Potential impacts of COVID-19 research on livestock health research and innovation

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The importance of infectious diseases

➢ Animal health
  o Animal diseases cost several $ billions a year
  o Many tropical diseases represent neglected problems

➢ Human health
  o Foodborne disease causes over 2 billion people to fall ill / year
  o Most animal source food in developing countries is sold in wet markets and most is unsafe

➢ Environmental health
  o 75% of new human diseases emerge from animals, many have a wildlife-livestock interface

COVID-19 has re-focussed global attention on infectious diseases
COVID-19 has re-emphasized a need for tools

➢ Health tools required in a disease outbreak
  o Diagnostics to implement bio-security measures to prevent spread
  o Drugs to treat infection or reduce severity of disease and prevent death
  o Vaccines to prevent or reduce severity of disease and prevent death

➢ Vaccination is a cost-effective and sustainable strategy to combat infectious diseases
  o Developing vaccines is a long and risky business, high cost and high failure rates
COVID-19 vaccine technologies being used

- **Genetic vaccines**
  - Pfizer/BioNTech and Moderna (mRNA platforms)

- **Vectored vaccines**
  - AstraZeneca/Oxford (ChAdOx1 platform)

- **Recombinant protein-based vaccine**
  - Novavax (nanoparticle platform)

- **Inactivated pathogen-based vaccines**
  - Sinopharm, Sinovac, Bharat Biotech

- **Live attenuated pathogen-based vaccines**
  - Still in pre-clinical phase
Use of CRISPR/cas and synthetic genomics

Novel live attenuated vaccines

Novel diagnostic tools

Adapted from Gootenberg JS et al., Multiplexed and portable nucleic acid detection platform with Cas13, Cas12a, and Csm6. 2018

collateral trans-cleavage: specific high-sensitivity enzymatic reporter unlocking (SHERLOCK)

Lucilla Steinaa and Elise Schieck, AHH program, ILRI

Nick Svitek, AHH program, ILRI
Potential impact of COVID-19 on livestock health

➢ Increased investment in livestock zoonoses research and control

➢ Use livestock to test novel vaccine technologies for zoonotic diseases

➢ Lead to increased knowledge and research tools for livestock health research *per se*
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