

The ins and outs of virus infection: from binding to exit

Meeting report of the 16th Workshop “Cell Biology of Viral Infections” of the German Society of Virology (GfV) in Schöntal, November 8th–10th 2017.

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Group photo with 2017 workshop participants in the main entrance of the Kloster Schöntal.

The GfV workshop “Cell Biology of Viral Infection” aims at bringing together virologists and cell biologists with the intention to promote and encourage collaborations on cell biological aspects of virus infections. The 2016 Lasker award to the cellular virologists Prof. Ralf Bartenschlager and Prof. Charles M. Rice demonstrated once again that cell biological studies are needed to understand fundamental principles of virus infection, which may then enable clinical research. The research of the four keynote speakers of the 2017 meeting also perfectly illustrates this concept.

Dr. Pierre-Yves Lozach (Heidelberg) and Dr. Gisa Gerold (Hannover) took on the organization of the

16th annual workshop. The conference was held at the Kloster Schöntal, Germany, for the fourth consecutive time; this year from November 8th to 10th 2017. All participants stayed directly at the conference site, which stimulated active discussions during lunch and dinner gatherings as well as during the social events such as the wine tasting in the cellar.

The theme of this year was “The ins and outs of virus infection: from binding to exit”. The program included four keynote lectures, a workshop on scientific editing, 24 oral presentations, and a poster session. The workshop was a great success with 48 participants, involving among others 26

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students, six post-docs, and seven young group leaders. The majority of the junior scientists were virologists from various German academic research institutes, but also French and Austrian scientists came to the former Cistercian monastery. The four excellent keynote speakers from Switzerland, USA, and Germany as well as the enthusiastic participants significantly contributed to the success of the workshop. We were extremely satisfied that students actively participated in the lively discussions with their colleagues including the keynote speakers.

The workshop opened with the inspiring keynote lecture “Cell biology of influenza virus uncoating” given by the emeritus Prof. Ari Helenius from the Swiss Federal Institute of Technology (ETH) in Zürich, Switzerland. Prof. Helenius dedicated his career to studying intracellular trafficking and protein folding using viruses as functional cargo. His work is an excellent illustration of how viruses can contribute to improve our understanding of complex cell biological processes. During his keynote, Prof. Helenius highlighted the various strategies that viruses use to hijack cellular mechanisms for cell entry. In the second part of his presentation he focused on endocytic cellular factors subverted by influenza virus for entry including uncoating.

Prof. Beate Sodeik from the Hannover Medical School, Germany gave the second enlightening keynote, entitled “The importins of herpes simplex virus replication”. Prof. Sodeik investigates cell entry, trafficking and assembly/exit of alpha-herpesviruses with a major focus on Herpes simplex virus type 1 (HSV1). She discussed the transport of HSV1 in human neurons and the host cell proteins that guide HSV1 capsid to the nucleus, where the viral genome is released into the nucleoplasm at the nuclear pore. She put a particular emphasis on the role of importins in axonal transport within neurons and introduced exciting imaging techniques in conjunction with *in vitro* culture systems for murine neurons.

The third exciting keynote, “New twists on enveloped virus entry and exit”, was given by Prof. Margaret Kielian from the Albert Einstein College

of Medicine in New York, NY, USA. Prof. Kielian started her lecture by reporting on research that spanned almost her entire career: membrane fusion proteins. She has used among other proteins the Semliki Forest virus (SFV) envelope glycoprotein E1 as a fusion protein model and also explained how this protein plays a critical role in SFV cellular life cycle, both during entry and exit. The second part of her presentation described the exciting new phenomenon of intercellular extensions formed by alphavirus infected cells and how they are used for cell-to-cell transmission.

Prof. Stefan Pöhlmann from the Leibniz Institute for Primate Research in Göttingen, Germany, gave the final keynote on “Virus-activating host cell proteases: determinants of cell entry and pathogenesis, targets for intervention”. He beautifully described the role of host proteases in activation/priming required during entry of diverse enveloped viruses including emerging viruses such as SARS coronavirus and Ebola virus. He demonstrated the important role of serine proteases in influenza A virus activation in human cells and animal models, and concluded with promising studies in non-human primate models with the perspective to develop new antiviral strategies.

This year, for the first time a short interactive session on scientific editing was organized. Dr. Sarai Rodriguez-Navarro, an associate editor at the journal *Viruses* (MDPI publishing group), gave an entertaining and insightful talk on the editorial process, pitfalls during manuscript submission, and Open Access publishing. This provided an excellent platform for students to interactively discuss questions regarding the submission of their scientific work to international peer-reviewed journals.

Among the many excellent student presentations, the prize committee had the hard task to select two prizewinners. Venkat Raman Ramnarayan from the group of Dr. Sebastian Springer at Jacobs University in Bremen was awarded the prize for the best student oral presentation with the title “The p24 family protein TMED10 / Tmp21 / p24 δ 1 anchors m152 / gp40 in the endoplasmic reticulum to abolish MHC class I surface expression”.

Due to the high numbers of registrations, the 2017 workshop featured a poster session in addition to the oral communications. The poster session was extremely well attended with many fruitful discussions in a friendly environment. Dr. Miriam Becker from the lab of Dr. Mario Schelhaas at the University of Münster received the award for the best poster presentation for her work on the “Entry of Merkel cell polyomavirus into A549 cells”.

According to immediate feedback from participants ranging from students to keynote speakers, everybody praised the high quality of all presentations, the friendly and engaging discussions that lasted until the last glass of wine. In particular the students appreciated the feedback on their work and new insights into other topics in Cell Biology of Viral Infections.

The organizers would like to thank the German Society for Cell Biology (DGZ) and the Society for Virology (GfV) for their support. The workshop would also not have been possible without generous contributions from the Chica and Heinz Schaller (CHS) Foundation as well as the companies ReBlikon, MDPI, and Becton Dickinson.

We already look forward to the 17th annual workshop, which will be held again at the Kloster Schöntal, October 15th–17th 2018, with the new exciting theme, “High resolution approaches in virology: from cell ultrastructure to OMICS”. More information and updates can be found on the workshop’s website (www.gfv-cellviro.de).