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Thematic portfolio



African swine fever: responding to the global threat



PERSPECTIVES

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No commercial vaccine is available for African swine fever virus (ASFV), which limits control options. This is due to the complexity of the virus DNA genome, which encodes up to 165 proteins and packages about 70 in the multi-layered virus particle.

Inactivated virus preparations have failed to induce protection in pigs against challenge. In contrast, live attenuated vaccine (LAV) candidates can induce high levels of protection. LAVs can be produced by passage of virus in cell culture or by targeted gene deletions, or they may be isolated from the field. Increasing numbers of full genome sequences and understanding of viral gene functions have established that deletion of genes that inhibit the main host antiviral pathway (the type I interferon response) can attenuate virulent virus and induce protection.

Several promising live attenuated vaccine candidates have been identified

Several promising LAV candidates have been identified. These should meet preliminary safety and efficacy standards prior to their scale up and further larger-scale testing. A cell line needs to be identified for this scale up. Required safety criteria include limited clinical signs and virus replication after immunisation and challenge over a defined dose range, and following repetition and overdosing. Efficacy should enable the predicted herd immunity threshold to be achieved. Vaccination of both domestic and wild pigs against ASFV will be needed. Therefore, vaccines should be effective when delivered intramuscularly or orally in baits to wild pigs.

Further research may enable the development of vaccines with an improved safety profile compared with live attenuated vaccines

Protective immune responses and antigens that induce these are poorly characterised. Cellular CD8+ responses are required for protection, but the cell subsets involved have not been described. Transfer of serum from immune to naïve animals induces partial protection. Some targets for neutralising antibodies have been reported, although these are not fully effective. Pools of antigens that induce some protective responses have been identified. Further research may discover an antigen combination and delivery method that induces good efficacy. This could enable the development of vaccines with an improved safety profile compared with LAVs. Vaccines designed with capability to distinguish infected from vaccinated animals would, in the longer term, aid monitoring of vaccination campaigns and establishment of freedom from disease.

<http://dx.doi.org/10.20506/bull.2020.1.3123>

DOSSIER

Vaccines for ASF

Current situation and perspectives

KEYWORDS

#African swine fever (ASF), #African swine fever virus (ASFV), #vaccination, #vaccine.

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