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Immunogenicity and efficacy of a MVA vaccine expressing spike and nucleocapsid antigens against SARS-CoV-2 challenge infection in the k18-hACE2 mouse model

Inhalt

An important countermeasure against infectious diseases is the development of protective and safe vaccines. This has been demonstrated by the COVID-19 pandemic, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). In this context, the combination of different target proteins within a candidate vaccine seems to be an interesting approach to further improve vaccination strategies.
The aim of this study was to characterize the immunogenicity and efficacy of Modified Vaccinia virus Ankara (MVA) based candidate vaccines expressing either the SARS-CoV-2 S-protein (MVA-S) or the SARS-CoV-2 S- and N-protein (MVA-S/N) in the k18-hACE2 mouse model.
Groups of mice were vaccinated with MVA-S or MVA-S/N comparing a prime and prime-boost vaccination regime, followed by SARS-CoV-2 infection. All animals were monitored for clinical symptoms and the viral loads in lung and brain tissue. In addition, we also characterized the SARS-CoV-2 specific immune responses.
MVA-S and MVA-S/N robustly protected the mice against SARS-CoV-2 challenge after prime-boost and also after single vaccination. We confirmed the robust activation of neutralizing antibodies and the activation of S-specific T cells after vaccination. Interestingly, MVA-S/N vaccination appears to induce slightly improved protection in these mice. Ongoing work focuses on the identification of potential immune correlates of this improved protection.

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SARS-CoV-2, MVA, Antibodies, T cells

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Professional Status of the Speaker

PhD Student

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Yes, I am a Junior Scientist.

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