

# No evidence for long-term carrier status of pigs after African swine fever virus infection

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## Summary

This study targeted the assessment of a potential African swine fever virus (ASFV) carrier state of 30 pigs in total which were allowed to recover from infection with ASFV “Netherlands’86” prior exposure to six healthy sentinel pigs for more than 2 months. Throughout the whole trial, blood and swab samples were subjected to routine virological and serological investigations. At the end of the trial, necropsy of all animals was performed and viral persistence and distribution were assessed. Upon infection, a wide range of clinical and pathomorphological signs were observed. After an initial acute phase in all experimentally inoculated pigs, 66.6% recovered completely and seroconverted. However, viral genome was detectable in blood samples for up to 91 days. Lethal outcomes were observed in 33.3% of the pigs with both acute and prolonged courses. No ASFV transmission occurred over the whole in-contact phase from survivors to sentinels. Similarly, infectious ASFV was not detected in any of the tissue samples from ASFV convalescent and in-contact pigs. These findings indicate that the suggested role of ASFV survivors is overestimated and has to be reconsidered thoroughly for future risk assessments.

## KEYWORDS

African swine fever, carrier state, long-term persistence, transmission, virus shedding

## 1 | INTRODUCTION

African swine fever (ASF) is one of the important diseases of pigs worldwide and is notifiable to the World Organization for Animal Health (OIE). The causative agent is African swine fever virus (ASFV), a large double-stranded DNA virus of the genus *Asfivirus* within the *Asfarviridae* family (Takamatsu et al., 2011). It is the only known arthropod-borne (ARBO) virus with a DNA genome, in this case, soft ticks of the *Ornithodoros* genus (Penrith, 2009).

The disease is endemically present in several countries of sub-Saharan Africa and on Sardinia. Moreover, an unresolved disease cluster is found in Eastern Europe and the Caucasus region. Following the introduction of ASF into Georgia in 2007, the disease has spread into several Trans-Caucasian countries, the Russian Federation, Belarus and Ukraine. In 2014, the disease reached the Eastern Borders of the European Union, and as of today, the Baltic Member States, Czech Republic and Poland are affected, especially in the wild

boar population. Most recent outbreaks affected also Moldova and Romania (OIE WAHID interface, visited online 11 November 2017).

The causative virus strains in Eastern Europe and the Caucasus region are of genotype II and showed a high virulence for both domestic pigs and European wild boar under experimental conditions (Blome, Gabriel, Dietze, Breithaupt, & Beer, 2012; Gabriel et al., 2011; Gallardo et al., 2015a; Guinat et al., 2016; Mur et al., 2014; Nurmoja et al., 2017; Pietschmann et al., 2015). Given the high lethality in all age classes, disease dynamics could have shown self-limitation after introduction into the wild boar population. This behaviour was seen previously on Sardinia (Laddomada et al., 1994) and in Spain (Perez et al., 1998), but up to now not in the Baltic Member states. Explosive spread based on both the high tenacity and contagiousity could have been an alternative option. In the end, neither happened (Depner et al., 2016), and at present, numerous new cases are reported from a quite stable geographical region every week, an endemic cycle was apparently established within the affected wild