

Success of Porcine circovirus eradication in specific pathogen free miniature pig herd by repeated vaccination

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Introduction

Porcine circovirus type2 (PCV2) is causative pathogen for PCVAD (porcine circovirus-associated disease). For the research of pathogenicity and etiology, PCV2 free herd is necessary. Furthermore, PCV2 must be eradicated to be a source animal for xenotransplantation. White Yucatan miniature pigs are bred for xenotransplantation. The International xenotransplantation association (IXA) defined the 76 virus to eradicate for being source animal in 2009. PCV2 is not dangerous pathogen for human, but it is undesirable because it indicates a breakdown in biosecurity and/or may compromise health of the pigs. Unfortunately, as the PCV2 is transferrable disease through the placenta, it is very difficult to eradicate.



Materials and Methods

Optipharm imported miniature pigs from Sinclair Research Center (MO, USA) in 2007. All miniature pigs were maintained in barrier facility with HEPA filtered AHU (air handling unit). The imported miniature pigs were antigen and antibody positive for PCV2. From 2008 PCV2 eradication program was designed. To eradicate PCV2 in sows at first, PCV2 commercial vaccines were inoculated four times to 83 miniature pigs. The Synbiotics PCV2 antibody ELISA kits were used for PCV2 antibody analysis.



Fig 1. White Yucatan Miniature Pigs and barrier facility.



Results

The last PCV2 antigen was detected in June 24, 2009. After that, PCV2 antigen was disappeared in all sows and piglets. But antibody was still positive. After maternal antibody was decayed, no seroconversion was observed. It took average 140 days that maternal antibody was disappeared. Since 2009 PCV2 vaccination was stopped. Although the PCV2 virus was disappeared but still vaccinated sows are producing the piglets, maternal antibodies are still detected. Since 2012, all sows and piglets became serologically negative for PCV2. Finally all miniature pigs became PCV2 naïve herd.

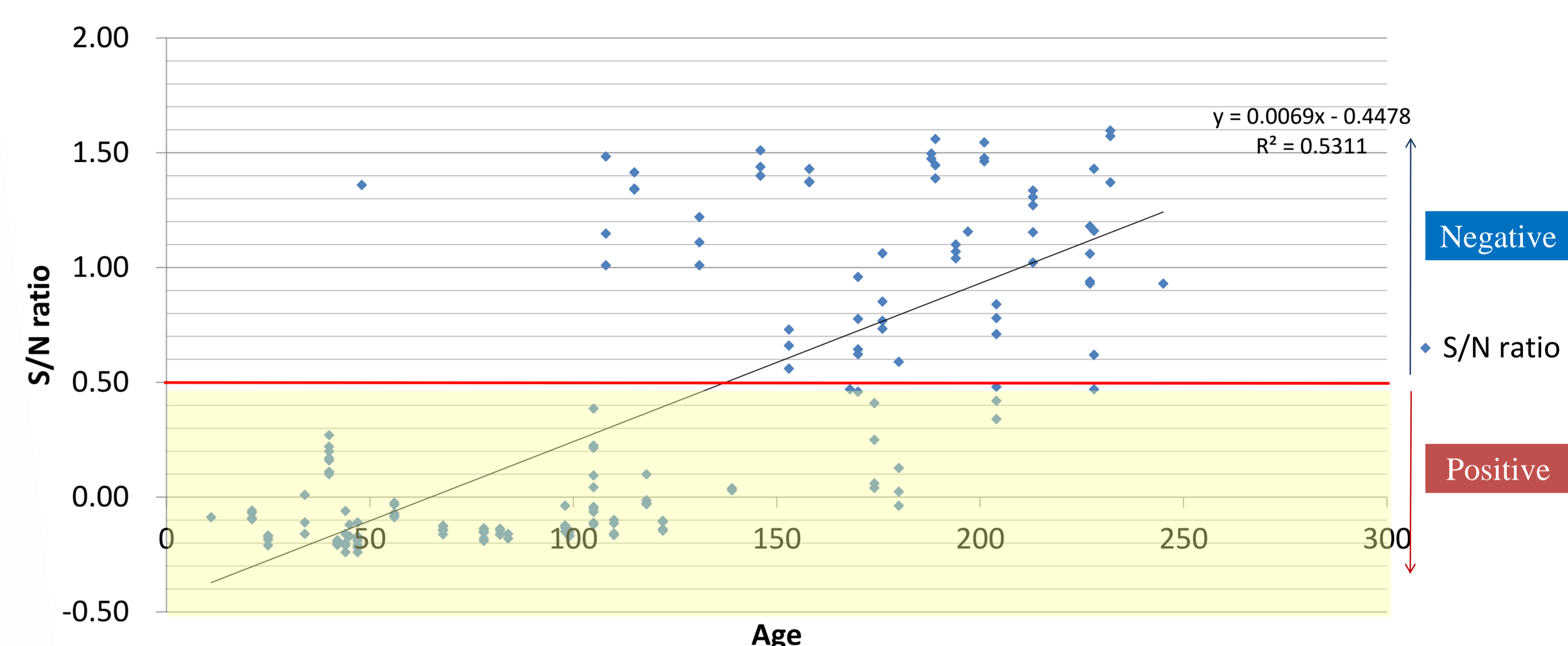


Fig 2. The Synbiotics PCV2 antibody ELISA kits were used for PCV2 antibody analysis.

Serological and PCR Antigen Test Result							
(Zip code) 28158 63, Osongsaengmyeong 6-ro, Osong-eup, Heungdeok-gu, Cheongju-si, Chungcheongbuk-do, Korea Tel. +82-43-249-7500 Fax. +82-43-249-7535							
Receipt data	October 16th, 2015			Client Information	Optipharm, Inc. (Soobin Hyeon)		
Sample information	Blood 31ea			Farm Information	Medpig Business Unit		
Sample No.	PCV2			Sample No.	PCV2		
	Serological Test	PCR Antigen Test			Serological Test	PCR Antigen Test	
	S/N ratio	Result	Result		S/N ratio	Result	Result
W15-122	0.55	Negative	Negative	W15-209	0.56	Negative	Negative
W15-123	1.03	Negative	Negative	W15-210	0.90	Negative	Negative
W15-124	0.75	Negative	Negative	W15-211	0.74	Negative	Negative
W15-125	0.80	Negative	Negative	W15-212	0.78	Negative	Negative
W15-178	0.93	Negative	Negative	W15-213	1.11	Negative	Negative
W15-179	0.75	Negative	Negative	W15-214	0.89	Negative	Negative
W15-180	0.72	Negative	Negative	W15-215	0.88	Negative	Negative
W15-181	0.73	Negative	Negative	W15-216	0.81	Negative	Negative
W15-182	0.70	Negative	Negative	W15-217	0.78	Negative	Negative
W15-183	0.65	Negative	Negative	W15-218	0.77	Negative	Negative
W15-196	0.70	Negative	Negative	W15-219	0.78	Negative	Negative
W15-197	0.69	Negative	Negative	W15-220	0.80	Negative	Negative
W15-198	0.99	Negative	Negative	W15-221	0.76	Negative	Negative
W15-199	0.79	Negative	Negative	W15-222	0.80	Negative	Negative
W15-200	0.73	Negative	Negative	W15-223	0.77	Negative	Negative
W15-201	0.76	Negative	Negative				
Method: Blocking ELISA				KIT: SYNBIOTICS		Interpretation: Less than 0.5 - Positive	

Table 1. PCV2 antibody and antigen analysis.



Conclusion

Repeated commercial vaccine inoculation made it possible to eradicate PCV2 in SPF facility. As the SPF facilities are maintained with HEPA filter filtrated air and density of pigs are very low compared to general commercial pig farms. But in this experiment, we proved that PCV2 can be eradicated with just repeated commercial vaccine inoculation. The successful eradication of PCV2 makes it possible to evaluate PCV2 vaccine efficacy exactly without indirect effect of humoral immunity induced by PCV2. Additionally, by monitoring the PCV2, it can be indicator for a sign of breakdown in SPF biosecurity system.