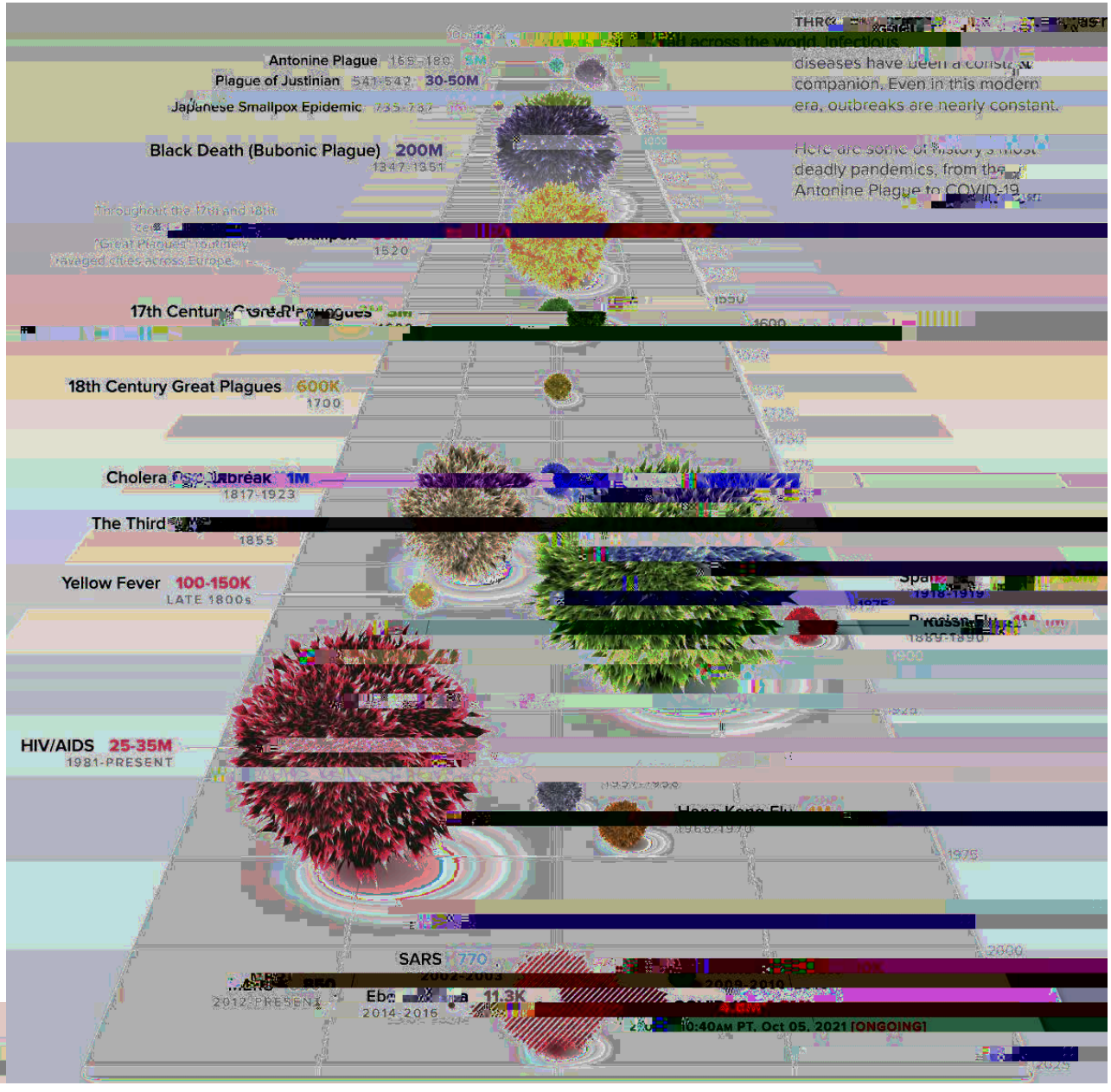
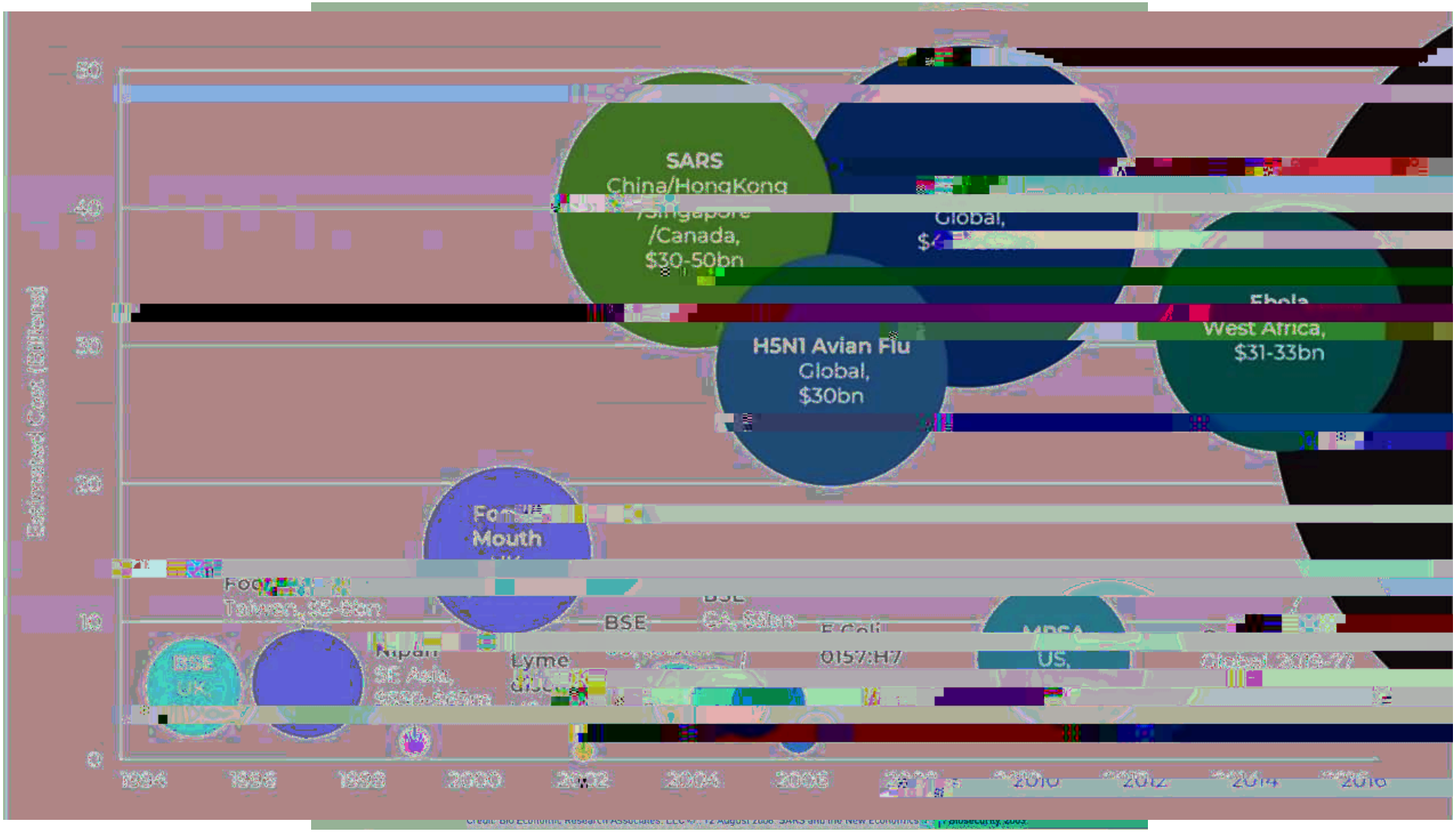
Developing SARS-CoV-2 assays and standards to enable studies of viral host range and vaccine development

Infectious disease pandemics



VISUAL CAPITALIST

Not just a public health impact



Health for Animals (2015)

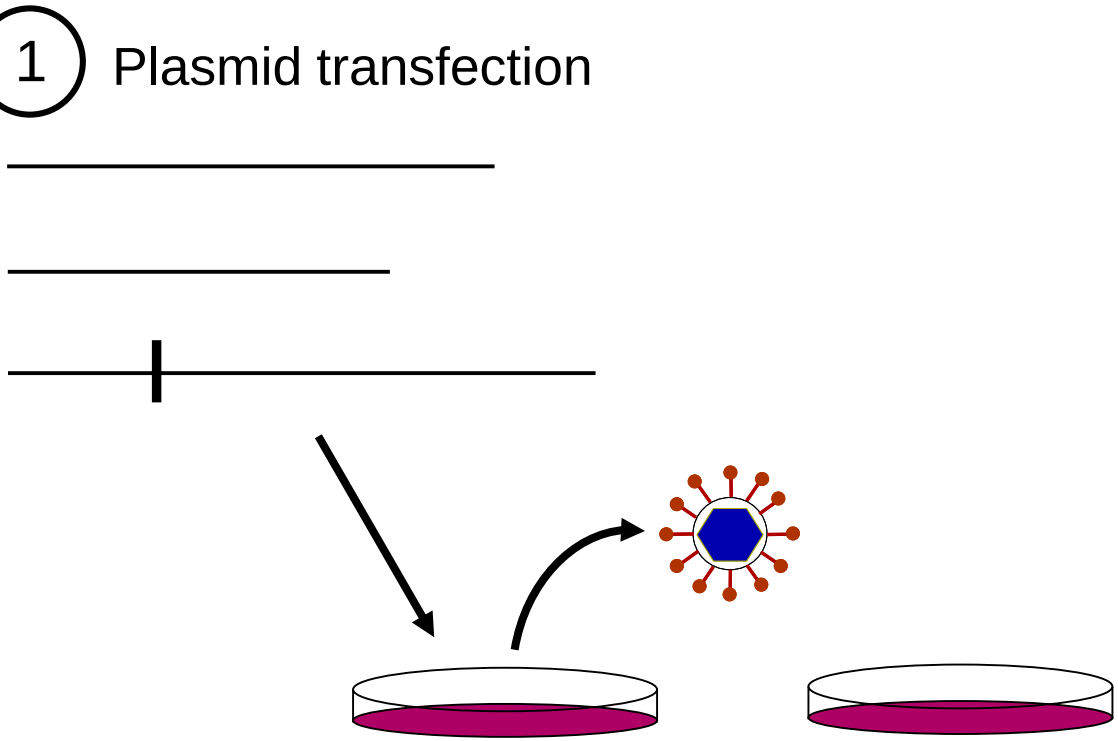
- Generation and characterisation of emerging virus pseudotypes to enable far reaching epidemiology studies, host cell interactions and the development of vaccines and antivirals.

- Sero-epidemiology of filoviruses and henipaviruses in African fruit bats to guide public health interventions.

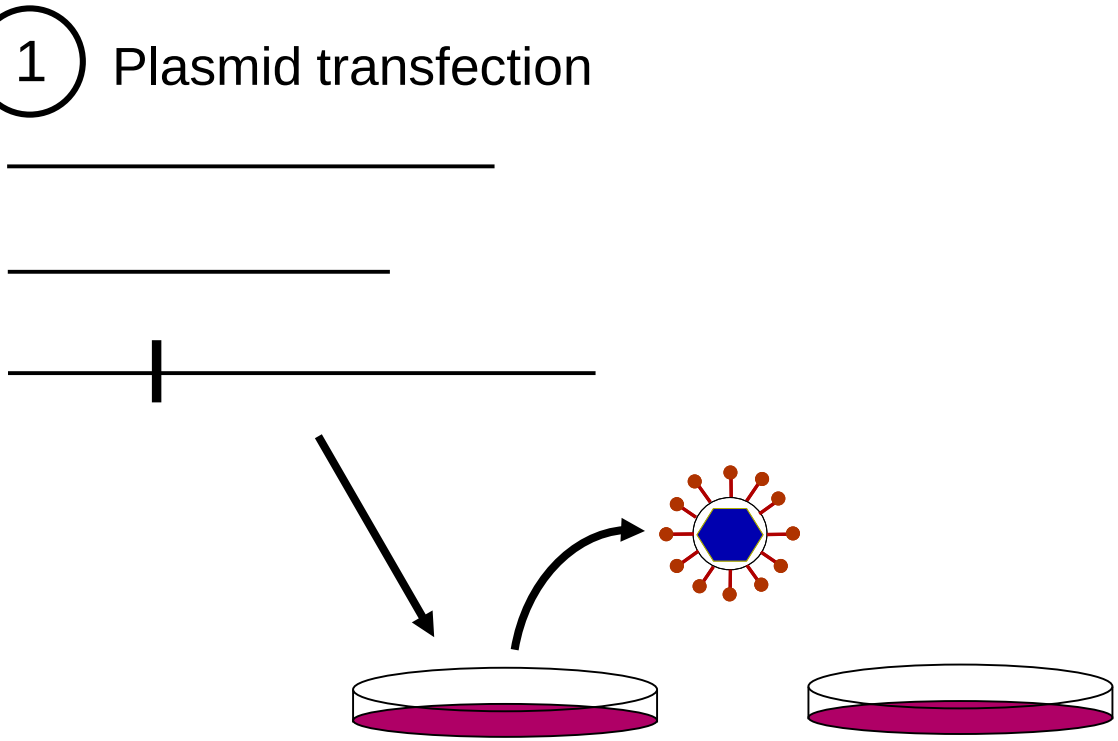
- The study of the immunogenic hierarchy of viral envelope protein (VEP) epitopes to aid the construction of antigenically optimised isoforms.

- Bioinformatic

1 Plasmid transfection



1 Plasmid transfection



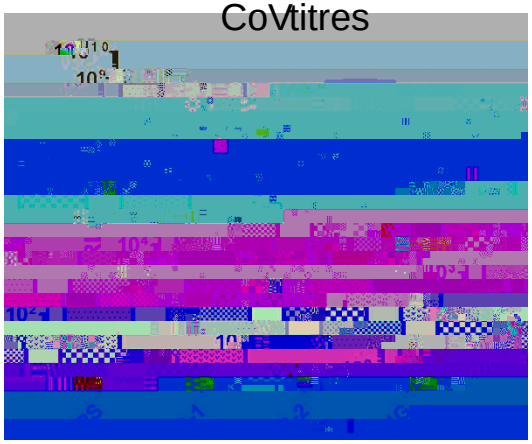
Application of SARS-CoV-2 PV

1. Developing assays and standards

Murray et al. 2021 Journal of Infection
Di Genova et al. 2021 Bio-Protocols
James et al. 2021 Viruses

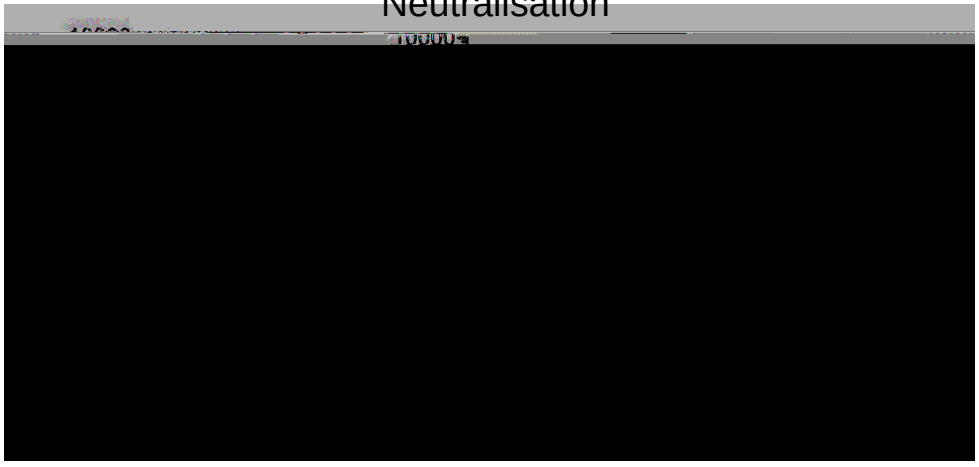
- Pseudotyped viruses [ELISA]

CoVtitres



Correlation with authentic virus neutralisation

Neutralisation

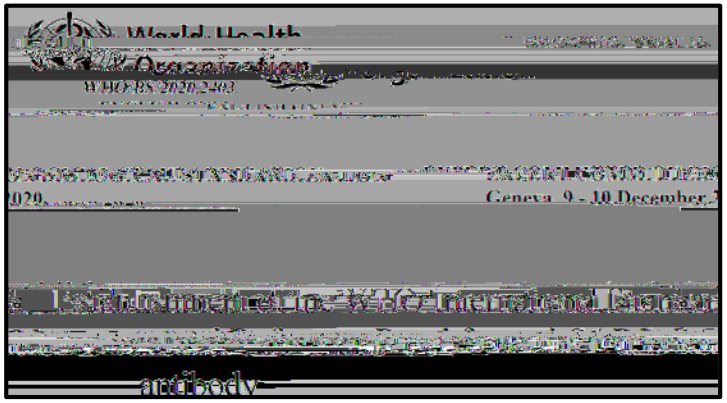


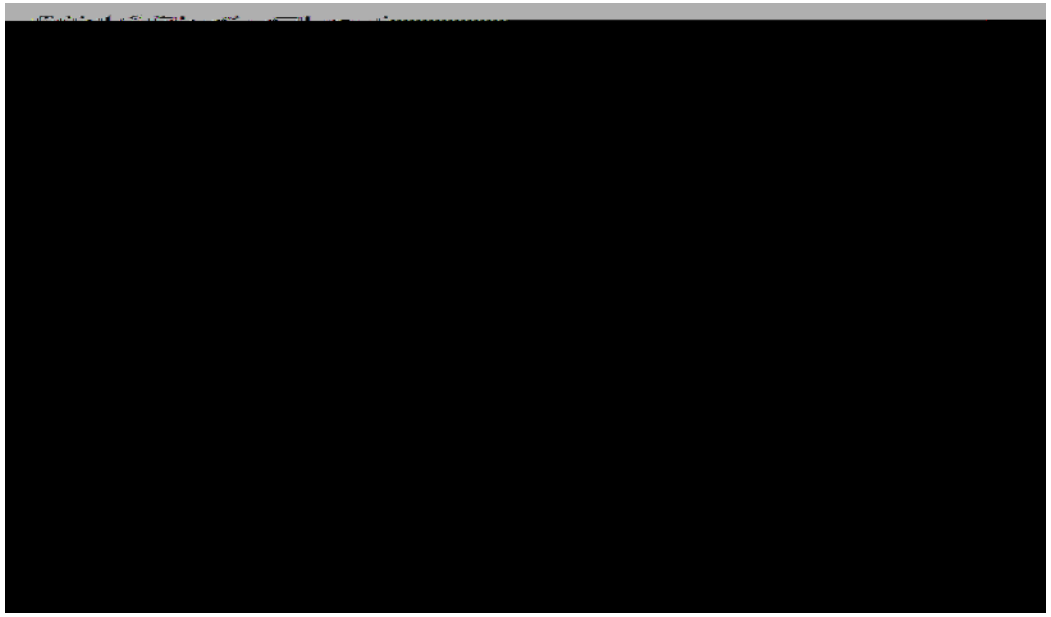
Validation of commercial ‘surrogate’ neutralisation ass

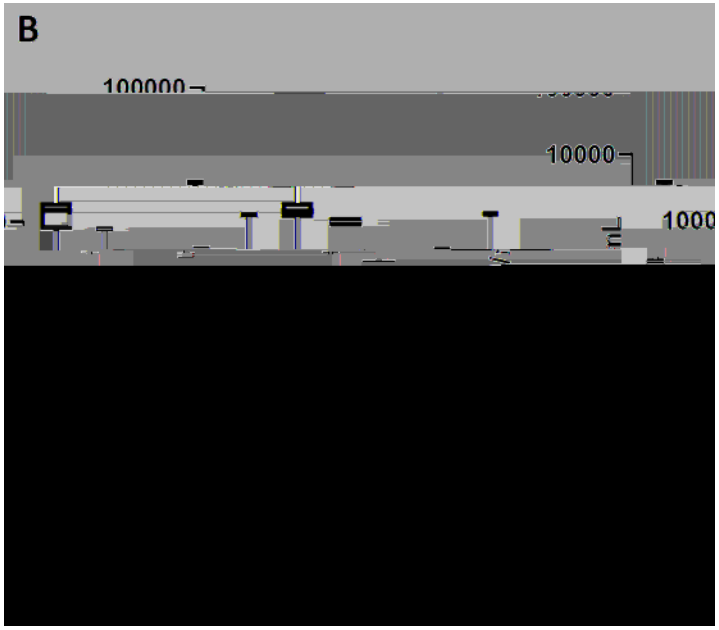
Application of SARS-CoV-2 PV

1. Developing assays and standards

   - Pseudotyped viruses [ELISA]
   - Serological standard [NA]





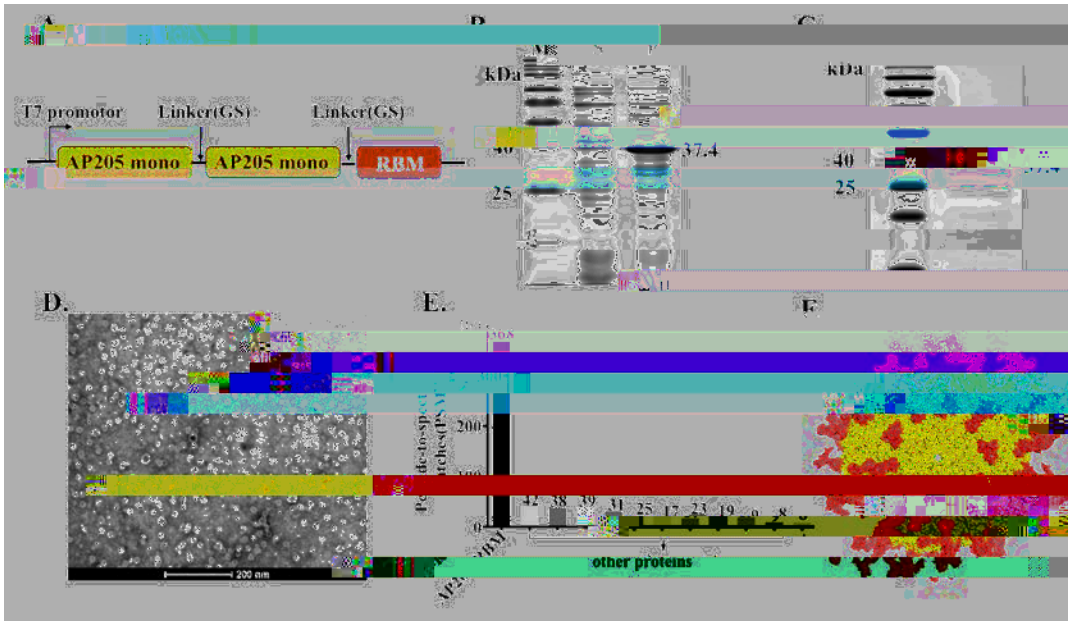


Application of SARS-CoV-2 PV (2)

2. Vaccine development

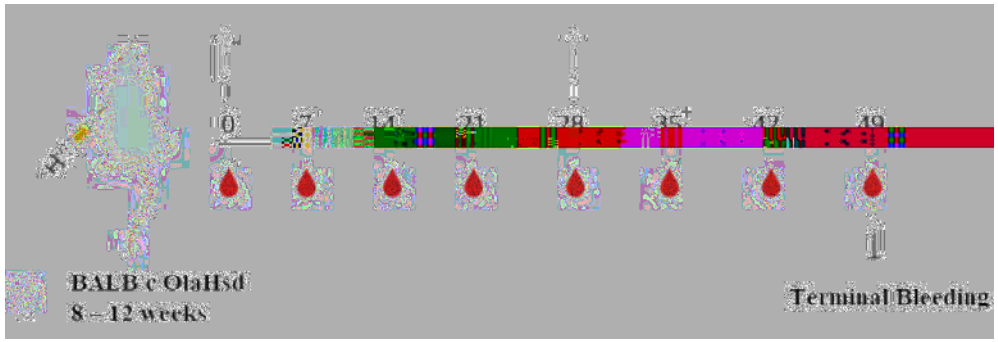
Liu et al. 2021 Vaccines

AP205 RBM VLP based vaccine

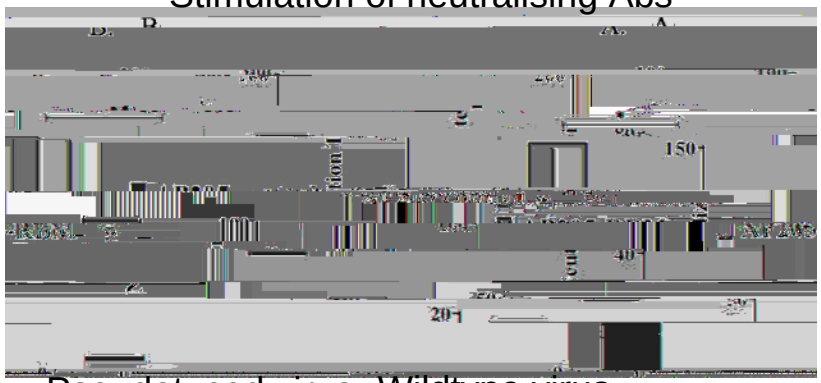


Stimulation of binding Abs

Vaccination and bleeding schedule



Stimulation of neutralising Abs



Pseudotyped virus Wildtype virus

Application of SARS-CoV-2 PV (3)

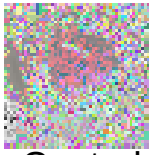
3. Treatment/Entry inhibitor development

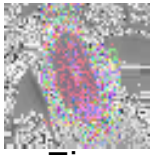
Jose et al. 2021 Submitted

- Small molecule inhibitors

Protease inhibitors

Metal nano-particle polymer membranes


Control


Zinc


Silver

Application of SARS-CoV-2 PV (3)

3. Treatment/Entry inhibitor development

Jose et al. 2021 Submitted

- Small molecule inhibitors
- CRISPR/CAS-9 genomic screen for entry inhibitors

Negative selection CRISPR/PRV screen

SARS-CoV-2 TK PV induced cell death

Application of SARS-CoV-2 PV (4)

4. Animal hosts and tissue tropism

   - VoC reverse zoonosis threat (Dalan Bailey - Pirbright Institute)
   - Infection of blood vessel cells (Catherine Hall,

Lyssavirus -

UNIVERSITY OF SUSSEX
Mariliza Derveni
Beth Auld

Leandro Castellano
Tom Stiff

Luca Biasetti
Catherine Hall