

Brief Communication

THE DETECTION OF THE 987 P ANTIGEN IN ESCHERICHIA COLI ISOLATED FROM PIGLETS WITH DIARRHOEA

It is well established that fimbriae on enterotoxigenic *E. coli* are responsible for the adhesion of the organism to the epithelial cells of the small intestine of pigs. So far the fimbrial antigens K88 and K99 have been demonstrated in pigs in Norway, K88 being the most common.

A third fimbrial antigen, the 987 P antigen, which also shows adhesive properties with regard to the epithelial cells of the small intestine of pigs, may be difficult to demonstrate. This is because most bacterial strains *in vitro* are present mainly in a non-fimbriated phase. However, organisms possessing this property have the ability to revert to the fimbriated phase *in vivo* (Nagy *et al.* 1977).

The following is a report on the first demonstration of this antigen in an *E. coli* strain isolated from neonatal pig diarrhoea in Norway.

A sample of the small intestinal contents from a necropsied 10 day old piglet was streaked onto a blood agar plate (7 % bovine blood) and incubated overnight.

From this plate, eight colony forming units were subcultivated onto Minca-medium and trypticase soya broth (TSB) containing 1 % α -methyl-mannoside. A further subcultivation was performed from the TSB onto Slanetz medium.

In all cases, incubation was carried out at 37°C in an atmosphere of 5—10 % CO₂. The broths were incubated statically. Pellicle formation was taken as an indication of the possession by the strain of fimbriae-producing properties (Duguid 1959).

Fimbriae were determined using the slide-agglutination test with known antisera. The antisera were of rabbit origin, and fimbriae from the strain O149: K88: H10,0101: K99: H-, and 09: K103: H-987 P were used for immunisation.*

*All three strains were kindly supplied by Drs. Ida and Frits Ørskov, Denmark.

A pure culture of anhemolytic *Escherichia coli* was found on the primary blood agar plate. All 8 colony forming units involved in this study were found to be K88 and K99 negative.

After 72 h of incubation a thick pellicle had developed on the surface, and a loose sediment at the bottom of 4 of the TSB broth tubes. The broth in all 8 tubes was diffusely opaque. A large number of the colony forming units produced after subcultivation of the pellicle material on Slanetz medium gave positive reactions in the slide agglutination test with the 987 P antiserum. The positive reaction still persisted after several subcultivations on Slanetz medium.

One of the 987 P positive strains was freeze-dried and sent to Drs. Ida and Frits Ørskov at the International *Escherichia* and *Klebsiella* Center, Denmark for further typing. Here the strain were determined to be 020:K101:H-. The 987 p antigen has not been detected so far.

The fimbrial antigen 987 P is most commonly found in the *E. coli* serogroups 09, 020, and 0141. The strain described in this report belonged to the serogroup 020 and agglutinated in the slide test with the 987 P antiserum. It must therefore be assumed to have possessed the 987 P fimbrial antigen, but to have lost this characteristic during freeze-drying. This is the first time that this antigen has been demonstrated in Norway.

The piglet from which the strain was isolated came from a farm in which neonatal piglet diarrhoea had previously not been a problem. However, the death of this piglet was one of several which occurred at the neonatal and suckling stage during a short period.

It has recently been reported that the 987 P fimbriae are the most common type 2 fimbriae in *E. coli* isolated from pig intestines in the USA (*Brinton Jr. et al.* 1983). No indication was given in this study of the *E. coli* serogroups in which the fimbriae were found. However, *Nagy et al.* (1977) reported, also from the USA, that among 119 enterotoxigenic *E. coli* belonging to the serogroups 09,020 and 0101, 50 % of the 09 and 14 % of the 020 produced the 987 P antigen. None of the strains from the serogroup 0101 produced 987 P.

In a Norwegian study, 235 strains of *E. coli* from neonatal pig diarrhoea were serogrouped (*Lund et al.* 1982). The serogroups 09 and 0141 were represented by 2 strains each. The sera used for testing did not encompass serogroup 020, and altogether 70

strains remained unidentified. Of the 235 strains investigated, 81 strains were found to have K88 fimbriae and 12 strains to have K99 fimbriae. The presence of 987 P was not investigated.

It seems reasonable to suppose that 987 P might in fact be more commonly associated with cases of neonatal pig diarrhoea than hitherto been reported. This is because routine investigation with respect to 987 P antigen is laborious and seldom seems to be carried out, and because special cultivation techniques are often required if the bacteria are to produce the antigen *in vitro*. Furthermore, as the strains tend to go into a non-fimbriated phase *in vitro*, the antigen might be difficult to demonstrate, in spite of special cultivation techniques. In the reported case, freeze-drying of the strain for transport to another laboratory seems to have resulted in the organism ceasing to form fimbriae, at least *in vitro*.

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