

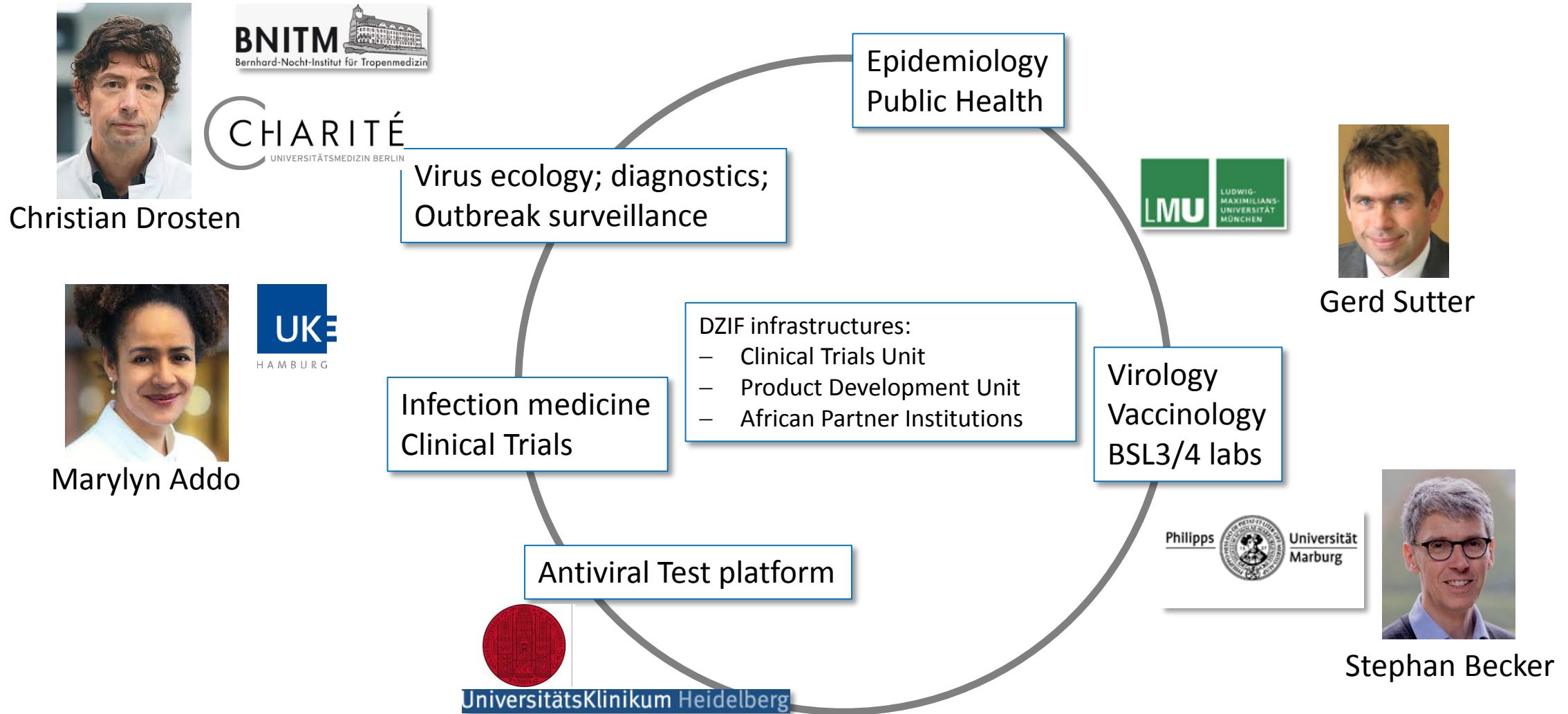


MVA-SARS-2-S

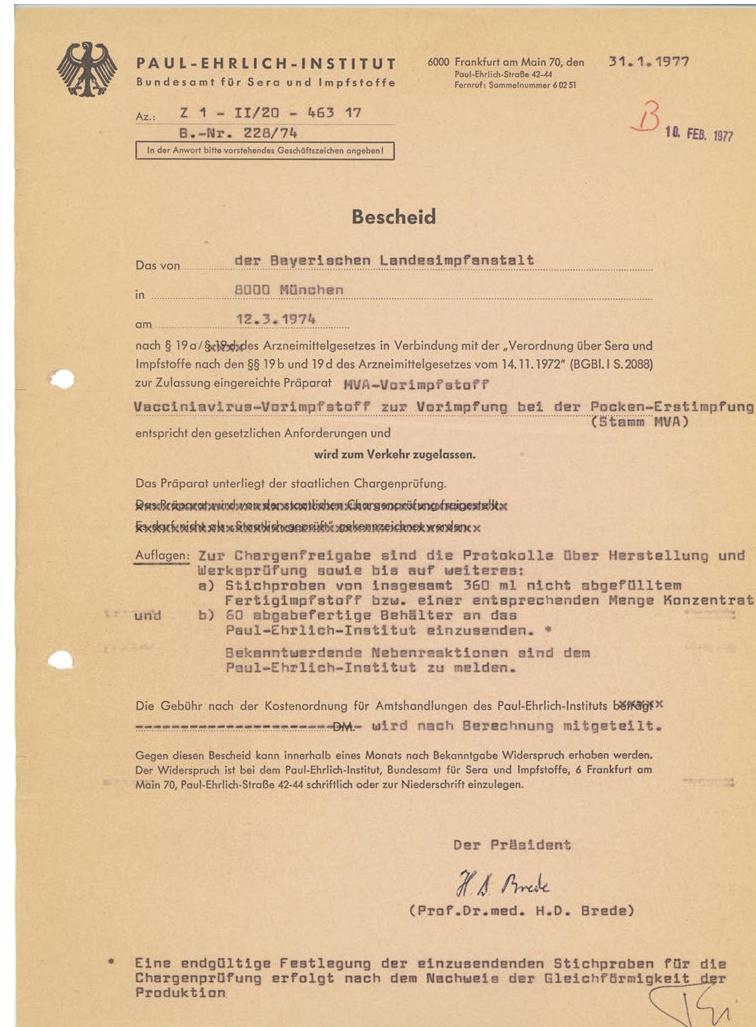
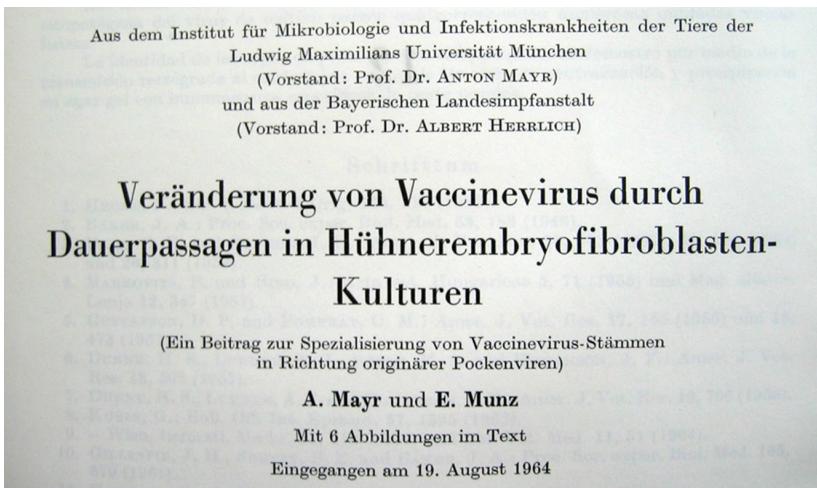
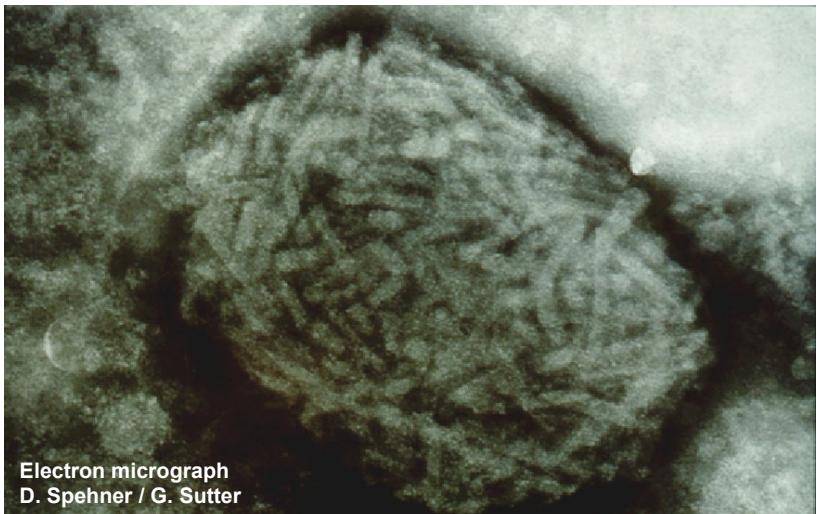
DZIF COVID-19 vaccine candidate

Marylyn M. Addo (UKE), Stephan Becker (UMR), Gerd Sutter (LMU),
Andreas Neubert (IDT), Thomas Hesterkamp (PDU-DZIF)

DZIF - Emerging Infections

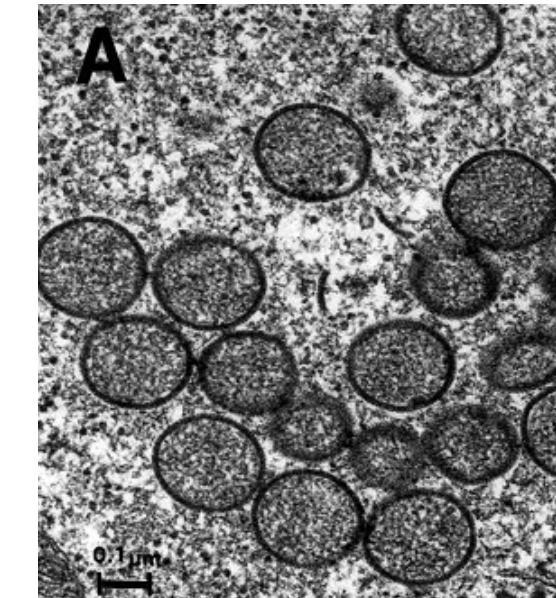
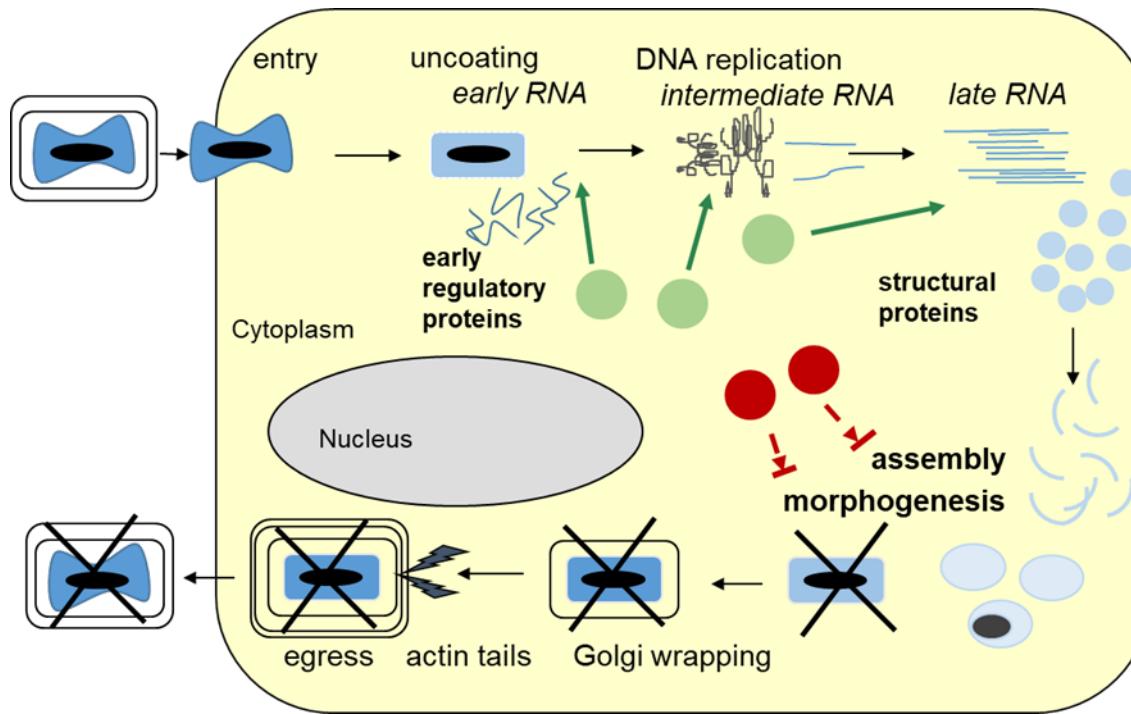


Portrait of vaccinia virus MVA



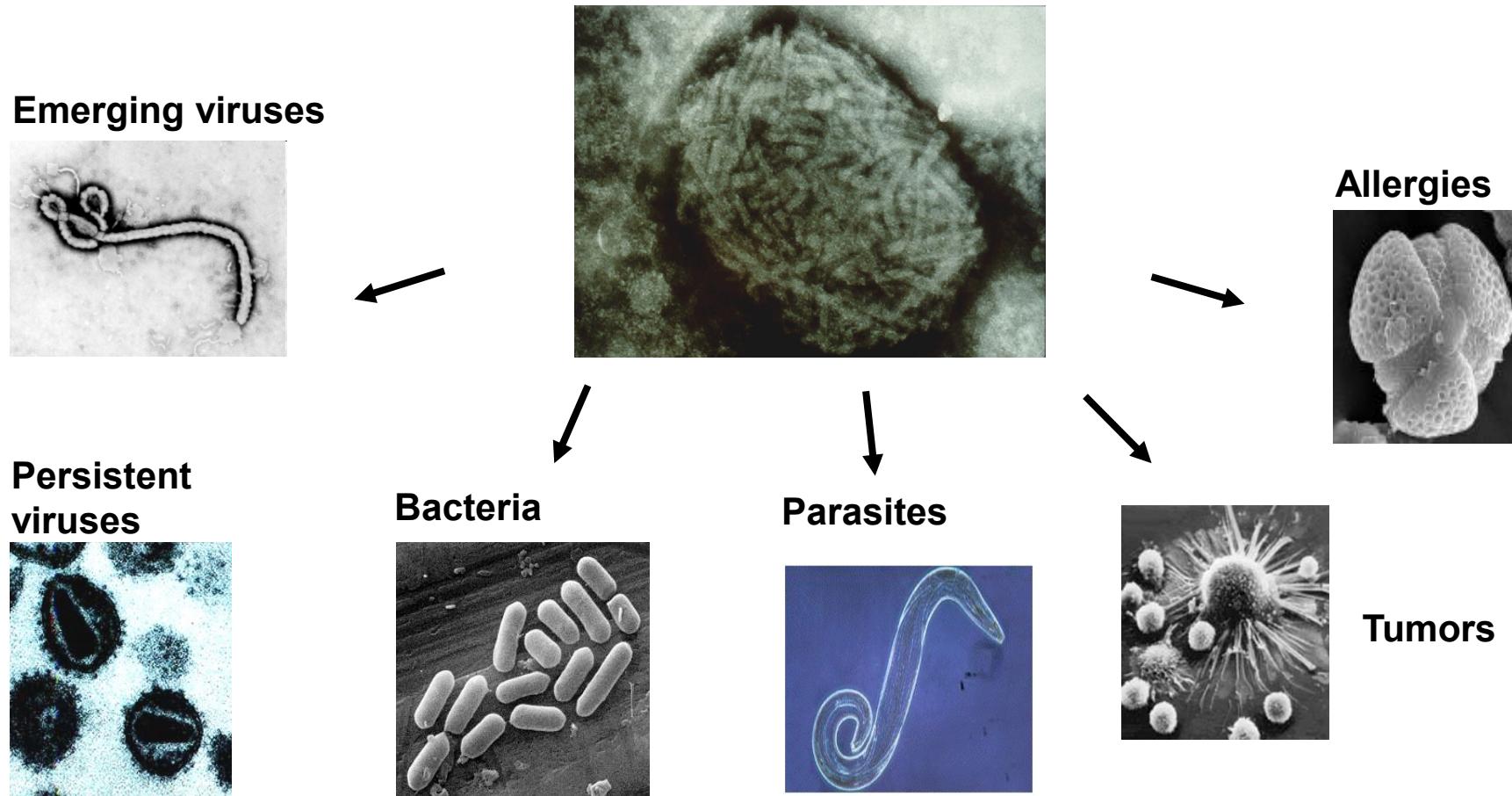
MVA as vector for gene expression and vaccination

- non-replicating virus in mammalian hosts, high level of biological safety
- efficient production and delivery of heterologous antigens
- experience with various vector vaccines in clinical testing

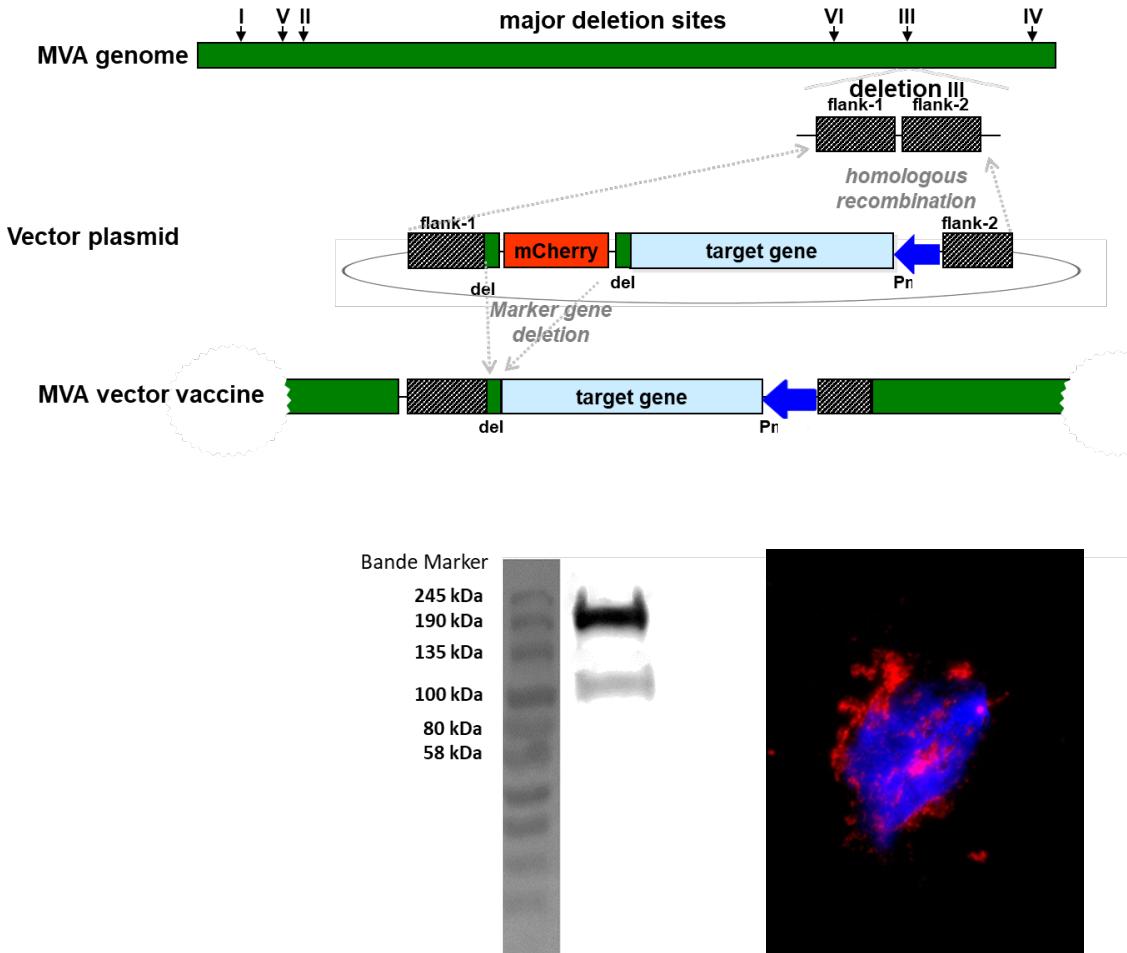


Sutter & Moss, 1992, Sutter et al., 1994

MVA vectors as candidate vaccines



MVA-SARS-2-S: Design and preclinical testing



- MVA platform technology based on MVA F6 LMU
- Expression of full-length SARS-CoV-2 S gene sequence
- Production of mature ~190 kDa spike glycoprotein
- Genetic homogeneity, genetic identity, genetic stability
- Full growth capacity in cell substrate for manufacturing
- Immunizations in mice induce spike protein-specific antibodies and T cells
- Protective efficacy in mice against SARS-CoV-2 infection

MVA-MERS-S as blueprint

- Based on validated recombinant Modified vaccinia virus Ankara vector platform, MVA-SARS-2-S was designed to follow the **MVA-MERS-S development**
 - Song F et al., 2013
 - Volz A et al., 2015
 - Koch T/Dahlke C et al., 2020



Introduction to IDT Biologika



Owner

Klocke Holding GmbH
Carsten Klocke and Stefan Klocke (CEOs)

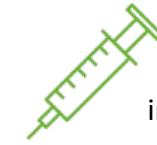


1,600
employees in
2019



€ 209 m

turnover in 2018



€ 440 m

invested by IDT since
1993



Worldwide

confidence in the services provided by IDT from global pharmaceutical and biotech industry, government and scientific research.

BSL2 development and production facilities | EMA and FDA compliance, ANVISA ready



Rockville U.S.A.

Clinical test materials for vaccines

- Contract development
- Clinical test materials for clinical phases I to II
- Filling and finishing
- Quality control and analysis

Magdeburg, Germany

Development Site for recombinant vaccines

- Process characterization and development

Dessau-Rosslau, Germany

Viral vaccines, Genetherapy and immunotherapeutic products

- Contract development
- Clinical test materials for clinical phases I to III
- Commercial production

Biologicals

- Filling and finishing
- Packaging
- Quality control and analysis

Further clinical development program MVA-SARS-2-S (Spike)



SARS-CoV-2: IDT Biologika füllt Impfstoffkandidat ab

 NEWS ABONNIEREN



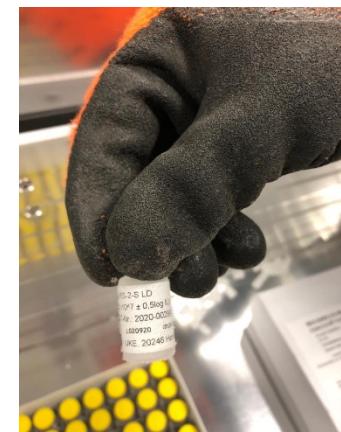
Klinische Phase steht kurz vor dem Start

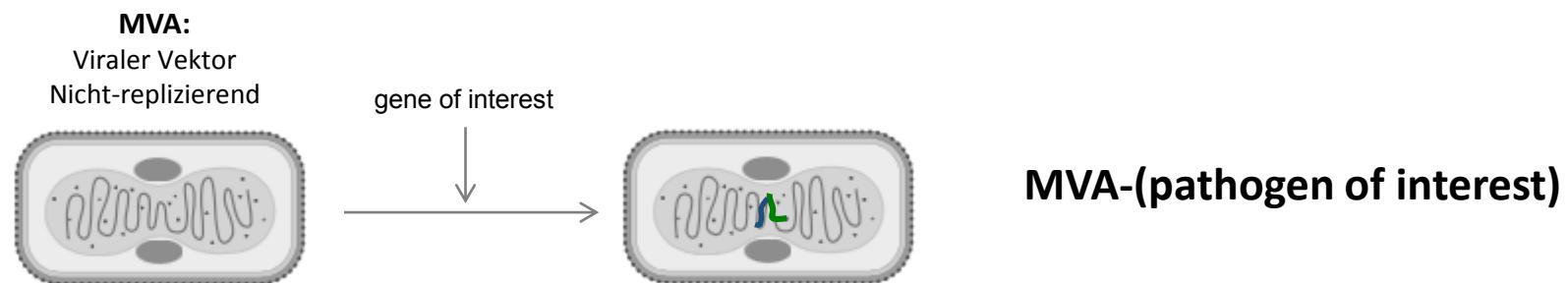


Phase 1 Studie at UKE Study initiation 30.9.2020



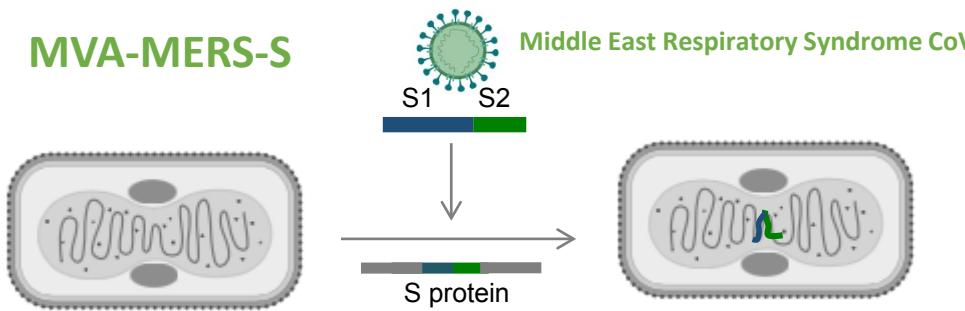
Arrival of the vaccine
UKE 1.10.2020





DZIF clinical portfolio for MVA vaccines- all investigator-initiated trials (IIT):

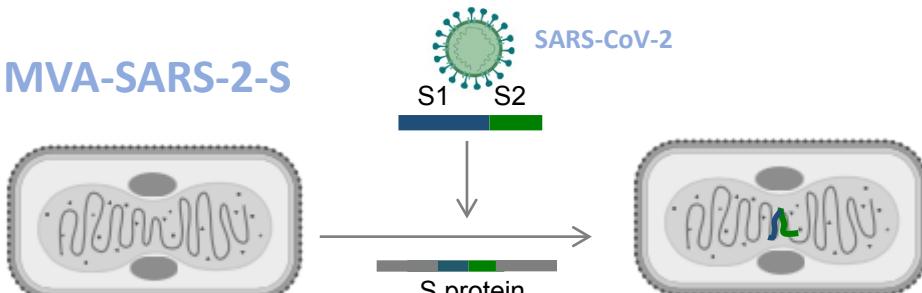
MVA-MERS-S



- **Phase Ia Studie:** UKE, financing DZIF
- completed. (Koch, Dahlke et al., 2020)



MVA-SARS-2-S



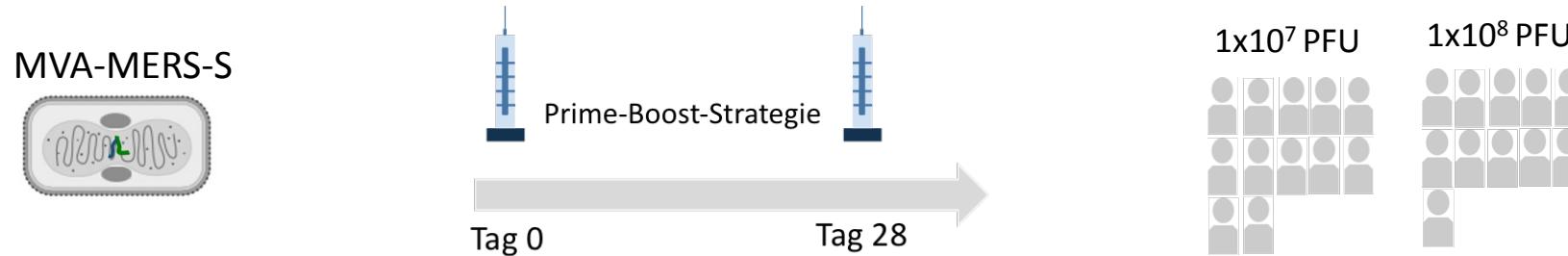
- **Phase Ib/II Studien:** CEPI-funded project
- consortial partners DZIF, IDT, EMC & CR2O (Niederlande)
- Development program still ongoing
- Phase 1b Start planned for end of 2020

CEPI

- **Phase I Studie:** financing DZIF (initiated 30.9.2020)
- **Phase II/III Studien:** BMBF-Förderung (IDT)



Clinical testing of a corona vaccine against MERS-CoV: MVA-MERS-S: Blueprint for MVA-SARS-S



Safety and immunogenicity of a modified vaccinia virus Ankara vector vaccine candidate for Middle East respiratory syndrome: an open-label, phase 1 trial



Till Koch*, Christine Dahlke*, Anahita Fathi, Alexandra Kupke, Verena Krähling, Nisreen M A Okba, Sandro Halwe, Cornelius Rohde, Markus Eickmann, Asisa Volz, Thomas Hesterkamp, Alen Jambrecina, Saskia Borregaard, My L Ly, Madeleine E Zinser, Etienne Bartels, Joseph S H Poetsch, Reza Neumann, Robert Fux, Stefan Schmiedel, Ansgar W Lohse, Bart L Haagmans, Gerd Sutter, Stephan Becker, Marylyn M Addo

**100% Seroconversion
in HD Gruppe**

Summary

Background The Middle East respiratory syndrome coronavirus (MERS-CoV) causes a respiratory disease with a case fatality rate of up to 35%. Given its potential to cause a public health emergency and the absence of efficacious drugs or vaccines, MERS is one of the WHO priority diseases warranting urgent research and development of countermeasures. We aimed to assess safety and tolerability of an anti-MERS-CoV modified vaccinia virus Ankara (MVA)-based vaccine candidate that expresses the MERS-CoV spike glycoprotein, MVA-MERS-S, in healthy adults.

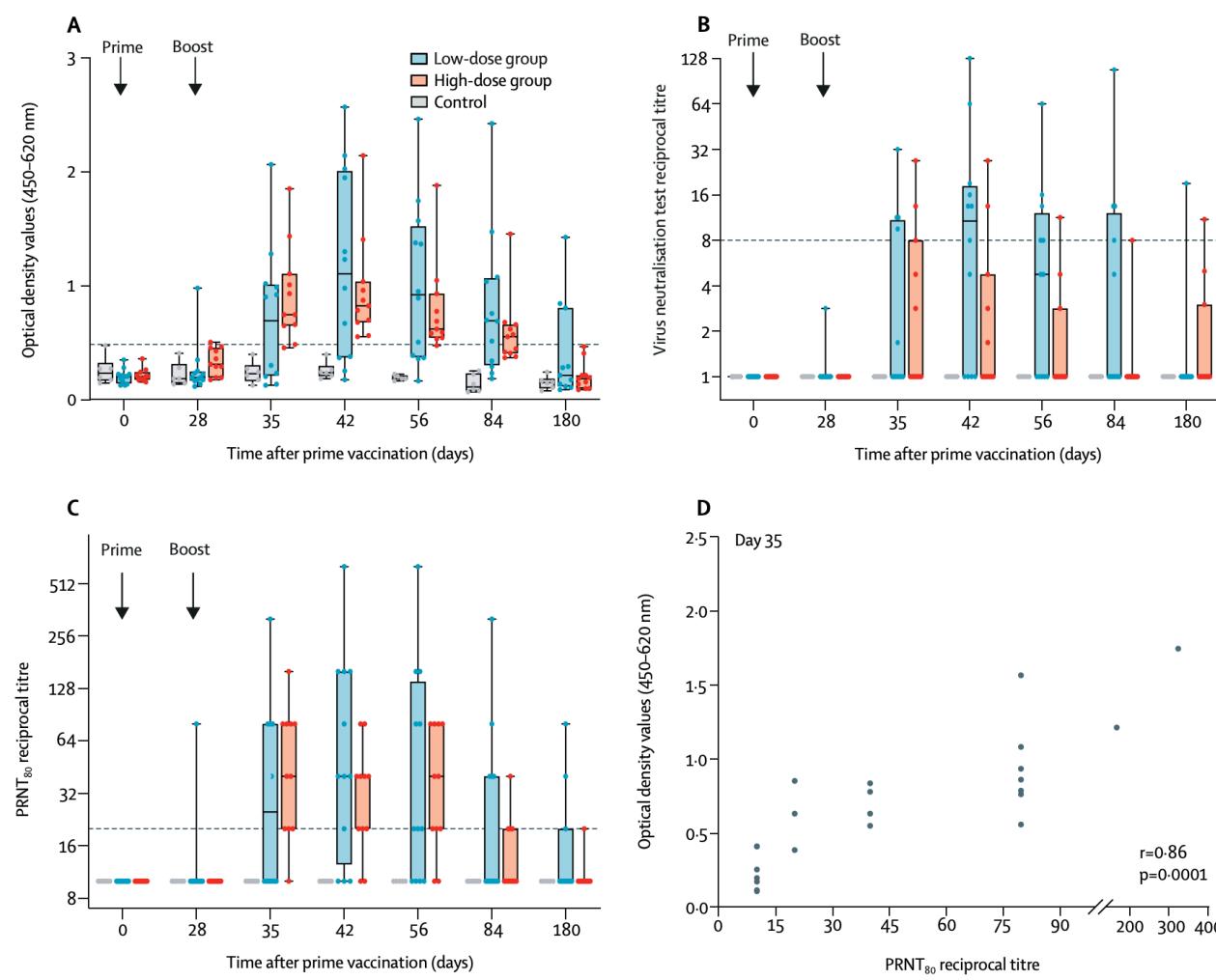
Lancet Infect Dis 2020;
20: 827–38
Published Online
April 20, 2020
[https://doi.org/10.1016/S1473-3099\(20\)30248-6](https://doi.org/10.1016/S1473-3099(20)30248-6)

The vaccine was well tolerated.

Antibody and T-cell responses were generated.

MVA-MERS-S showed robust immune responses & 100% seroconversion in the high dose group

ELISA



Virus Neutralization



PRNT80

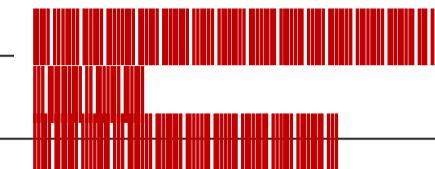
Now approved: Phase I study MVA-SARS-2-S (responsible as sponsor according to AMG: UKE)

Study design is almost identical to the Phase 1 vaccine study against MERS-CoV

Phase I study initiation after approval by Ethics Committee (27.9) and PEI approval on 30.9.2020. First vaccinations planned for October 2020

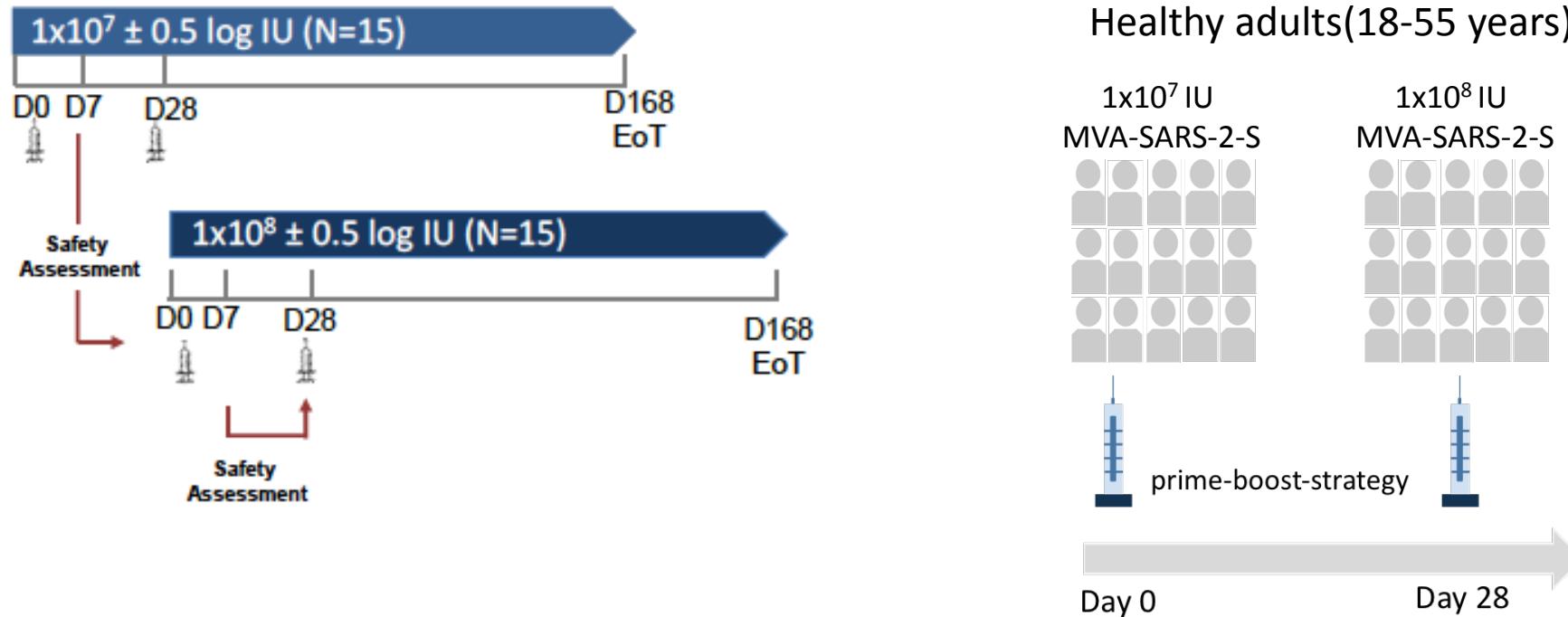
An open-label, single-center Phase I trial to assess the safety, tolerability and immunogenicity of two ascending doses of the candidate vaccine MVA-SARS-2-S

EudraCT No.	2020-002998-10
Protocol No.	UKE-DZIF-SARS-CoV-2
Version/Date	3.0 / 22 SEP 2020
Sponsor	University Medical Center Hamburg-Eppendorf Martinstr. 52 20246 Hamburg, Germany
Coordinating Investigator	Prof. Marylyn M. Addo, MD, PhD, MSc, DTM&H University Medical Center Hamburg-Eppendorf I. Department of Medicine Martinstr. 52 20246 Hamburg, Germany



Long-term collaboration for early clinical trials with the Clinical Trial Center North.





Primary Objectives

Evaluation of **safety and tolerability** of two intramuscular dose administrations and two ascending dose levels of MVA-SARS-2-S in healthy adults

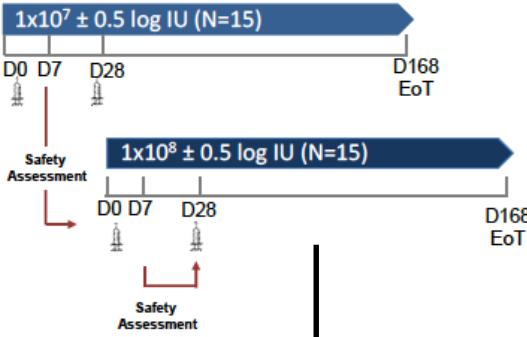
Secondary Objectives

to quantify **binding antibodies against the SARS-CoV-2 spike protein** and to **evaluate seroconversion rates** in healthy adults after two dose levels and two administrations of MVA-SARS-2-S

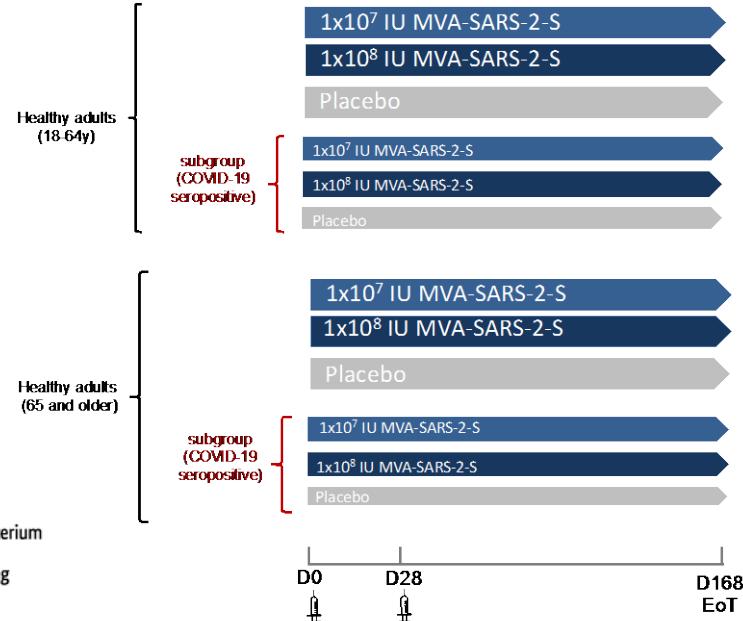
Outlook:

How does the current approval of the phase 1 study fit into the overall development program?

Phase I DZIF



**1. Impfung
Oktober 2020**



Phase II



Bundesministerium
für Bildung
und Forschung

**Sponsor: UKE
Multi-center study
n=600
Q4/2020**



**Sponsor: Klinikum
München
Multi-center study
N>20000
2021**

Phase III



Thanks to the team !

Back up slides

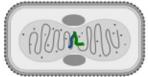
Frühere Studien

MVA



- 1968-1985: MVA wurde als Impfstoff gegen Pocken verwendet
- Mehr als 120 000 Menschen wurde mit MVA geimpft
- Es wurden keine schweren Nebenwirkungen beobachtet

Rekombinanter
MVA



- Vektorimpfstoff MVA (gegen HIV, Tuberkulose, Ebola etc.)
- Mehr als 7500 Menschen mit einem rMVA geimpft
- Mehr als 247 Studien registriert
- Mehr als 1000 Menschen mit einem schwachen Immunsystem geimpft
- Verträglichkeit in Kindern