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SERUM ANTIBODIES TO *E. COLI* IN PIGLETS

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Introduction

The aim of this study was to develop an ELISA to monitor antibodies to *E. coli* in general, and to validate potential to collect valuable epidemiological information about this ubiquitous microbe by measuring serum antibodies.

Materials and methods

The ELISA was designed from six strains of *E. coli* expressing different adhesion factors and toxins as shown in Table 1. To stimulate expression of the adhesion factors the strains were grown on sheep blood agar plates in 37°C for 18 h. From each plate the whole growth was harvested in 2 ml PBS without Ca, Mg pH 7.4. The suspension was thereafter sonicated for 5 min in batches of 8 ml, following centrifugation in 12,000 g for 20 min at +4°C. The liquid phase was diluted 1/ 20,000 in Coating buffer pH 9.6 when used as antigen. Each well was coated with 100 µl of the antigen and analysing sera diluted 1/1,000 was added. Positive and negative control sera were included on each micro titer plate.

Table 1. Strains included in the antigen

Strain ID	Serotype	Fimbriae	Toxins
Bd 1107/75	O8	F4	LT, STa, STb
Bd 218/84	O64	F41	STa, STb
Bd 3437/84	O101	F5	STa
Bd 2027/75	O141		VT2, STb
Bd 2401/84	O147	F4	STb
853/67	O149	F4	LT, STa, STb

To establish a base line and to monitor the maternal immunity to *E. coli* infections, blood was collected from 3 three-day old piglets in 95 litters (n = 285 piglets) in a herd with a high health status. These results obtained were also correlated to treatments of lameness and diarrhoea in these litters.

To monitor whether weaners were able to mount a serological response to *E. coli*, blood was also collected from piglets weaned at 35 days of age and exposed to pathogenic strains of *E. coli*. Each group comprised six pigs and blood was collected 14 days post weaning (**1**).

Results

The mean absorbance of the 285 piglets aged 3 days was 1.44±0.52 and ranged from 0.03 to 2.70 (Fig 2). Littermates were always similar with respect to amounts of serum antibodies to *E. coli*, and the age of the dam had no influence (the parity number 1 - 9, and mean absorbance per category ranged from 1.2±0.5 to 1.7±0.4).

No influence of antibody levels to *E. coli* was recorded with respect to diarrhoea or lameness. However, diarrhoea was only recorded in 3 out of the 95 litters, and *E. coli* was only demonstrated in 3 out of 100 cultures from joints with arthritis at this time.

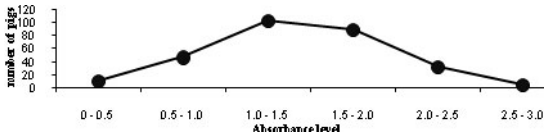

Fig 1. The distribution of absorbance levels of antibodies to *E. coli* in 285 three day old piglets

The absorbance levels of serum antibodies to *E. coli* in weaners exposed to *E. coli* at weaning is shown in fig 2. Pigs exposed to three different serotypes of *E. coli* clearly seroconverted in the ELISA, whereas the absorbance values in pigs exposed to only one pathogenic strain of *E. coli* did not differ from that of the control pigs.

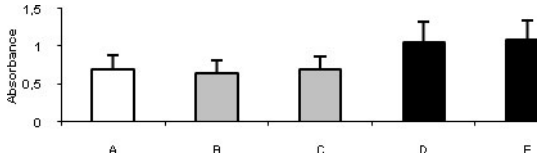

Fig 2. Absorbance levels of serum antibodies to *E. coli* 14 days post weaning in control pigs (A) and exposed to *E. coli* O149 (B, C) or *E. coli* O149, O141 and O147 (D, E) at weaning. Groups C and E were also exposed to ACTH aiming to imitate stress

Discussion

The immune system of piglets is immature and weaning is considered to be an event of potential danger. Therefore it was interesting that piglets weaned at an age of 35 days obviously were able to mount an immune response to an *E. coli* challenge. However, the absence of response when exposed to a single strain of *E. coli* still indicates an immature immune system.

As *E. coli* is ubiquitous, a baseline related to age and health status is crucial if this ELISA is to be used. The result obtained showed a great difference in the sow-dependant maternal immunity, which could mirror a different resistance to neonatal diarrhoea between litters. However, this must be scrutinised in herds with *E. coli* related neonatal diarrhoea. Possibly the level of maternal antibodies could mirror the efficacy of vaccines used to prevent neonatal diarrhoea.

References

1. Melin, L., et al (2004). J. Vet. Med. B. 51:12-22