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Serological Profiles of Pigs Consecutively Challenged with an American and a European strain of the Porcine Reproductive and Respiratory Syndrome Virus

P.J.G.M. Steverink, J.M.A. Pol
DLO-Institute for Animal Science and Health Research
P.O. Box 65, NL-8200 AB, Lelystad, the Netherlands

Introduction Since the identification of Lelystad virus as the causative agent of Porcine Reproductive and Respiratory Syndrome (PRRS), various serological tests have been developed. This has led to the recognition that PRRS virus infections are widespread in pigs in Europe, and are associated with economic losses and increases in costs of pig production. Although PRRS virus strains may have identical properties, it is known that isolates from the U.S.A. and Europe differ substantially on the genome level (1). Furthermore, in the field they give rise to distinct immunological responses dividing isolates into a European and a US group (2). Until now only European strains were isolated from field cases of PRRS in Europe. Consequently, only European types of antibodies could be detected in field sera by the immunoperoxidase monolayer assay (IPMA). As recently a Modified Live vaccine was introduced in Europe based upon an American strain (VR2332; Ingelvac PRRS-MLV®, Boehringer Ingelheim, Ingelheim, Germany), we were interested in evaluating the antibody-differentiating properties of the IPMA in the presence of both an American and a European strain. Therefore we determined the serological profiles of pigs after consecutively being challenged with an American and a European strain of PRRSV under experimental conditions.

Materials and Methods Ten-week-old SPF-pigs (n=20), were randomly divided into 4 groups. Group 1: intramuscularly (2 mL) challenged with a US-strain (VR2332, $10^{4.9}$ $TCID_{50}$/mL) on day 0 (=D0), and after 28 days (=D28 of the experiment) intranasally (2 mL) re-challenged with the Dutch-strain LV-tH (10^5 $TCID_{50}$/mL); Group 2: challenged with VR2332 on D0; Group 3: challenged with LV-tH on D28; Group 4: sentinels.
On the day of the LV-tH challenge (=D28), group1 was mixed with group 2, and group 3 was mixed with group 4. Seroconversion was detected in all groups by an IPMA using a Dutch strain (EU-IPMA) and an American strain (US-IPMA) on the following days: Prior to the start of the experiments (D0), on D28 (LV-tH challenge), on D42 and on D56.

Results No clinical signs could be detected in any of the animals. Table 1 shows the mean antibody titres in the four groups.
No PRRS virus directed antibodies could be detected in any of the pigs before being challenged.
In group 1 and 2, US-IPMA titres are higher than or even to the EU-IPMA titres at all time-points. In group 3 and group 4, EU-IPMA titres exceeded US-IPMA titres at all time-points post challenge.

Conclusion In naive animals both the EU and the US-IPMAs were able to differentiate between EU and US types of antibody, indicating an infection with either a European type or an American type of PRRSV. When both serotypes are present in a herd, the IPMA is not suitable for use as a differential test at certain timepoints after challenge therefor, as the exact time of challenge with a slow spreading virus like PRRS will not be known under field conditions, the properties of the differential IPMA have limited value under field conditions.

Table 1.

	EU-IPMA				US-IPMA			
Group	D0	D28	D42	D56	D0	D28	D42	D56
1	<1:10	1:160	1:2560	1:10240	<1:10	1:10240	1:10240	1:10240
2	<1:10	1:160	1:640	1:10240	<1:10	1:2560	1:10240	1:10240
3	<1:10	<1:10	1:2560	1:10240	<1:10	<1:10	<1:10	1:640
4	<1:10	<1:10	1:640	1:2560	<1:10	<1:10	<1:10	1:640

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