*bulletin*

#2020-1

# PANORAMA

*Thematic portfolio*

## African swine fever: responding to the global threat

**# PERSPECTIVES | # DOSSIER | # AROUND THE WORLD**

www.oiebulletin.com

OIE WORLD ORGANISATION FOR ANIMAL HEALTH
*Protecting animals, preserving our future*

*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.

AUTHORS

L. Dixon[(1)]*, L. Heath[(2)] & J.-M. Sanchez-Vizcaino[(3)]

(1) The Pirbright Institute, United Kingdom.
(2) Agricultural Research Council – Onderstepoort Veterinary Research, South Africa.
(3) Facultad de Veterinaria, Universidad Complutense, Spain.

* Corresponding author: linda.dixon@pirbright.ac.uk




*© Freer Law/Getty Images*

REFERENCES

1. Arias M., de la Torre A., Dixon L., Gallardo C., Jori F., Laddomada A., Martins C., Parkhouse R.M., Revilla Y., Rodriguez F. & Sanchez-Vizcaino J.M. (2017). – Approaches and perspectives for development of African swine fever virus vaccines. *Vaccines (Basel)*, **5** (4), 35. https://doi.org/10.3390/vaccines5040035.
2. European Commission Directorate-General for Health and Food Safety (2017). – Blueprint and roadmap on the possible development of a vaccine for African swine fever prepared by the African Swine Fever EU Reference Laboratory on Commission request. SANTE-2017-10272.

**The OIE** is an international organisation created in 1924 with a mandate from its 182 Members to improve animal health and welfare. Its activities are permanently supported by 325 centres of scientific expertise and 12 regional offices with a presence on every continent.

Follow the OIE: www.oie.int

@OIEAnimalHealth

World Organisation for Animal Health - OIE

OIEVideo

World Organisation for Animal Health

World Organisation for Animal Health (OIE)

Digital version: www.oiebulletin.com

WORLD ORGANISATION FOR ANIMAL HEALTH
*Protecting animals, preserving our future*

12, rue de Prony - 75017 Paris, France
Tel.: +33 (0)1 44 15 18 88 - Fax: +33 (0)1 42 67 09 87 - oie@oie.int