#15, May 2022

KNVM Virology News

Dear fellow virologist,

It was recently announced that Esther Nolte 't Hoen (Utrecht University) and Sander Herfst (Erasmus MC) were awarded an NWO **VICI grant** for their research on extracellular vesicles in virus-host interactions and transmission of respiratory viruses, respectively. See below for a short interview with Esther and Sander.

The next **DYVS** is scheduled for Wednesday June 22nd, be sure to mark your calendar! If you are a PhD-student and would like to present your research to the Dutch virology community, do not hesitate to submit your abstract for consideration.

The board of the Virology division of the KNVM
(Emmanuel Wiertz, Jolanda Smit, Ronald van Rij, Bart Haagmans,
Katja Wolthers, Martijn Langereis, and Puck van Kasteren)

Virology events

June 12-17, 2022
NSV2022

June 22, 2022
DYVS

July 16-20, 2022
ASV2022

July 18-22, 2022
VoM2022

July 20-22, 2022
IUMS2022

Virology Double-Interview

Esther Nolte 't Hoen
Associate professor
Veterinary Medicine
Utrecht University

What is your main research focus?

My work focuses on tiny membrane particles called extracellular vesicles (EVs), which mediate intercellular communication in all kingdoms of life by transferring protein- and RNA-encoded messages. Picornaviruses exploit this form of communication and escape infected cells packaged in specific subsets of EVs during the pre-lytic stage of infection. The EV 'coat' changes the 'seeing and being seen' of the naked virus, and this is why we study the role of these EVs in picornavirus dissemination and antiviral responses.

Why is your research important?

Because for most picornaviruses no vaccine or antiviral is available, it is important to increase our fundamental understanding of these viruses and their mechanisms of infection. Our work addresses how packaging in EVs endows picornaviruses with novel functional properties, which affect their recognition by neutralizing antibodies, transportation over cellular barriers, and activation of immune cells. Unravelling the underexposed role of EVs in the picornavirus life cycle and in virus-host communication can guide future vaccination strategies and development of antiviral therapies.

Of which accomplishment are you most proud?

We are one of the few groups in the world that can perform flow cytometric analysis and sorting of individual EVs. Using this technique we discovered that picornaviruses induce multiple different EV-subpopulations and that only particular EV-subsets can effectively spread the infection. This illustrates the power of the technology to reveal the compositional and functional heterogeneity of virus-induced EVs.

Sander Herfst
Assistant professor
Dept. of Viroscience
Erasmus MC

What is your main research focus?

In recent years, I have studied the transmissibility and pathogenesis of influenza viruses. Currently, my research group focuses on the viral, host and environmental factors that influence the transmission efficiency of respiratory viruses such as influenza viruses, coronaviruses and HMPV. To this end, my team has designed and built experimental systems to study the three stages of respiratory virus transmission via the air in detail: virus expulsion by the donor, the airborne phase and infection of a new recipient.

What is your favourite virus?

Influenza viruses are incredibly interesting because of their broad host range, their ability to adapt to new hosts, and their efficient way of escaping population immunity. Despite being one of the most studied viruses, there are still many fundamental questions that need to be answered.

Why is your research important?

Even after two years of COVID-19 pandemic, there is still much debate about the route by which SARS-CoV-2 is predominantly transmitted between individuals. The same is true for many well-known respiratory viruses such as RSV, HMPV, parainfluenza virus and the seasonal coronaviruses. Knowledge about the routes and efficiency of transmission and the factors influencing them will provide a more solid scientific basis for preparedness against respiratory viruses that cross the species barrier to humans and for designing or improving intervention strategies to prevent outbreaks or even pandemics.

Recent publications

Rijsbergen, L. C., Schmitz, K. S., Begeman, L., Drew-Bear, J., Gommers, L., Lamers, M. M., Greninger, A. L., Haagmans, B. L., Porotto, M., de Swart, R. L., Moscona, A., & de Vries, R. D. (2022). Modeling Infection and Tropism of Human Parainfluenza Virus Type 3 in Ferrets. mBio, 13(1), e0383121. doi:10.1128/mbio.03831-21

Rosu, M. E., Kok, A., Bestebroer, T. M., de Meulder, D., Verveer, E. P., Pronk, M. R., Dekker, L., Luider, T. M., Richard, M., van den Brand, J., Fouchier, R., & Herfst, S. (2022). Contribution of Neuraminidase to the Efficacy of Seasonal Split Influenza Vaccines in the Ferret Model. Journal of virology, 96(6), e0195921. doi:10.1128/jvi.01959-21

Bhatt, D. K., Wekema, L., Carvalho Barros, L. R., Chammas, R., & Daemen, T. (2021). A systematic analysis on the clinical safety and efficacy of onco-virotherapy. Molecular therapy oncolytics, 23, 239–253. doi:10.1016/j.omto.2021.09.008