with congenital immunodeficiencies. J.L. Casanova (New York) presented the impressive results of a large-scale international collaboration that had revealed the importance of polymorphisms in the immune sensor TLR7 as a risk factor for severe COVID-19 disease. Similarly, Trine Mogensen (Aarhus) had identified variants in the RNA polymerase III gene as a cause of severe varicella zoster virus disease, as well as defects in the autophagy machinery as a cause of recurrent HSV2 meningitis (mollaret mengitis). Genetic variants can also play a role in the composition of the microbiome, as Malte Rühlemann (Kiel) was able to show using the biliverdin reductase gene as an example. Doris Steinemann gave an overview of a collaborative project in RESIST, which aims to elucidate genetically determined immunodeficiencies in people who frequently suffer from infections.

Thanks to these excellent presentations, many facets of the topic of susceptibility to infections and the resulting acute and chronic infections were covered; new ideas were generated and plans for new projects and experiments were drafted in the discussions during coffee breaks and over dinner. The joy of having once again participated in a 'real' congress and discussions with 'real' people was great at the end of the conference. I hope it will serve as a motivation during the coming months and we hope to be able to organise a similarly successful final symposium of SFB900 in autumn 2022.

Over a coffee:
Numerous conversations took place in a relaxed atmosphere in front of the conference room.

In the sunshine:
With a view of the Maschsee, there were opportunities to exchange ideas during the breaks.

Start: Biomedical Data Analysis

THE FIRST STUDENTS HAVE STARTED THE NEW MASTER'S PROGRAMME

The Corona pandemic has made it clear to us: In medicine, it is becoming increasingly important to be able to handle large amounts of data safely. That is why the MHH is now training experts in this field with the new "Biomedical Data Analysis" Master's programme. The course was developed within the framework of RESIST with significant participation from the Peter L. Reichertz Institute for Medical Informatics (PLRI) at the MHH and the TU Braunschweig.

The first 18 students started their studies in October. They are graduates with a life sciences bachelor's degree or a medical degree. In the coming four semesters they will learn to generate and handle large, heterogeneous and complex amounts of data in a targeted manner and to develop and apply IT solutions. This knowledge is intended to optimise the prevention of diseases and provide precise diagnoses as well as treatment and therapy decisions.

"We are pleased to now be able to launch the study programme together with you," said RESIST speaker Prof. Schulz, Head of the MHH Institute of Virology, at the opening ceremony on 7 October. He is the speaker for the new degree programme, together with Prof. Dr. Dr. Michael Marschollek, Managing Director of the PLRI. The lecturers of the PLRI are substantially involved in the teaching of the study programme.

The right study programme in the right place at the right time

"MHH is a very good place to combine the best of computer science with the best of medicine," emphasised Björn Thümler, Lower Saxony's Minister of Science and Culture, who had prepared a video message for the ceremony. MHH President Prof. Dr. Michael P. Manns, who introduced the MHH to the students at this ceremony, underlined this statement: "It's the right degree programme in the right place at the right time."

MHH Dean of Studies Prof. Dr. Ingo Just pointed out that the students have a medical or a natural science background and that the study programme thus prepares them very well for interdisciplinary teamwork. "To work together cooperatively, productively and harmoniously, you have to learn how the other person thinks," he said.

"Digitalisation will turn medicine upside down," predicted Prof. Dr. Rudi Balling. The director of the "Luxembourg Centre for Systems Biomedicine" at the University of Luxembourg addressed "tricky problems" in his keynote speech – problems with many components and interactions and a high degree of interconnection, networking and feedback. With his words "For these problems, for example pandemics, climate change and racism, there are no clear-cut but only participative solutions – and the basis of these solutions is data", he emphasised the importance of the new degree programme.

First students of the new Master's programme "Biomedical Data Analysis".

Konstantin Büttner

"I studied medicine at the MHH and saw during my doctoral thesis in the Department of Haematology, Haemostaseology, Oncology and Stem Cell Transplantation on the topic of "NGS detection of minimal residual disease in acute myeloid leukaemia after allogeneic stem cell transplantation" how important it has become to be able to deal with large amounts of data in research. That's why I decided to take this new Master's programme and hope to gain more experience in dealing with biomedical datasets."

Viviane Steinberg

"After studying biology at the Leibniz University, I worked as a student assistant at the MHH Institute for Experimental Haematology and saw how important it is to use digitisation programmes in research. With this new Master's programme, I want to acquire the necessary knowledge to better position myself for my own research work and thus be able to enhance it."

Sören Sievers

"I have almost finished my medical studies at the MHH and have written my doctoral thesis in research ethics. In the process, I have already worked with large amounts of data and seen how important it is to be able to handle the increasingly large amounts of data safely in order to be able to use them in studies for the benefit of patients. I have already attended some seminars on the topic of biomedical data science, but I would like to deepen my knowledge and am therefore glad that there is now this new Master's programme at the MHH for this purpose."

Further information

on this Master's programme is available on the internet at www.mhh.de/master-biomeddat and from the programme coordinator Dr. Melina Celik, telephone: (0511) 532-5700, e-mail: master.biomeddat@mh-hannover.de.

Impressum

Editor
Cluster of Excellence RESIST
Institute for Virology
Hannover Medical School (MHH)
Carl-Neuberg-Straße 1,
30625 Hannover, Germany
E-mail: RESIST@mh-hannover.de
Phone: (0511) 532-4107
Internet: www.RESIST-cluster.de

Editor-in-Chief
Professor Dr. Thomas Schulz
Hannover Medical School (MHH)
E-mail: Schulz.Thomas@mh-hannover.de
Phone: (0511) 532-4107

Editorial office
Bettina Bandel
E-mail: Bandel.Bettina@mh-hannover.de
Phone: (0511) 532-4046

Dr. Eugenia Gripp and Dr. Danica Bergmann
E-mail: RESIST@mh-hannover.de
Phone: (0511) 532-4107

Design and printing
Digital media of the Hannover Medical School (MHH)

Online edition
The RESIST newsletter is also available on the Internet at www.RESIST-cluster.de.

Photos
Karin Kaiser, MHH (1, 8, 9)
Bettina Bandel, MHH (2-5, 12)
Mareike Heger, MHH (6-7)
Olaf Malzahn (8)
Yamel Fotography (9)
Tom Figiel (9)
Caro Korth, MHH (10)
Science Relations (11)

A **second million** euros for RESIST

Another financial blessing: In February 2021, RESIST received one million euros from the Volkswagen Foundation and the state of Lower Saxony from the "Niedersächsisches Vorab" – to support the research of W2 RESIST professors Sarina Ravens, MHH Institute of Immunology, Sabrina Schreiner, MHH Institute of Virology, Marco Galardini, Twincore Institute of Molecular Bacteriology, and Nico Lachmann, MHH Clinic for Paediatric Pneumology, Allergology and Neonatology. In September, the funders supported this research with a second million euros, also from the "Niedersächsisches Vorab". Many thanks on behalf of RESIST!

Prof. Lachmann (top left), Prof. Schreiner (top right), Prof. Ravens (bottom left) and Prof. Galardini (bottom right)

Success in the analysis of herpes viruses

Prof. Dr. Thomas Krey at the University of Lübeck

A team led by RESIST researcher Prof. Dr. Thomas Krey from the Institute of Biochemistry at the University of Lübeck has found a possible new starting point for the therapy of diseases caused by herpes viruses. These can be particularly problematic for patients who are immunocompromised as a result of organ transplants or HIV infection. The team were able to publish their results in November in the scientific journal PLOS Biology. The results are based on work carried out at the University of Lübeck, the MHH and the CSSB Hamburg.

The starting point of the research is the icosahedral capsid, a small regular capsule constructed from viral proteins, in which the DNA genome of the virus is packed for protection against environmental influences. This capsid consists of a solid protein layer and is impenetrable to nucleic acids. They must pass through it both during the packaging of the genome for the purpose of forming new viruses and during "unpacking", i.e. the release of the genome during infection of a host cell, through a unique portal channel. This is located at one of the twelve capsid corners and is closed there by a portal cap.

Decoded crystal structure enables understanding of infection processes

The team succeeded in deciphering the crystal structure of a laboratory-made portal cap of the Kaposi's sarcoma herpesvirus, a γ-herpesvirus. They were also able to elucidate how the structure of the corresponding protein looks in β-herpesviruses (such as cytomegalovirus), which, despite obvious differences in capsid association, has a striking structural similarity to its α- and γ-herpesvirus counterparts.

"Despite the enormous progress that cryo-electron microscopy currently allows us to make in this line of research, it would have been difficult to understand the processes taking place around the portal cap better without our crystal structure, as the resolution in this area of the capsid is not sufficient for this," explains Prof. Krey.

In the results they have now published, the researchers were able to prove that the portal cap protein (pORF19) also pentamerises in solution and they provide insights into how pentamerisation might be triggered in infected cells. Furthermore, structure-based mutagenesis on the lateral contact sites of this pORF19 pentamer, resulting in a blockade of pentamerisation, showed severely impaired production of infectious progeny. It is these results that should now pave the way to a better understanding and more targeted treatment of diseases caused by herpes viruses.

Text source: University of Lübeck

Launch of **HAGIS seminars**

HAGIS
Hannover-Glasgow Infection Strategy

The HAGIS logo features the bridge over the River Clyde in Glasgow, Scotland, and the Ernst August Monument.

The teams from RESIST and the MRC-University of Glasgow Centre for Virus Research (CVR) in Glasgow plan to use their complementary strengths to conduct joint research in the field of infectious diseases and provide an excellent training environment. With this goal in mind, they have created the new scientific partnership "Hannover-Glasgow Infection Strategy" HAGIS.

On 10 November, the new HAGIS seminar series was launched – with a lecture by Prof. Dr. Yang Li on the topic of "Integration of Multi-omics Data for Understanding Immunological Diseases" and with a presentation by Prof. David Robertson entitled "Data-driven Virology". Around 120 listeners took part in this online event, where the speakers also took around half an hour to talk to the students as well as (post-) doctoral students and anyone else who was interested. At the second event, Prof. Dr. Gisa Gerold from RESIST and Prof. Alain Kohl from the CVR spoke. The seminar series will now continue. The dates and topics of the seminars can be found at www.RESIST-cluster.de.

HAGIS is funded by the Lower Saxony Ministry of Science and Culture. An essential part of the partnership will be the exchange of PhD students. For this reason, projects have been and are being sought in which students can participate in research for a few months in the other partner country and institute; in some cases, cooperations already exist. RESIST researchers who would like to host PhD students from Glasgow or send PhD students to Glasgow are welcome to contact the RESIST office: RESIST@mh-hannover.de.

To further develop the partnership, exchange visits and a joint symposium are planned for 2022. A joint DFG proposal for an international research training group is then planned for mid-2023, to start at the beginning of 2024.

Influential **RESIST researchers**

Prof. Dr. Michael Manns, Prof. Dr. Alice McHardy and Prof. Dr. Thomas Werfel are among the most cited scientists in the world. This was the result of the evaluation "Highly Cited Researchers 2021" by the US company Clarivate Analytics. The three RESIST members are listed in the "Cross-Field" category, which includes researchers who have an impact on science beyond their actual field of work.

Prof. Manns is a founding member of RESIST and currently has an advisory role on the RESIST Research Management Board as president of the MHH. Prof. McHardy, head of the Department of Bioinformatics of Infection Research at the HZI in Braunschweig, and Prof. Werfel, deputy director of the MHH Department of Dermatology, Allergology and Venereology and head of the Department of Immunodermatology and Experimental Allergology, are involved in various RESIST projects.

The "Web of Science", in which all citations of scientific studies are collected, serves as the basis for this list. For the evaluation, the scientific publications of the past ten years were analysed and the frequency that the researchers' work was cited by colleagues from the scientific community in their publications was examined. The number of citations serves as a measure of the scientific influence as well as the reputation of the journal in which work is published. The entire list of "Highly Cited Researchers 2021" and further information can be found on the Web of Science website at www.clarivate.com.

Prof. Manns

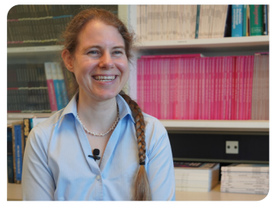
Prof. McHardy

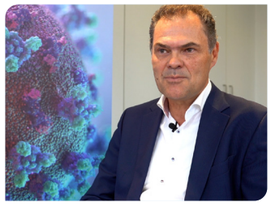
Prof. Werfel

Corona research to watch

HOW CAN PEOPLE BE PROTECTED FROM CORONA DISEASE WITH ANTIBODIES? HOW LONG DOES THE CORONA VACCINE LAST? AND HOW DOES THE BODY DEFEND ITSELF AGAINST NEW VIRUSES? TWO NEW RESIST VIDEOS REVOLVE AROUND THESE QUESTIONS.

Dr. Saskia Stein
Prof. Dr. Ulrich Kalinke





In the first video, Dr. Saskia Stein from the research group of Prof. Dr. Thomas Schulz at the MHH Institute of Virology explains research for people who cannot be vaccinated against SARS-CoV-2 or whose antibodies in response to vaccination do not develop well or are too weak. To prevent those affected from contracting Corona too severely, they will be given neutralising antibodies that prevent the viruses from entering the cells – prophylactically or as soon as possible after an infection.

"We have already found a handful of antibodies that can neutralise both the wild type of the SARS-CoV-2 virus and the different variants currently circulating in the world. These antibodies are currently being tested in animal models," explains Dr. Stein, describing the current status of this MWK-funded project, which is being conducted in cooperation with Prof. Dr. Thomas Krey's working group at the University of Lübeck, in which numerous RESIST researchers participate. How they managed to track down these highly potent antibodies, produce them themselves by genetic engineering and even test them on other coronaviruses with pandemic potential – you can find out in the new video on the RESIST homepage at www.RESIST-cluster.de/en.

It is worth clicking on the page because there you can also watch another new video in which Prof. Dr. Ulrich Kalinke explains the exciting question of how the Corona pandemic can advance research and ultimately improve vaccines. "For example, it is now possible for the first time to research how immune responses against new viruses are initiated in humans," says the Twincore CEO. In the video, he describes research into memory B cells, which are created as part of the immune response. His team fishes memory B cells out of the blood of people who have recovered from Corona to read the sequences of virus-neutralising antibodies from these cells. Based on this information, the team has developed dozens of virus-neutralising monoclonal antibodies, which are now being further developed towards clinical application. Ultimately, this research will also contribute to finding out how vaccines induce long-lasting protection against Corona.

RESIST Seminars

Exciting topics, interestingly presented: Every Thursday (except during school holidays), one or two RESIST researchers or top-class researchers from external institutions present their projects in the RESIST seminar series for RESIST and SFB 900 members as well as for other colleagues and, of course, interested students.

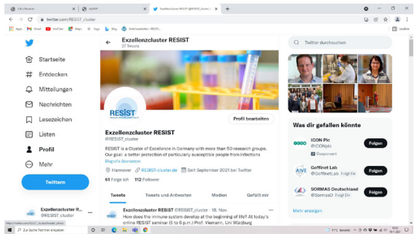
There have already been around 50 RESIST seminars – with presentations by more than 80 researchers and external scientists. So far, the events have always taken place between 5 and 6 pm. From 2022, this is to change – as this is "family time" for many. The seminars will then take place between 1 and 2 pm.

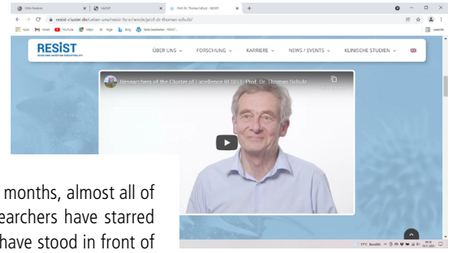
Another change will take place after the evaluation, i.e. from the second week of March 2022. The content of the seminars will then change: It will no longer be about the research of the respective lecturer, but more about the RESIST projects, in which several researchers are usually involved. The exact dates of the seminars as well as the names and topics of the speakers will be sent to you by e-mail and they will also be announced on the RESIST homepage www.RESIST-cluster.de. We wish all participants interesting lectures, listening and discussions.

RESIST is on **Twitter**

RESIST has been on Twitter since September and already has more than 115 followers: You can find out the latest news under @RESIST_cluster. For example, you can see our latest videos, current events and publications, as well as everything else about our research and the scientists in our team.

Feel free to write, quote and follow us – and we hope you enjoy watching and reading.





Prof. Schulz reports on his research

Videos of our researchers

In the past few months, almost all of the RESIST researchers have starred in a film. They have stood in front of the camera and talked about themselves and their research – for example Prof. Dr. Thomas Schulz, who can be seen in the photo. The more than 40 appealing and informative resulting videos can now be seen on the RESIST homepage – embedded in the pages of the respective scientists at www.resist-cluster.de/en/about-us/research-team/. Many thanks to all for making this project a success. Please feel free to link to the videos from your department or institution's website. Thank you very much.

RESIST funds female researchers

Dr. Jasmin Zischke
Dr. Lisa Osbelt

RESIST has been funding female researchers Dr. Jasmin Zischke, a postdoc from the MHH Institute of Virology, and Dr. Lisa Osbelt, a postdoc from the HZI Institute of Microbial Immunoregulation, to participate in the TRAIN Academy's two-year in-work training programme "Translational Research and Medicine: From Idea to Product" since October 2021. The programme is aimed at medical doctors and natural scientists with a doctorate and at least two years of professional experience. The TRAIN Academy is part of the Translational Alliance in Lower Saxony (TRAIN), an association of ten research institutions that links biomedical know-how in Lower Saxony.

Ten years of the **LISA Summer Academy**

About a dozen RESIST researchers participated in the "Lower Saxony International Summer Academy in Immunology" (LISA) 2021 programme as lecturers. This year, the one-week summer academy took place for the tenth time – due to the Corona pandemic, however, it was exclusively online and unfortunately also without the laboratory rotations that are usually offered, or the cultural supporting programme and the informal get-togethers with alumni and speakers. The digital training programme consisted of lectures, keynote lectures, a workshop and a virtual lab tour as well as poster presentations. If the situation allows in 2022, this academy will then take place again as an in person event at the usual scale. More information can be found on the internet at: **www.mhh.de/hbrs/lisa.**

RESIST – About us

Funded by DFG Deutsche Forschungsgemeinschaft German Research Foundation

The clinicians and scientists working in the Cluster of Excellence RESIST (Resolving Infection Susceptibility) aim to offer scientific excellence for the people most vulnerable to infections. RESIST researchers work at **Hannover Medical School** (MHH), **TWINCORE** Centre for Experimental and Clinical Infection Research, **Helmholtz Centre for Infection Research** (HZI) in Braunschweig, **Centre for Structural Systems Biology** (CSSB) Hamburg, **Centre for Chronic Immunodeficiency** Freiburg (CCI) and the **University of Veterinary Medicine Hannover**, Foundation (TiHo). The work of the Cluster of Excellence RESIST is funded by the **German Research Foundation** (DFG).

Ask the **Uni**

IN ADDITION TO THEIR WORK IN RESEARCH AND TEACHING, EIGHT RESIST SCIENTISTS HAVE DEDICATED THEMSELVES WITH GREAT COMMITMENT AND SKILL TO COMMUNICATING THEIR RESEARCH TO YOUNG PEOPLE. THEY WORKED IN PAIRS TO MAKE VIDEOS ANSWERING SCHOOLCHILDREN'S QUESTIONS ABOUT INFECTIONS.

The young people asked the questions as part of the Leibniz University Hannover's UniKik school project under the heading "Ask the Uni" on Instagram. Prof. Dr Sarina Ravens and Dr Annett Ziegler, for example, took on the question "What happens in the body during an infection?" and answered it in a very entertaining and descriptive way, with numerous details and yet very clearly in their self-produced video. This work has even officially become the most successful part of the entire "Ask the Uni" series.

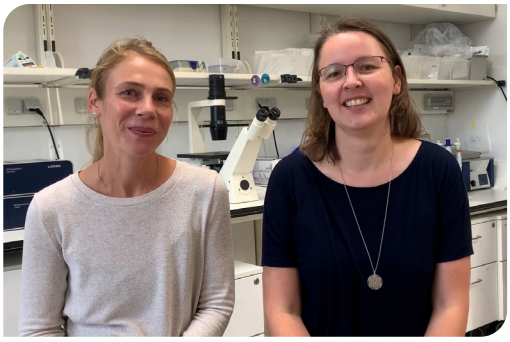
What the difference is between a healthy and a weakened immune system – that is what Carla Seegers and PD Dr Jens Bohne show in an easily understandable way and also with memorable drawings. They go into detail about the components of the immune system and what can cause it to be weakened.

The short film by Prof. Dr Sabrina Schreiner and Prof. Dr Jens Bosse focuses on the consequences an infection can have for immunocompromised people. Both also provide insights into their respective work in Hanover and Hamburg. With the friendly support of their team members, they explain in a very entertaining way how some viruses can become very dangerous for some people.

Dr Henrike Ahsendorf and Maike Willers show what one can do to ensure that one's own body is well armed against viruses with numerous ideas and props. The message for the pupils: we are not helplessly at the mercy of viruses and bacteria.

The lovingly designed works, which are interesting for everyone, can be seen on the RESIST homepage at
https://www.resist-cluster.de/en/career/promoting-young-talent/.

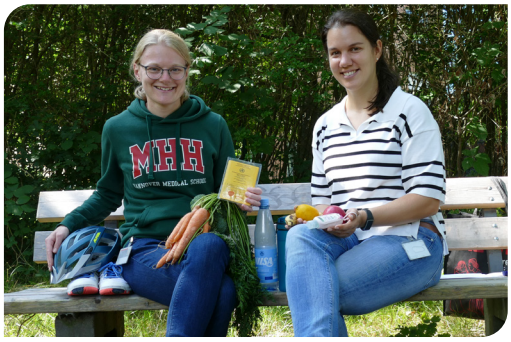
Have fun watching!



In the lab in front of the camera: Prof. Ravens and Dr Ziegler (from left).

From Hamburg and Hanover: Prof. Schreiner and Prof. Bosse (from left).

Filmed in the office: Carla Seegers (photo) made the video with PD Dr Bohne.



Outside shooting: Maike Willers and Dr Henrike Ahsendorf (from left).