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Three-week post-vaccination efficacy of the CSF CL strain produced on ovine cell line against a virulent classical swine fever (Hog cholera) challenge

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Introduction
Classical swine fever (CSF) is a highly contagious viral disease classified as a notifiable pig disease by OIE. In an infected environment, vaccines are the basic tools for control and eradication of CSFV. This study aimed at assessing the efficacy of an attenuated CSF CL strain produced on ovine cells against a virulent CSF challenge performed three weeks post-vaccination.

Materials and Methods
Two groups of 8 CSF-negative crossbred pigs weighing 18 kg were either vaccinated with a live one dose of CL strain (>100 PD_{50}/dose) or left unvaccinated. Three weeks post-vaccination, they were challenged with 5.5log10 $TCID_{50}$ CSFV of Haiti-96 strain both intramuscularly and intranasally with separated aliquots. Clinical signs, rectal temperature were monitored for 28 days post-challenge (DPC) and necropsied. Blood samples, nasal swabs and tonsil scrapings were regularly collected and assayed for blood formulation, sera antibody titres (E2-E^{rms} ELISAs, SN titrations), and viral loads in total blood, nasal and tonsil mucus.

Results
Following 5-6 incubation days, all controls showed typical acute CSF. Two of them were euthanized on ethical ground. They also developed severe leukopenia and lymphopenia. Necropsic lesions were evocative of chronic form of CSF. None of the vaccinates developed any sign of CSF. In controls, CSFV viremia was detected from 5 DPC reaching levels above 6log10 $TCID_{50}$/mL from 6 DPCH to 11 DPCH. Tonsils were positive for CSF as well from 5 DPCH and viral sheddind in nasal mucus could reached more than 4log10 $TCID_{50}$/mL. Vaccinates showed drastically (P<0.001) reduced viremia with overall mean titer of 1.7log10 $TCID_{50}$/mL and no detectable CSFV in tonsils or nasal mucus. Vaccinates showed low levels of seroneutralizing antibodies and neither E2 nor Erms antibiodies before challenge. Following challenge seroconversion was significantly (P<0.05) faster in vaccinates.

Conclusion
Viral circulation in herds relies mainly on direct nose-to-nose contacts and in-utero transmission. The ability of vaccines to limit CSFV transmission is vital for control and eradication strategies. Under the conditions of the study, the CL strain was able to totally prevent CSF, drastically limit viremia and abolished CSFV shedding through oro-nasal route. Total protection despite absent to low antibody levels suggested a major contribution of cell-mediated immunity to protection.

Keywords: classical swine fever, vaccination, transmission

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