

Development and Validation of a *Streptococcus suis* Serotype 2 Meningitis Challenge Model In Weaner Piglets

Introduction

S. suis is an α -hemolytic streptococci of major importance to the pig industry due to the economic impact of disease outbreaks, with prevention and control as well as the welfare implications for infected herds. A total of 35 serotypes have been described of which serotype 2 has been identified as being responsible for the majority of the infections in diseased pigs in most countries. A validated serotype 2 challenge model would facilitate efficacy testing of novel vaccines and therapeutics.



Materials and Methods

Sixteen weaner pigs (of approximately 4 weeks of age) were housed in two groups in separate pens. All animals were observed by a veterinarian on Day -1 for suitability for inclusion on the study.

On Day 0, a clinical observation was carried out on all animals, prior to sample collection, and then each animal was administered 5ml of

1% acetic acid by intranasal application. One hour later one group of animals (n=5) was administered 5ml of saline by the intranasal route while the remaining group (n=11) was inoculated with 5ml of a recent UK field isolate of *S. suis* again by intranasal application.

Post challenge, clinical observations were carried out and consisted of assessments of demeanour, faecal consistency, body condition and rectal temperature ($^{\circ}$ C). Additional observations relating to behavioural or neurological problems were also recorded.

Any animals which were observed as showing unacceptable levels of disease following challenge were euthanased on welfare grounds and a necropsy performed. Necropsies were performed on all remaining study animals following clinical observation on Day 7. Brain and tonsil tissues were removed for bacteriological analysis.

Results

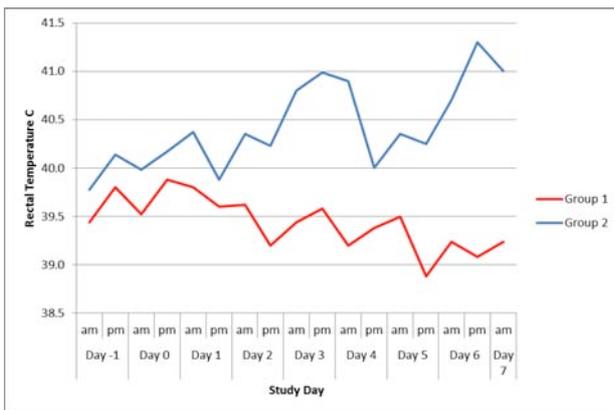
The first clinical signs in the *S.suis* challenged animals were observed between 36 and 48 hours post challenge and were characterized by initial pyrexia (see Fig.1), quickly followed by nervous signs such as reduced coordination, unsteadiness, and some lameness. Over a period of 12 to 24 hours, the severity of the

www.moredun-scientific.com

nervous signs increased until animals were unable to stand. These signs are consistent with a field type infection.

The challenge success rate (i.e. number of animals that are challenged which went on to develop clinical disease) was in excess of 90% with 10 of the 11 challenged animals euthanased on welfare grounds. *S.suis* was recovered from all of these animals. The remaining animal had no signs of clinical disease and no bacteria were recovered within the study timeframe. No control animals were observed to have clinical disease during the study.

Figure 1. Group mean rectal temperature



Conclusions and Discussion

The study demonstrated that the intranasal challenge is reproducible and consistent with a low level of variability between animals and will be applicable in the testing of veterinary medicinal products to control and prevent *S.suis* infection in pigs. The clinical signs and progression of disease were consistent in the animals (although there was a delay in onset of signs observed in some of the animals from of up to 5 days post challenge).



Contact Us

Moredun Scientific offer validated experimental disease models for a range of porcine pathogens including *Actinobacillus pleuropneumoniae*, *Salmonella* species and *Streptococcus suis* which are used with clients for efficacy studies for vaccines and therapeutic agents.

We have GLP accredited animal and laboratory facilities and an independent Quality Assurance department to ensure all studies are conducted to the required quality standards.

Please contact us for further details or to discuss your specific requirements:

Email: info@moredun-scientific.com

Tel: +44 131 445 6206

Moredun Scientific
Pentlands Science Park
Bush Loan
Penicuik
EH26 0PZ
Scotland

www.moredun-scientific.com